



National Flood Insurance Program

Final Nationwide Programmatic Environmental Impact Statement

APPENDICES

Action Agency:

Federal Emergency Management Agency

Cooperating Agency:

U.S. Environmental Protection Agency

September 2017



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APPENDIX A. ENVIRONMENTAL LAWS AND REGULATIONS

The proposed implementation of the project must meet the requirements of National Environmental Policy Act (NEPA) and other applicable Federal laws and regulations, Executive Orders, and implementing guidance. The National Flood Insurance Program (NFIP) Programmatic Environmental Impact Statement (PEIS) addresses these requirements, as applicable. Titles are listed alphabetically.

Table A-1. Applicable Laws and Regulations and Executive Orders

Title	Description
Laws and Regulations	
Bald and Golden Eagle Protection Act (16 United States Code [U.S.C.] § 668 et seq.)	Prohibits the take, possession, sale, purchase, barter, or offer to sell, purchase, or barter, export, or import any part of a bald eagle or golden eagle.
Clean Air Act (CAA) (42 U.S.C. §§ 7401-7671g)	Protects air quality; authorizes the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for six "criteria pollutants" that threaten human health and welfare: carbon monoxide (CO), nitrogen dioxide (NO ₂), ozone (O ₃), sulfur dioxide (SO ₂), particulate matter with a diameter equal to or less than 10 microns equal (PM ₁₀) or less than 2.5 microns (fine particles) (PM _{2.5}), and lead (Pb). The CAA includes provisions for reducing soil erosion to preserve air quality.
Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.)	Protects water quality; aims to restore and maintain the chemical, physical, and biological integrity of "waters of the United States." Section 320 of the CWA establishes the National Estuary Program, identifying nationally significant estuaries threatened by pollution. Section 404 of the CWA deals with prohibition and permitting for discharge of dredged or fill material into waters of the United States.
Coastal Barrier Improvement Act of 1990 (CBIA) (Public Law [P. Law] 101-591)	Amended the Coastal Barrier Resources Act to include the designation of otherwise protected areas (OPAs), which applies to the national, state and local areas that include coastal barriers held for conservation or recreation. OPAs are generally comprised of lands held by a qualified organization primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purpose. The only Federal spending prohibition within OPAs is the prohibition on Federal flood insurance. (USFWS, 2015a)
Coastal Barrier Resources Act of 1982 (CBRA) (P. Law 97-348)	Protects sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines, as well as Puerto Rico and U.S. Virgin Island. The CBRA encourages the conservation of hurricane prone, biologically rich coastal barriers by restricting federal expenditures that encourage development, such as federal flood insurance. Areas within the CBRS can be developed provided that private developers or other non-federal parties bear the full cost.

Title	Description
Coastal Zone Management Act of 1972 (CZMA) (16 U.S.C. §§ 1451-1464)	Establishes a national policy to preserve, protect and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone, which includes the coastal waters and the adjacent shorelines of islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and the Great Lakes. Encourages States to exercise their full authority over the coastal zone. Development projects in the coastal zone must, to the maximum extent possible, be consistent with a State's coastal zone management program.
Comprehensive Environmental Responsibility, Compliance, and Liability Act (CERCLA - Superfund Law) (42 U.S.C. § 9601)	Authorizes the EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. EPA is required to establish criteria for determining priorities among releases or threatened releases of hazardous substances for the purpose of taking remedial action.
Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 Code of Federal Regulations [C.F.R.] Parts 1500-1508)	Provides direction to ensure compliance with procedures to achieve the goals of NEPA. Public officials are able to make decisions based on understanding of environmental consequences, and take actions to protect, restore, and enhance the environment.
Endangered Species Act of 1973 (ESA) (16 U.S.C. §§ 1531–1543, as amended)	Requires Federal agencies to conserve and protect threatened and endangered species. Consultation under Section 7 of the ESA is required to determine if an action that is authorized, funded, or carried out by a federal agency will jeopardize the continued survival of threatened or endangered species or adversely modify designated critical habitat. Section 9 of the ESA, which applies to both private and federal actions, prohibits the taking of ESA species. Take is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capture, or collection of ESA species, or attempting to engage in any such conduct. Section 10 of the ESA provides exceptions to the Section 9 prohibitions. Section 10(a)(1)(B) of the Act allows non-Federal parties to apply for an incidental take permit for activities that could result in the incidental taking of ESA-listed species. The application must include a habitat conservation plan (HCP) that lays out the proposed actions, determines the effects of those actions on ESA species and their habitats, and defines measures to minimize and mitigate adverse effects.
Flood Plain Management Criteria for Flood-prone Areas (44 C.F.R. Part 60.3)	Provides FEMA's floodplain management criteria for flood-prone areas known as Special Flood Hazard Areas, or SFHAs.
Homeowner Flood Insurance Affordability Act of 2014 (HFIAA) (P. Law 113-89)	Repeals and modifies certain provisions of the Biggert Waters Flood Insurance Reform Act of 2012 (BW-12), and makes additional program changes to other aspects of the program not covered by the BW-12.
Identification and Mapping of Special Hazard Areas (44 C.F.R. Part 65)	Provides guidance on the identification and mapping of special hazard areas.

Title	Description
Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) (16 U.S.C. §§ 1801-1882)	Requires conversation and management of U.S. fishery resources through implementation of fishery management plans (FMPs) and Regional Fishery Management Councils (FMCs). FMPs enable stakeholders to participate in the administration of fisheries, consider social and economic needs of States, develop underutilized fisheries, and protect essential fish habitats.
Marine Mammal Protection Act of 1972 (MMPA) (16 U.S.C. Chapter 31)	Establishes a moratorium on the taking and importation of marine mammals; prohibits harassing, hunting, capturing, collecting, or killing of marine mammals or attempting such actions; requires permits for taking marine mammals; and requires consultations with USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries if impacts on marine mammals are possible.
Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703-712, as amended)	Implements treaties and conventions among the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds.
National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4332 et seq.)	Requires Federal agencies to consider the environmental impacts of proposed major federal actions and reasonable alternatives to those actions.
National Flood Insurance Act of 1968 (NFIA) (42 U.S.C. § 4001 et seq.)	Created the Federal Insurance Administration and made flood insurance available to the public through the National Flood Insurance Program (NFIP). Subsequently, the Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property in Special Flood Hazard Areas (SFHAs).
National Historic Preservation Act (NHPA) (P. Law 89–665, 16 U.S.C. § 470)	Directs Federal agencies to consider the effects of undertakings on historic and cultural resources. While preservation is not mandated, a carefully considered decision-making process is required under Section 106.
Noise Control Act of 1972 (42 U.S.C. § 4901 et seq.)	Initiated a federal program to regulate noise to protect human health and minimize the public's annoyance from noise.
Resource Conservation and Recovery Act of 1976 (RCRA) (40 C.F.R. Parts 239-282)	Amends the Solid Waste Disposal Act of 1965 to address how to safely manage and dispose of municipal and industrial waste generated nationwide. Identifies more stringent hazardous waste management standards, and a comprehensive regulatory program for underground storage tanks (USTs) that store petroleum or certain hazardous materials.
Wild and Scenic Rivers Act (16 U.S.C. §§ 1271–1287)/ Wild and Scenic Rivers (36 C.F.R. Part 297)	Provides for a Wild and Scenic river system by recognizing the remarkable values (scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values) of specific rivers of the United States. Wild and Scenic Rivers includes requirements for the protection of scenic and natural values from the effects of any water resources project.

Title	Description
Executive Orders (EO)	
Executive Order 11988 – Floodplain Management	Directs Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
Executive Order 11990 – Protection of Wetlands	Directs Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.
Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Directs Federal agencies to avoid disproportionate adverse effects to minority and low income populations.
Executive Order 13112 – Invasive Species	Directs Federal agencies to prevent the introduction of plant, animal, and microorganism invasive species, and control and minimize the economic, ecologic, and human health impacts that invasive species may cause.
Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds	Directs Federal agencies to take certain actions to implement the Migratory Bird Treaty Act.
Executive Order 13653 – Preparing the United States for the Impacts of Climate Change	Directs Federal agencies to take steps that will make it easier for American communities to strengthen their resilience to extreme weather and prepare for other climate change impacts. Continues coordinated action with EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, and the Interagency Climate Change Adaptation Task Force.
Executive Order 13693 – Planning for Federal Sustainability in the Next Decade	Directs Federal agencies to maintain federal leadership in sustainability and greenhouse gas emission reductions. Section 16 revokes EO 13423 – Strengthening Federal Environmental, Energy, & Transportation Management and EO 13514.

**National Flood Insurance Program
Nationwide Programmatic Environmental Impact Statement**

APPENDIX B. PUBLIC MEETING SUMMARY REPORT

June 2017

Overview

The Federal Emergency Management Agency (FEMA) prepared a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) to evaluate the potential environmental impacts of proposed modifications to the National Flood Insurance Program (NFIP). The proposed modifications to the NFIP consist of implementing the legislative requirements of Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA); and demonstrating compliance with the Endangered Species Act (ESA). The need to implement the legislative requirements of BW-12 and HFIAA arises from recent concerns over the fiscal soundness of the NFIP.

FEMA has determined that a NPEIS is the appropriate level of environmental review under the National Environmental Policy Act of 1969 (NEPA). As required under NEPA, FEMA conducted meetings and solicited public comments on the draft NPEIS. The Council of Environmental Quality (CEQ) regulations (40 Code of Federal Regulation [CFR] Parts 1500-1508) provide guidance on opportunities for public participation. This report provides an overview of the NFIP draft NPEIS public meetings and webinars and comments received during the comment period.

Public Notification

On April 7, 2017, FEMA published a Notice of Availability (NOA) in the *Federal Register* to initiate a 60-day public comment period (82 *Federal Register* [FR] 17023). The NOA, provided in **Appendix A**, identified that FEMA released the draft NPEIS for public review and solicited input from the public on the document. The NOA also announced the FEMA Web site for information on the public meeting and webinar dates and locations and included instructions on comment submittals. Issuance of the NOA commenced a 60-day public comment period that ended on June 6, 2017.

The dates and locations of the public meetings and webinars were posted on the project Web site at <https://www.fema.gov/programmatic-environmental-impact-statement>. In addition, FEMA placed a public notice in each local newspaper one week prior to the in-person public meeting identifying the date, time, and location. Publication of the notices occurred in the following newspapers:

- The New York Times (Thursday, April 13, 2017);
- The Times Picayune (Wednesday, April 19, 2017);
- Sun-Sentinel (Thursday, April 20, 2017);
- The Oregonian (Thursday, May 3, 2017);
- Kansas City Star (Wednesday, May 10, 2017); and
- The Washington Post (Friday, May 12, 2017).

Copies of the newspaper notices are included in **Appendix B**.

The public meetings and webinars were also announced in FEMA Bulletin, a weekly online newsletter distributed via email and available on the FEMA.gov Web site at <https://www.fema.gov/fema-bulletin>. The first announcement was published in the Tuesday, April 10, 2017 edition. Announcements were published on a weekly basis via the FEMA Bulletin until the comment period closed in early June 2017. The weekly FEMA Bulletin is delivered to approximately 57,000 email recipients. Copies of the bulletin notices are in **Appendix C**.

FEMA also distributed email announcements to (1) interested parties who expressed interest in the NPEIS from scoping meetings or commented during the scoping period; (2) FEMA's Tribal Listserv; and (3) Congress and congressional staff via Congressional Affairs. These announcements are included as **Appendix D**.

Public Meetings

FEMA held six in-person public meetings and three webinars. These meetings provided the public and interested stakeholders with an opportunity to learn more about the project and to provide comments on the NFIP draft NPEIS. The public meetings and webinars included a presentation delivered by FEMA staff followed by a comment period. The same presentation was provided at each meeting and included an overview of the purpose and need for the NPEIS, alternatives considered, and potential environmental consequences. Each meeting concluded with instructions on submitting public comments and an opportunity for attendees to provide verbal comments. A copy of the presentation is included in **Appendix E**. FEMA held public meetings at the following locations:

- *Brooklyn, New York* – Thursday, April 20, 2017; 3:30-5:30 p.m. EDT
New York Headquarters Fire Department, 9 MetroTech Center, Brooklyn, NY.
- *New Orleans, Louisiana* – Tuesday, April 25, 2017; 5:30-7:30 p.m. CT
New Orleans Public Library, 219 Loyola Avenue, New Orleans, LA.
- *Ft. Lauderdale, Florida* – Thursday, April 27, 2017; 5-7 p.m. EDT
United Way or Broward County Ansin Building, 1300 South Andrews Avenue, Ft. Lauderdale, FL.
- *Portland, Oregon* – Wednesday, May 10, 2017; 5-7 p.m. PT
Multnomah County Library Midland Branch, 805 SE 122nd Avenue, Portland, OR.
- *Kansas City, Missouri* – Wednesday, May 17, 2017; 5-7 p.m. CT
Kansas City Library, Trails West Branch, 11401 East 23rd Street, Independence, MO.
- *Washington, DC* – Friday, May 19, 2017; 3-5 p.m. EDT
FEMA Headquarters, 500 C Street SW, FEMA Conference Room A, Washington, DC.

Transcripts of the Brooklyn, Portland, Kansas City, and DC meetings are included in **Appendix F**. No transcripts were prepared for the New Orleans and Ft. Lauderdale meetings as there were no attendees (Table 1).

Each public meeting included a copy of the NFIP draft NPEIS and a two-page handout. The handout provided an overview of the proposed action and alternatives, and instructed attendees

on comment submittals. At each meeting, attendees were also offered comment cards to write down their comments. The handout is included in **Appendix G**.

In addition to the public meetings, FEMA held three webinars to reach a broader audience. The same presentation delivered during the public meetings was presented to the webinar participants and online attendees were offered an opportunity to provide comments. Webinar transcripts are included in **Appendix F**. FEMA held webinars on the following dates and times:

- Tuesday, April 18, 2017 from 2-4 p.m. EDT;
- Wednesday, April 26, 2017 from 5-7 p.m. EDT; and
- Tuesday, May 9, 2017 from 5-7 p.m. PT.

A total of 35 people attended the NFIP draft NPEIS meetings/webinars. FEMA received 31 comments during the 60-day comment period. Table 1 identifies the number of attendees and the breakdown of comments received. Comments received via U.S. Postal Service mail, regulations.gov, or email are counted once as regulations.gov.

Table 1. Summary of Attendees and Public Comments Received

Meeting/Comment Format	Attendees	Attendees	Comments
In Person Meetings	(Public)	(FEMA/Support Team)	
Brooklyn, New York (April 21, 2017)	4	3 / 2	0
New Orleans, Louisiana (April 25, 2017)	0	2 / 2	0
Ft. Lauderdale, Florida (April 27, 2017)	0	2 / 2	0
Portland, Oregon (May 12, 2017)	6	3 / 2	1
Kansas City, Missouri (May 17, 2017)	1	2 / 2	1
Washington, DC (May 19, 2017)	4	5 / 2	1*
Webinars			
Tuesday, April 18, 2017	11	7 / 3	1
Wednesday, April 26, 2017	3	1 / 2	0
Tuesday, May 9, 2017	6	2 / 2	2
Written Comments			
Regulations.gov Web site	NA	NA	23
Email	NA	NA	2
U.S. Postal Service / FedEx Delivery	NA	NA	0
Total	35	27 / 19	31*

*Verbal comment read the content of a submitted written letter (same comment)

Summary of Comments

The public and local agencies raised several concerns during the public comment period. The following general concerns and issues were raised during the public comment period:

- Comments regarding FEMA's land use authority and its legal authorities generally.
- Comments related to FEMA's relationship to private floodplain development and its impacts.
- Comments related to addressing climate change and impacts from climate change.
- Statements about the need to conduct Section 7 consultation for the actions proposed in the NFIP draft NPEIS.
- Suggestions for additional program changes the NFIP should make, such as changes to FEMA's mapping program, changes to FEMA's floodplain management criteria to include energy efficiency requirements, incorporation of additional ESA compliance measures, and implementation of the TMAC recommendations.
- Statements in support of or against the proposed alternatives.
- Comments about how the NPEIS and/or implementation of the alternatives analyzed in the NPEIS affect implementation of the Reasonable and Prudent Alternative in the Oregon Biological Opinion.

In addition to these concerns and issues, several comments requested revisions and changes to the draft NPEIS.

Appendix A
Federal Register Notice of Availability
April 7, 2017

the several perils covered, or where the flood insurance coverage amount is over and above the limits of liability available to the insured under the Program.

Article XIV. Access to Books and Records

FEMA, the Department of Homeland Security, and the Comptroller General of the United States, or their duly authorized representatives, for the purpose of investigation, audit, and examination shall have access to any books, documents, papers and records of the Company that are pertinent to this Arrangement. The Company shall keep records that fully disclose all matters pertinent to this Arrangement, including premiums and claims paid or payable under policies issued pursuant to this Arrangement. Records of accounts and records relating to financial assistance shall be retained and available for three (3) years after final settlement of accounts, and to financial assistance, three (3) years after final adjustment of such claims. FEMA shall have access to policyholder and claim records at all times for purposes of the review, defense, examination, adjustment, or investigation of any claim under a flood insurance policy subject to this Arrangement.

Article XV. Compliance With Act and Regulations

This Arrangement and all policies of insurance issued pursuant thereto are subject to Federal law and regulations.

Article XVI. Relationship Between the Parties and the Insured

Inasmuch as the Federal Government is a guarantor hereunder, the primary relationship between the Company and the Federal Government is one of a fiduciary nature, that is, to assure that any taxpayer funds are accounted for and appropriately expended. The Company is a fiscal agent of the Federal Government, but is not a general agent of the Federal Government. The Company is solely responsible for its obligations to its insured under any policy issued pursuant hereto, such that the Federal Government is not a proper party to any lawsuit arising out of such policies.

Authority: 42 U.S.C. 4071, 4081; 44 CFR 62.23.

Dated: April 3, 2017.

Roy E. Wright,

Deputy Associate Administrator for Insurance and Mitigation, Federal Emergency Management Agency.

[FR Doc. 2017-07020 Filed 4-6-17; 8:45 am]

BILLING CODE 9111-52-P

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

[Docket ID FEMA-2012-0012]

National Flood Insurance Program Nationwide Programmatic Environmental Impact Statement

AGENCY: Federal Emergency Management Agency, DHS.

ACTION: Notice of availability of a draft nationwide programmatic environmental impact statement and notice of public meetings.

SUMMARY: The Federal Emergency Management Agency (FEMA) has prepared a draft nationwide programmatic environmental impact statement (NPEIS) evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program (NFIP). This Draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a nationwide programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP. Public meetings and public outreach opportunities will be held during the comment period on the Draft NPEIS. The Draft NPEIS is available for download at www.regulations.gov under Docket ID FEMA-2012-0012.

DATES: FEMA will conduct public meetings and webinars on the Draft NPEIS. For information on the dates, times, and locations for the public meetings or to register for an online webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

The public comment period on the Draft NPEIS starts with a concurrent publication through the U.S. Environmental Protection Agency of a notice in the **Federal Register** and will continue until June 6, 2017. FEMA will consider all comments recorded at the public meetings and all electronic and written comments on the Draft NPEIS received or postmarked by June 6, 2017. Agencies, interested parties, and the public are invited to submit comments on this Draft NPEIS at any time during the public comment period.

ADDRESSES: FEMA will hold public meetings to allow the public an opportunity to learn more about the project and to provide comments on the Draft NPEIS. In addition to the public meetings, FEMA has organized a series of online webinars. Similar to the in-

person public meetings, during the webinars, FEMA will present information about the Draft NPEIS and accept comments on the Draft NPEIS. For information on the dates, times, and locations for the public meetings or to register for an online webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>. You may submit comments, identified by Docket ID FEMA-2012-0012, using one of the following methods:

Federal eRulemaking Portal: <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for submitting comments.

Mail/Hand Delivery/Courier: Regulatory Affairs Division, Office of Chief Counsel, Federal Emergency Management Agency, 8NE, 500 C St. SW., Washington, DC 20472.

Instructions: All submissions received must include the FEMA Docket ID. Regardless of the method used for submitting comments or materials, all submissions will be publically available, become part of the public record, and may be printed in the Final NPEIS. Therefore, submitting this information makes it public. All personally identifiable information, such as name or address, voluntarily submitted by the commenter may be publicly accessible.

FOR FURTHER INFORMATION CONTACT: For more information on the NPEIS, contact Bret Gates, FEMA, Federal Insurance and Mitigation Administration, Floodplain Management Division, 400 C Street SW., Washington, DC 20472, or via email at Bret.Gates@fema.dhs.gov, or by phone at 202-646-2780.

SUPPLEMENTARY INFORMATION: Flooding has been, and continues to be, a serious risk in the United States. To address the need, in 1968, Congress established the NFIP as a Federal program to provide access to federally backed flood insurance protection. The NFIP is a voluntary Federal program through which property owners in participating communities can purchase Federal flood insurance as a protection against flood losses. In exchange, communities must enact local floodplain management regulations to reduce flood risk and flood-related damages. However, the power to regulate floodplain development, including requiring and approving permits, establishing permitting requirements, inspecting property, and citing violations, requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct

involvement in the administration of local floodplain management ordinances or in the permitting process for development in the floodplain.

In addition to providing flood insurance and reducing flood damages through floodplain management, the NFIP identifies and maps the nation's floodplains. Maps depicting flood hazard information are used to promote broad-based awareness of flood hazards, provide data for rating flood insurance policies, and determine the appropriate minimum floodplain management criteria for flood hazard areas.

On average, flooding continues to be the single greatest source of damage from natural hazards in the United States, causing about 82 deaths and \$8 billion in property damage annually. Today, more than 22,000 communities participate in the NFIP, with more than 5.1 million flood insurance policies in effect, providing over \$1.2 trillion in insurance coverage. The NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disaster. In 2011, former FEMA Administrator Craig Fugate reported to the Senate Committee on Banking, Housing, and Urban Affairs that implementation of the NFIP minimum floodplain management requirements is estimated to save the nation about \$1.7B annually through avoided flood losses.

The proposed modifications to the NFIP are needed to (a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA); and (b) to demonstrate compliance with the Endangered Species Act (ESA). As stated in the draft NPEIS the need to implement the legislative requirements of BW-12 and HFIAA arises from the recent concerns over the fiscal soundness of the NFIP.

This Draft NPEIS considers four alternatives and describes the potential environmental effects of each alternative. The four alternatives include:

- Alternative 1 (No Action)
- The No Action Alternative refers to the current implementation of the NFIP. The No Action Alternative is prescribed by Council on Environmental Quality regulations (40 CFR 1502.14(d)) and serves as a benchmark against which impacts of the alternatives can be evaluated.
- Alternative 2 (Legislatively Required Changes, Floodplain Management Criteria Guidance, and Letter of Map Change [LOMC] Clarification) (Preferred Alternative)
 - Phase out of subsidies on certain pre-FIRM properties (non-primary

residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.

- Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.

- Implement a monthly installment plan payment option for non-escrowed flood insurance policies.

- Clarify that pursuant to 44 CFR 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing floodplain development permits.

- Clarify that the issuing of certain LOMC requests (*i.e.*, map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

- Alternative 3 (Legislatively Required Changes, Proposed ESA Regulatory Changes, and LOMC Clarification)

- Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.

- Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.

- Implement a monthly installment plan payment option for non-escrowed flood insurance policies.

- Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 CFR 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible.

- Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the

restoration of the natural and beneficial functions of floodplains.

- Increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100.

- Clarify that the issuance of certain LOMC requests (*i.e.*, map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

- Alternative 4 (Legislatively Required Changes, ESA Guidance, and LOMC Clarification)

- Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.

- Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.

- Implement a monthly installment plan payment option for non-escrowed flood insurance policies.

- Utilize the existing performance standard in 44 CFR 60.3(a)(2) to implement a new policy/procedure requiring communities to ensure that, for any floodplain development for which a floodplain development permit is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed floodplain development will be undertaken in compliance with the ESA.

- Clarify that the issuance of certain LOMC requests (*i.e.*, map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

Public Involvement and Comments

During the public comment period, FEMA will host several in-person public meetings and online webinars to receive comments on the Draft NPEIS. Public meetings will include an overview presentation and an opportunity for the public to present oral comments or submit written comments on the Draft NPEIS. Meeting locations and times are listed under the project Web site <https://www.fema.gov/programmatic-environmental-impact-statement>.

Speakers will be asked to provide brief comments to allow adequate time to hear all comments. Should any speaker desire to provide further information for the record that cannot be presented within the designated time, such additional information may be submitted at the meeting, electronically, or by letter at the address provided on this notice by June 6, 2017. Speakers are encouraged to provide a written version of their oral comments at the in person meetings to ensure that their comments are completely and accurately recorded.

FEMA requests that reviewers provide specific information and comments on factual errors, missing information, or additional considerations that should be corrected or included in the Final NPEIS. Comments on the Draft NPEIS should be as specific as possible and address the adequacy of the NPEIS or the merits of the alternatives discussed (40 CFR 1503.3).

Individual respondents may request confidentiality. The names, street addresses, and city or town information of those providing comments will be part of the administrative record, and will be subject to public disclosure unless confidentiality is requested. Such a request must be stated prominently at the beginning of the comment. We will honor requests to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety, consistent with applicable law.

Comments submitted during this public comment period will be considered in preparation of a Final NPEIS and used by FEMA in its decision-making process for the Federal action. After gathering public comments, FEMA will review and provide responses in the Final NPEIS according to 40 CFR 1503.4. A Record of Decision addressing the Federal action will be issued by FEMA no sooner than 30 days following the distribution of the Final NPEIS.

Authority: 42 U.S.C. 4331 *et seq.*; 40 CFR part 1500; FEMA Instruction 108–1–1.

Dated: March 29, 2017.

Robert Fenton,

Senior Official Performing the Duties of the Administrator, Federal Emergency Management Agency.

[FR Doc. 2017–06671 Filed 4–6–17; 8:45 am]

BILLING CODE 9111–A6–P

DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

[Docket ID FEMA–2014–0022]

Technical Mapping Advisory Council

AGENCY: Federal Emergency Management Agency, DHS.

ACTION: Committee Management; Request for Applicants for Appointment to the Federal Emergency Management Agency's Technical Mapping Advisory Council.

SUMMARY: The Federal Emergency Management Agency (FEMA) is requesting qualified individuals interested in serving on the Technical Mapping Advisory Council (TMAC) to apply for appointment. As provided for in the *Biggert-Waters Flood Insurance Reform Act of 2012*, the TMAC makes recommendations to the FEMA Administrator on how to improve, in a cost-effective manner, the accuracy, general quality, ease of use, and distribution and dissemination of flood insurance rate maps (FIRMs) and risk data; and performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States. Applicants will be considered for appointment for the four vacancies on the TMAC.

DATES: Applications will be accepted until 11:59 p.m. EST on April 24, 2017.

ADDRESSES: Applications for membership should be submitted by one of the following methods:

- **Email:** FEMA-TMAC@fema.dhs.gov.
- **Mail:** FEMA, Federal Insurance and Mitigation Administration, Risk Management Directorate, Attn: Mark Crowell, 400 C Street SW., Suite 313, Washington, DC 20472–3020.

FOR FURTHER INFORMATION CONTACT:

Mark Crowell (Designated Federal Officer for the TMAC); FEMA, Federal Insurance and Mitigation Administration, Risk Management Directorate, 400 C Street SW., Suite 313, Washington, DC 20472–3020; telephone: (202) 646–3432; and email: FEMA-TMAC@fema.dhs.gov. The TMAC Web site is: <http://www.fema.gov/TMAC>.

SUPPLEMENTARY INFORMATION: The TMAC is an advisory committee that was established by the *Biggert-Waters Flood Insurance Reform Act of 2012*, 42 U.S.C. 4101a, and in accordance with provisions of the *Federal Advisory Committee Act (FACA)*, 5 U.S.C. App. (Pub. L. 92–463). The TMAC is required to make recommendations to FEMA on mapping-related issues and activities.

This includes mapping standards and guidelines, performance metrics and milestones, map maintenance, interagency and intergovernmental coordination, map accuracy, funding strategies, and other mapping-related issues and activities. In addition, the TMAC is required to submit an annual report to the FEMA Administrator that contains: (1) A description of the activities of the Council; (2) an evaluation of the status and performance of flood insurance rate maps and mapping activities to revise and update Flood Insurance Rate Maps; and (3) a summary of recommendations made by the Council to the FEMA Administrator.

Members of the TMAC will be appointed based on their demonstrated knowledge and competence regarding surveying, cartography, remote sensing, geographic information systems, or the technical aspects of preparing and using FIRMs. To the maximum extent practicable, FEMA will ensure that membership of the TMAC has a balance of Federal, State, local, Tribal, and private members, and includes geographic diversity.

FEMA is requesting qualified individuals who are interested in serving on the TMAC to apply for appointment. Applicants will be considered for appointment for four vacancies on the TMAC, the terms of which start on October 1, 2017. Certain members of the TMAC, as described below, will be appointed to serve as Special Government Employees (SGE) as defined in section 202(a) of title 18 United States Code. Candidates selected for appointment as SGEs are required to complete a Confidential Financial Disclosure Form (Office of Government Ethics (OGE) Form 450). This form can be obtained by visiting the Web site of the Office of Government Ethics (<http://www.oge.gov>). Please do not submit this form with your application. Qualified applicants will be considered for one or more of the following membership categories with vacancies:

a. One representative of a State government agency that has entered into a cooperating technical partnership with the FEMA Administrator and has demonstrated the capability to produce FIRMs;

b. One member (SGE) of a recognized professional association or organization representing flood hazard determination firms; and

c. One representative of a recognized professional association or organization representing State geographic information.

Members of the TMAC serve terms of office for two years. There is no

Appendix B
Newspaper Notices



The New York Times

620 8TH AVENUE • NEW YORK, NY 10018

PROOF OF PUBLICATION

April 17 2017

I, Alice Weber, in my capacity as a Principal Clerk of the Publisher of **The New York Times**, a daily newspaper of general circulation printed and published in the City, County and State of New York, hereby certify that the advertisement annexed hereto was published in the editions of

The New York Times on the following date or dates, to wit on

APR 13 2017

β 15

Alice Weber

Sworn before me the

17th day of April, 2017

Michelle M Scibilia

Notary Public

MICHELLE MARY SCIBILIA
NOTARY PUBLIC-STATE OF NEW YORK
No. 01SC6281145
Qualified In Nassau County
My Commission Expires May 13, 2017

NOTICES & LOST AND FOUND

(5100-5102)

Public meeting for the National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement.

The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program, a federal program established by Congress to provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document.

FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the draft NPEIS at New York Headquarters Fire Department, 9 MetroTech Center, Brooklyn, NY 11201, Thursday, April 20, 2017 from 3:30-5:30p.m. EDT.

In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

FEMA invites you to submit comments at <http://www.regulations.gov> (Docket ID: FEMA-2012-0012) or by mail to Regulatory Affairs Legal Division, Office of Chief Counsel, FEMA, Room 825, 500 C St SW, Washington, DC 20472-5100. Written comments must be postmarked by June 6, 2017.



The Times-Picayune
NOLA MEDIA GROUP

ONE CANAL PLACE, 365 CANAL ST., STE 3100, NEW ORLEANS, LOUISIANA 70130 TELEPHONE (504) 826-3201

**Public meeting for the
National Flood Insurance
Program Draft Nationwide
Programmatic Environmental
Impact Statement**

The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program, a federal program established by Congress to provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document.

FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the Draft NPEIS at:
New Orleans Public Library
219 Loyola Avenue,
New Orleans, LA 70112
Tuesday, April 25, 2017
from 5:30-7:30 p.m. CT

In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>. FEMA invites you to submit comments at <http://www.regulations.gov> (Docket ID FEMA-2012-0012) or by mail to Regulatory Affairs Legal Division, Office of Chief Counsel, FEMA, Room 835, 500 C St SW, Washington, DC 20472-3100. Written comments must be postmarked by June 6, 2017.

I attest that the copy attached hereto as "Exhibit A" is a true and correct copy of the advertisement published in The Times-Picayune on these dates.

State of Louisiana

Parish of Orleans

City of New Orleans

Personally appeared before me, a Notary in and for the parish of Orleans, Donna Laird who deposes and says that she is Administrative Assistant of NOLA Media Group, a division of The Times-Picayune, L.L.C., a Louisiana limited liability company, and Publishers of The Times-Picayune, Daily and Sunday, of general circulation; doing business in the City of New Orleans and the State of Louisiana, and that the attached

LEGALS

Re: Environmental Impact Statement

Advertisement of BOOZ ALLEN HAMILTON

112 E. PECAN ST. SUITE 900
SAN ANTONIO TX 78205

Was published in The Times Picayune

365 Canal Street, Suite 3100
New Orleans, LA 70130

On the following dates April 19, 2017

19TH

Sworn to and subscribed before me this
Day of APRIL 2017

Donna Laird

[Signature]

Notary Public

My commission expires at my death.

Charles A. Ferguson, Jr.

Notary identification number 23492

This E-Sheet confirms that the ad appeared in Sun-Sentinel on the date and page indicated. You may not create derivative works, or in any way exploit or repurpose any content displayed or contained on the electronic tearsheet.

Legal Notices

Fictitious Name Notice

NOTICE
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of Odor Guyz, Inc. intends to register the said name with the Florida Department of State, Division of Corporations, Tallahassee, FL and/or Clerk of the Circuit Court of Broward County, FL. Skylar Smith
5219 SW 91ST TER
COOPER CITY, FL 33328
4/20/17

NOTICE
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of Hitecon, S.A. intends to register the said name with the Florida Department of State, Division of Corporations, Tallahassee, FL and/or Clerk of the Circuit Court of Palm Beach County, FL. JAL CATV LLC
15705 99th St North
West Palm Beach, FL 33412
4/20/2017

NOTICE
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of Dan's Fan City intends to register the said name with the Florida Department of State, Division of Corporations, Tallahassee, FL and/or Clerk of the Circuit Court of Broward County, FL. Broward Fan Company, LLC
2530 North Federal Highway
Fort Lauderdale, FL 33305
April 20, 2017

NOTICE
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of JZ DEALER SUPPLIES intends to register the said name with the Florida Department of State, Division of Corporations, Tallahassee, FL and/or Clerk of the Circuit Court of Broward County, FL. J Z AUTO DEALER SUPPLIES, INC.
5900 Stirling Rd Bay 4
Hollywood, FL 33021
04/20/2017

NOTICE
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of Waxx Tech intends to register the said name with the Florida Department of State, Division of Corporations, Tallahassee, FL and/or Clerk of the Circuit Court of Miami-Dade County, FL. Stretch Tech LLC
1192 HORIZON VIEW DR
Sarasota, FL 34242
April 20, 2017

Public Hearing Notice

NOTICE OF PUBLIC HEARING
Notice is hereby given that a public hearing is held by the District School Board of Broward County, Florida, on May 2, 2017, at 10:05 am, and on June 13, 2017, at 10:05 am, on the following: A. New or Revised Job Descriptions, Minimum Qualifications and Job Titles for thirty (30) positions:

Executive Director, Exceptional Student Learning Support
Director, Exceptional Student Learning Support (Pre-K/Elementary)/ Curriculum Supervisor, Autism Spectrum Disorder/ Supervisor, FL Diagnostic & Learning Resource System/ Curriculum Supervisor, Preschool ELSE
Curriculum Supervisor, Emotional/Behavioral Disabilities/ Curriculum Supervisor, Intellectual Disabilities/ Curriculum Supervisor, Specific Learning Disabilities
Director, Exceptional Student Learning Support (Secondary) Specialist, Deaf and Hard of Hearing Charter Schools/ Specialist, Visually Impaired, Hospital/ Homebound, Private Schools/ Curriculum Supervisor, Behavior/
Curriculum Supervisor, Exceptional Student Learning Support/ Supervisor, ESLs Transition Services/
Director, Exceptional Student Learning Support Services/
District Coordinator, Due Process/ District Coordinator, Psychological Services/
District Coordinator Speech-Language Physically Impaired/ District Coordinator, Medicaid/
District Coordinator Severely Emotionally Disturbed Network/ Manager, SSS/ESLS Electronic Management System EZ IEP/
Supervisor, Resource Computer Training/ Program Manager, Nutrition, Education & Training/
Supervisor, Operations Equipment & Supplies/
Area Supervisor, Quality Assurance/ Purchasing Agent/
Manager, Supplier Diversity & Outreach Program/
Coordinator, Supplier Diversity & Outreach Program/
Coordinator, Supplier Diversity & Outreach Program Compliance/ Process Analyst (MWBE Construction)

SUMMARY OF INTENDED ACTION:
It is intended that the Board will act upon the new and revised job descriptions, minimum qualifications, and job titles of the above specific certified/non-certified position(s) in the Broward County School System. The rules contained in the criteria for these positions will establish the qualifications which each person must meet in order to qualify for a specific certified/non-certified position(s) when advertised.
SUMMARY OF ECONOMIC IMPACT STATEMENT:
In Section A, there is no additional financial impact to the District. Copies of the above rule and economic impact statement are available in the: Office of the Superintendent 600 Southeast Third Avenue Fort Lauderdale, FL 33301
THE DISTRICT SCHOOL BOARD OF BROWARD COUNTY, FLORIDA
IS:Robert W. Runcie
Superintendent

4/20/2017
PUBLIC MEETING FOR THE NATIONAL FLOOD INSURANCE PROGRAM
DRAFT NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program. A federal program established by Congress to provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document.

FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the Draft NPEIS at:
United Way of Broward County Ansin Building
1300 South Andrews Avenue, Ft Lauderdale, FL 33316
Thursday, April 27, 2017 from 5:00-7:00 p.m. EDT
In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit https://www.fema.gov/programmatic-environmental-impact-statement. FEMA invites you to submit comments at http://www.regulations.gov (Docket ID FEMA-2012-0012) or by mail to Regulatory Affairs Legal Division, Office of Counsel, FEMA, Room 835, 500 C St SW, Washington, DC 20472-3100. Written comments must be post-marked by June 6, 2017.
04/20/2017

CITY OF COOPER CITY
NOTICE TO BIDDER
NOTICE IS HEREBY GIVEN THAT THE CITY OF COOPER CITY, FLORIDA, WILL BE ACCEPTED SEALED BIDS FROM QUALIFIED FIRMS UNTIL 11:00AM (EST) ON THURSDAY, MAY 11, 2017.
IRRIGATION SYSTEM (FLAMINGO PARK)
The general Scope of Work includes the removal and replacement of a new commercial grade lawn irrigation system at Flamingo Park.
The detailed Invitation to Bid (ITB) shall be obtained online at www.DemandStar.com.
Bids must be received in the City Clerk's Office no later than 11:00AM (EST), Thursday, May 11, 2017. The outside of the envelope or box containing one (1) identified, unbound original, two (2) copies and one (1) electronic copy (CD or flash drive) of your bid must be clearly marked "ITB #2017-5-PW, Irrigation System (Flamingo Park).
Questions and requests for information relative to this ITB should be directed to Kerri Anne Fisher, Purchasing Agent. Please email questions to Purchasing@CooperCityFL.org or send via fax to 954-434-5099.
The City Commission of the City of Cooper City reserves the right, for any reason, to reject any and all bids/bids and to make awards in the best interest of the City.
A Cone of Silence is hereby imposed prohibiting communication regarding this invitation to Bid between a potential vendor, service provider, bidder, lobbyist, or consultant and the City Commissioners, City's professional staff including, but not limited to, the City Manager and his staff, any member of the City's selection or evaluation committee. For further information about the Cone of Silence, please contact the City's Attorney.
CITY OF COOPER CITY
Susan Poling, City Clerk
4/20/2017

Public Hearing Notice

NOTICE OF PUBLIC HEARINGS
CITY OF FORT LAUDERDALE
A public hearing will be held before the City Commission of the City of Fort Lauderdale, Florida, on Tuesday, May 2, 2017, at 6:00 p.m. or as soon thereafter as possible and a public hearing will be held before the City Commission of the City of Fort Lauderdale, Florida, on Tuesday, May 16, 2017 at 6:00 p.m. or as soon thereafter as possible, in the City Commission Room, City Hall, 100 North Andrews Avenue, Fort Lauderdale, Florida for the purpose of hearing any objections which might be made to the following ordinance:
AN ORDINANCE AMENDING THE UNIFIED LAND DEVELOPMENT REGULATIONS OF THE CITY OF FORT LAUDERDALE, FLORIDA, AMENDING SECTION 47-1.6.B OF THE UNIFIED LAND DEVELOPMENT REGULATIONS THROUGH THE REVISION OF THE OFFICIAL ZONING MAP OF CITY OF FORT LAUDERDALE AND SCHEDULE "A" REVISED COMPILED ATTACHED THERETO AND BY REFERENCE MADE A PART THEREOF, SO AS TO REZONE FROM "B-1 - BOULEVARD BUSINESS DISTRICT," AND "B-2 - GENERAL BUSINESS DISTRICT," TO "B-3 - HEAVY COMMERCIAL/LIGHT INDUSTRIAL BUSINESS DISTRICT," AND TO INCLUDE AND REZONE FROM "B-3 INTENSE COMMERCIAL BUSINESS DISTRICT" OF THE BROWARD COUNTY ZONING CODE TO "B-3 - HEAVY COMMERCIAL/LIGHT INDUSTRIAL BUSINESS DISTRICT" PORTIONS OF PARCEL "A", "RIVERBEND CORPORATE PARK", ACCORDING TO THE PLAT THEREOF, RECORDED IN PLAT BOOK 175, PAGE 95, OF THE PUBLIC RECORDS OF BROWARD COUNTY, FLORIDA, LOCATED NORTH OF WEST BROWARD BOULEVARD, NORTH OF WESTWEST 22 AVENUE, AND EAST OF NORTHWEST 25 AVENUE, AND SOUTH OF THE NORTH FORK NEW RIVER, BROWARD COUNTY, FLORIDA.
All interested parties may appear at said meeting and be heard with respect to the proposed Ordinance. The proposed Ordinance may be inspected by the public in the Office of the City Clerk, City Hall, 100 North Andrews Avenue, 7th Floor, Fort Lauderdale, Florida.
JEFFREY A. MODARELLI, City Clerk, City of Fort Lauderdale, Florida
NOTE: If any person decides to appeal any decision made with respect to any matter considered at this public meeting or hearing, he/she will need a record of the proceedings, and for such purpose he/she may need to ensure that verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.
Anyone needing auxiliary services to assist in participation at the meeting please contact the City Clerk at (954) 828-5002 two days prior to the meeting.
4/20, 4/27/2017

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AN ORDINANCE AMENDING THE CITY OF FORT LAUDERDALE, FLORIDA UNIFIED LAND DEVELOPMENT REGULATIONS BY AMENDING SECTIONS 47-6.11 - LIST OF PERMITTED AND CONDITIONAL USES, BOULEVARD BUSINESS (B-1) DISTRICT, SECTION 47-6.12 - LIST OF PERMITTED AND CONDITIONAL USES, GENERAL BUSINESS (B-2) DISTRICT, SECTION 47-6.13 - LIST OF PERMITTED AND CONDITIONAL USES, HEAVY COMMERCIAL/LIGHT INDUSTRIAL BUSINESS (B-3) DISTRICT, AND SECTION 47-20 - PARKING AND LOADING REQUIREMENTS, AND CREATING SECTION 47-18.46 - MEDICAL CANNABIS DISPENSING FACILITIES; PROVIDING FOR DEFINITIONS, ESTABLISHING REGULATIONS, CREATING LOCATION AND OPERATION STANDARDS AND CRITERIA FOR APPROVAL FOR MEDICAL CANNABIS DISPENSING FACILITIES; PROVIDING FOR SEVERABILITY; REPEAL OF CONFLICTING ORDINANCE PROVISIONS; AND PROVIDING AN EFFECTIVE DATE.
All interested parties may appear at said meeting and be heard with respect to the proposed Ordinance. The proposed Ordinance may be inspected by the public in the Office of the City Clerk, City Hall, 100 North Andrews Avenue, 7th Floor, Fort Lauderdale, Florida.
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Anyone needing auxiliary services to assist in participation at the meeting please contact the City Clerk at (954) 828-5002 two days prior to the meeting.
4/20, 4/27/2017

PUBLIC NOTICE
The City of Fort Lauderdale is hosting a Vacant and Rental Retention and Inspection Compliance Workshop" to assist vacation rental operators with the application and inspection processes.
Location: City of Fort Lauderdale - Commission Chambers
100 N. Andrews Avenue Fort Lauderdale, FL 33311.
Date & Times: Monday - May 1, 2017 at 9:30 am - 11:30am, Tuesday - May 4, 2017 at 5:30 pm - 7:00pm
Both workshops will be recorded for future broadcast on the City's website: vacationrental@fortlauderdale.gov.
4/16, 4/20/2017

Sale Notices

NOTICE OF PUBLIC SALE
April 28, 2017 02:00 PM
NOTICE IS HEREBY GIVEN that BOCA STORAGE intends to sell by public auction at 3600 N.W. Boca Raton Blvd, Boca Raton, FL 33431 the personal property described below. Boca Storage holds a lien imposed on said property under the Florida Self Storage Facility Statutes (Section 83.801-83.809).
PERSONAL PROPERTY CONSISTING of items used around the garage or in or out of the home, i.e. kitchen, linoleum dishes, glassware, furniture, household goods and other misc. items.
PURCHASES MUST BE PAID FOR ALL THE POINT OF SALE IN "CASH ONLY". All items sold as is, where is and removed within 24 hours from the time of sale. This notice is subject to cancellation in the event of settlement between owner and obligated party.
UNIT NAME
1415 THE TECHNOWISE GROUP
1514 THE TECHNOWISE GROUP
1712 SOUTHSTAR
2016 SOUTHSTAR
3008 SOUTHSTAR
2915 JOSEPH WINBEY

4/20, 4/27/2017
NOTICE OF PUBLIC SALE
The following personal property of Cydney Webster a/k/a Cydney Marie Reynolds will on the 27th day of April 2017, at 10:00 a.m., on property located at 569 SW 132 Avenue, Lot #5-004, Davie, Broward County, Florida 33325, be sold for cash to satisfy storage fees in accordance with Florida Statutes, Section 715.109: 1993 CLARKE MOBILE PROPERTY MAZD VIN NO: FL1LN70A0264254
Title No: 0069439454
And All Other Personal Property Therein

PREPARED BY:
Rosia Sterling
Lutz, Bobo & Telfair, P.A.
2155 Delta Blvd., Suite 210-B
Tallahassee, Florida 32303
4/13, 4/20/2017

NOTICE OF PUBLIC SALE
Insurance Auto Auctions, Inc. gives Notice of Foreclosure of Lien and intent to sell these vehicles on 05/18/2017, 09:00 am at 5901 SW 205 Ave, Pembroke Pines, FL 33332, pursuant to subsection 713.78 of the Florida Statutes. IAIA, INC reserves the right to accept or reject any and/or all bids.
WDBT16J15F123775 2005 MERZ
4JCB56E08A06619 2008 MERZ
KMHU4J6D89U59795 2009 HYUN
TYVH2B87F5M47275 2012 MAZD
3N1AB6APXCL71626 2012 NISS
3N1CN7AP0CL836274 2012 NISS
5XGKN44Y1D6170858 2013 KIA
WDGDF4H8AD765938 2013 MERZ
KMNH48FE1J2430 2014 HYUN
WLDWFK85EA99106 2014 MERZ
1N4AL3APEN355247 2014 NISS
4/20/2017

Miscellaneous

NOTICE OF DEFAULT AND INTENT TO FORECLOSE
TO:
COLEEN DALY / 113 LAREINE AVE APT. 105BRADLEY BEACH, NJ 07720
VICTOR B DEETER & TRACI L LAWSON, 810 CARNES SCHOOL ROAD SENECA, PA 16346
TIMOTHY L. DOHERTY & MARY T. FORD DONER, 8676 IRIS STREET ARVADA, CO 80005
ALBERTO DOMINGUEZ & JUDITH VERDUZ-CO, EBANO NO 101 COLONIA PETROLERA CP MEXICO, 88680
LEONARDO D'ONOFRIO & KYBELE CHIRI-ROS, CALLEJON MUJICA EDIF FRAMECA TORRE "A", PISO 6, #6C, VALENCIA EDO CAR 2001 VENEZUELA
LONNIE PHILIP DURAN, 29259 SW VIL-LEBOIS DR. S WILSONVILLE, OR 97070
JAMES E. EVERETT, 720 W. 12 ST APT. 311NEWTON, KS 67114
ARIEL GONZALEZ FLORES & MINERVA MARTINEZ & ARIEL GONZALEZ MARTINEZ,

NOTICE OF DEFAULT AND INTENT TO FORECLOSE
TO:
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARGARET A AAMODT, DECEASED, 9710 SW GENERAL PATTON TERR PT. ST. LUCIE, FL 34953 / 13 / DEFAUL AMOUNT \$9,317.00
GLORIA J ALBANZOZZO / 54 PEARCE AVE LILLIUPPT POOLE DORSET, BH14 8EH ENGLAND / UNIT 2606 / WEEK 19 / DEFAUL AMOUNT \$2,702.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JACK L EARNST, DECEASED, 2940 SW RIDGEWOOD AVENUE PORTLAND, OR 97225 / UNIT 2207 / WEEK 38 / DEFAUL AMOUNT \$1,811.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JOHN J KELCH, DECEASED, 18070 LANGLOIS ROAD, SPC 255 DESERT TRAIL, DECORAH, IA 52002 / UNIT 2108 / WEEK 15 / DEFAUL AMOUNT \$1,010.90
GERALD P O'NELY / 3790 BOUL SAINT JOSEPH LACHINE QUEBEC CANADA, H8T 1P8 / UNIT 2101 / WEEK 21 / DEFAUL AMOUNT \$1,811.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JAMES F TRENT, DECEASED, 2487 E BLUEJAY BLUFF LANE GREEN VALLEY, AZ 85614 / UNIT 2704 / WEEK 12 / DEFAUL AMOUNT \$5,323.98
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF ANDREW B WITKO, DECEASED, 10084 AMELIA MANOR COURT MECHANICSVILLE, VA 23116

YOU ARE HEREBY NOTIFIED of the institution of the above styled proceeding by the TRUSTEE to foreclose a lien recorded due to unpaid assessments relative to the following described properties:
Unit Week No. 21, in Time Share Unit 2101 ALL ANNUAL
Unit Week No. 15, in Time Share Unit 2108 ALL ANNUAL
Unit Week No. 14, in Time Share Unit 2201 ALL ANNUAL
Unit Week No. 19, in Time Share Unit 2206 ALL ANNUAL
Unit Week No. 38, in Time Share Unit 2207 ALL ANNUAL
Unit Week No. 13, in Time Share Unit 2306 ALL ANNUAL
Unit Week No. 4, in Time Share Unit 2504 TRIC TRIENNIAL
Unit Week No. 32, in Time Share Unit 2506 TRIB TRIENNIAL
Unit Week No. 32, in Time Share Unit 2508 EVEN BIENNIAL
Unit Week No. 12, in Time Share Unit 2701 ALL ANNUAL
Unit Week No. 44, in Time Share Unit 2708 ODD BIENNIAL
ALL OF Vacation Village at Weston as defined in the Declaration of Covenants, Conditions, and Restrictions recorded in Official Records Book 30631, at Page 745, of the Public Records of Broward County, Florida (the "Plan").
AND you are required to serve a copy of your written defenses, if any, to this action, upon Greenspoon Marder, P.A., TRUSTEE, Timeshare Default Department, whose address is Trade Centre South, Suite 700, 100 West Cypress Creek Road, Fort Lauderdale, FL 33309, within thirty (30) days of the first date of publication, on or before May 20, 2017, otherwise as a result of the default, you risk losing ownership of your timeshare interest through the trustee foreclosure procedure established in Section 721.855, Florida Statutes. At any time before the Trustee issues the Certificate of Sale you may cure the default which is the subject of this action and redeem the timeshare interest by paying the amounts secured by the lien in cash or certified funds to the Trustee at the address above. After the Trustee issues the Certificate of Sale there is no right of redemption.
OBJECTION FORM:
Should the obligor(s) wish to exercise the obligor's right to object to the use of the trustee foreclosure procedure contained in section 721.855, Florida Statutes, select your name below and return it to Greenspoon Marder, P.A., TRUSTEE, Timeshare Default Department, whose address is Trade Centre South, Suite 700, 100 West Cypress Creek Road, Fort Lauderdale, FL 33309.

THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARGARET A AAMODT, DECEASED / 9710 SW GENERAL PATTON TERR PT. ST. LUCIE, FL 34953 / 13 / DEFAUL AMOUNT \$9,317.00
GLORIA J ALBANZOZZO / 54 PEARCE AVE LILLIUPPT POOLE DORSET, BH14 8EH ENGLAND / UNIT 2206 / WEEK 19 / DEFAUL AMOUNT \$2,702.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JACK L EARNST, DECEASED / 2940 SW RIDGEWOOD AVENUE PORTLAND, OR 97225 / UNIT 2207 / WEEK 38 / DEFAUL AMOUNT \$1,811.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JOHN J KELCH, DECEASED / 18070 LANGLOIS ROAD, SPC 255 DESERT TRAIL SPRINGS, CA 92241 / UNIT 2708 / WEEK 44 / DEFAUL AMOUNT \$1,010.90
GERALD P O'NELY / 3790 BOUL SAINT JOSEPH LACHINE QUEBEC CANADA, H8T 1P8 / UNIT 2101 / WEEK 21 / DEFAUL AMOUNT \$1,811.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JAMES F TRENT, DECEASED / 2487 E BLUEJAY BLUFF LANE GREEN VALLEY, AZ 85614 / UNIT 2704 / WEEK 12 / DEFAUL AMOUNT \$5,323.98
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF ANDREW B WITKO, DECEASED / 10084 AMELIA MANOR COURT MECHANICSVILLE, VA 23116 / WEEK 15 / DEFAUL AMOUNT \$1,811.00
WITNESS MY HAND AND SEAL ON this 15TH day of APRIL, 2017.
By: GREENSPOON MARDER, TRUSTEE
4/20, 4/27/2017

Miscellaneous

MARTINEZ, APARTADO 0838 00753 ZONA 12, REPUBLICA DE PANAMA, PANAMA
BRUD M. FOOTE, 327 BROAD STREET SWEDESBORO, NJ 08085
EILEEN PEARTE, 28 FREDRICK BLVD SWEDESBORO, NJ 08085
ELISABETH BROOM FORD & EMMAUEL DAVID FORD, 3022 W. TRAPANOTTO DRIVE PHOENIX, AZ 85086
LONNIE PHILIP DURAN, 29259 SW VIL-LEBOIS DR. S WILSONVILLE, OR 97070
JAMES E. EVERETT / 720 W. 12 ST APT. 311NEWTON, KS 67114 / UNIT 401 / WEEK 9 / DEFAUL AMOUNT \$9,559.00
ARIEL GONZALEZ FLORES / APARTADO 0838 00753 ZONA 12, REPUBLICA DE PANAMA / UNIT 210 / WEEK 33 / DEFAUL AMOUNT \$3,557.00
MINERVA MARTINEZ / APARTADO 0838 00753 ZONA 12, REPUBLICA DE PANAMA / UNIT 210 / WEEK 33 / DEFAUL AMOUNT \$3,557.00
BRUD M. FOOTE / 327 BROAD STREET SWEDESBORO, NJ 08085 / UNIT 703 / WEEK 23 / DEFAUL AMOUNT \$2,676.00
ELISABETH BROOM FORD / 3022 W. TRAPANOTTO DRIVE PHOENIX, AZ 85086 / UNIT 505 / WEEK 42 / UNIT 502 / WEEK 29 / DEFAUL AMOUNT \$6,062.00 PER UNIT
EMMAUEL DAVID FORD / 3022 W. TRAPANOTTO DRIVE PHOENIX, AZ 85086 / UNIT 505 / WEEK 42 / UNIT 502 / WEEK 29 / DEFAUL AMOUNT \$6,062.00 PER UNIT
WILLIAM FORSHY / 200 MARKER ST 412 LLOWELL, MA 01852 / UNIT 202 / WEEK 34 / DEFAUL AMOUNT \$2,676.00
WITNESS MY HAND AND SEAL ON this 15TH day of APRIL, 2017.
By: GREENSPOON MARDER, TRUSTEE
4/20, 4/27/2017

PUBLIC NOTICE
BUDGET WORKSHOP MEETINGS
CITY OF COOPER CITY
NOTICE IS HEREBY GIVEN, that the City of Cooper City will hold Budget Workshops for the Fiscal Year 2017-2018 Budget Year in the auditorium of the Municipal Building located at 9090 Southwest 50 Place Cooper City, Florida. Persons with disabilities requiring accommodations in order to participate should contact the City Clerk's Office at (954) 434-4300 at least 24 hours in advance to request such accommodations. If a person decides to appeal any decision made by the City Commission with respect to any matter considered at such meeting or hearing, he/she will need a record of the proceedings, and that for such purpose, he/she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. F.S. 286.1005. The following dates have been scheduled for the Budget Workshops, which will begin at 6:30 p.m. on each of the dates set forth below:
Monday, May 1, 2017: Public input on recommended funding for projects and programs of public interest;
Tuesday, May 2, 2017: Public input on recommended funding for projects and programs of public interest;
Tuesday, May 16, 2017: Commission review and consideration of recommendations received from the public input process, and provision of additional input from the commission, all in accordance with City Charter Section 5.02.
Wednesday, May 17, 2017: Commission review and consideration of recommendations received from the public input process, and provision of additional input from the commission, all in accordance with City Charter Section 5.02.

CITY OF COOPER CITY, FLORIDA
SUSAN POLING, CITY CLERK
4/20/2017

NOTICE OF DEFAULT AND INTENT TO FORECLOSE
TO:
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF STEPHEN J. FUKES, DECEASED, 203 MAIN ST. WHITESBORO, NY 13492 / UNIT 2715 / WEEK 45 / DEFAUL AMOUNT \$1,673.80
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF JOHN S GETZENDANNER, DECEASED, 21007 CRESTVIEW COURT LAWRENCEBURG, IN 47025 / UNIT 2513 / WEEK 30 / DEFAUL AMOUNT \$2,625.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF WILLIAM GREER, DECEASED, 85 FREE RD DEVILLE, LA 71328 / UNIT 24 / DEFAUL AMOUNT \$4,456.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARJORIE JOYCE, DECEASED, 152 PARK STREET WEST ROXBURY, MA 02132 / UNIT 2109 / WEEK 10 / DEFAUL AMOUNT \$8,110.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF GEORGE M. CIVITELLI, DECEASED, P.O. BOX 17277 ANAHEIM HILLS, CA 92817 / UNIT 2612 / WEEK 8 / DEFAUL AMOUNT \$4,456.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARJORIE JOYCE, DECEASED, 152 PARK STREET WEST ROXBURY, MA 02132 / UNIT 2109 / WEEK 10 / DEFAUL AMOUNT \$8,110.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARJORIE JOYCE, DECEASED, 152 PARK STREET WEST ROXBURY, MA 02132 / UNIT 2109 / WEEK 10 / DEFAUL AMOUNT \$8,110.00
THE UNKNOWN SPOUSE, HEIRS, DEVISEES, GRANTEES, ASSIGNEES, LIENORS, CREDITORS, TRUSTEES, AND ALL OTHER PARTIES CLAIMING AN INTEREST BY, THROUGH, UNDER OR AGAINST THE ESTATE OF MARJORIE JOYCE, DECEASED, 152 PARK STREET WEST ROXBURY, MA 021

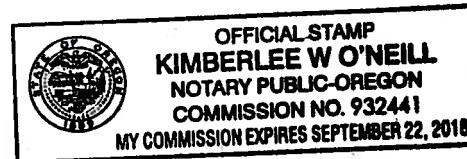
State of Oregon,) ss

County of Multnomah)

Justin Eubanks being duly sworn, deposes that he/she is principal clerk of Oregonian Media Group; that The Oregonian is a public newspaper published in the city of Portland, with general circulation in Oregon, and this notice is an accurate and true copy of this notice as printed in said newspaper, was printed and published in the regular edition and issue of said newspaper on the following date(s):

The Oregonian 05/03/2017


Principal Clerk of the Publisher



Sworn to and subscribed before me this 3rd day of May 2017


Notary Public

Public meeting for the National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement

The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program, a federal program established by Congress to provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document.

FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the Draft NPEIS at:

Multnomah County Library Midland
Branch, 805 SE 122nd Avenue,
Portland, OR 97233
Wednesday, May 10, 2017 from
5:00-7:00 p.m. PT

In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>. FEMA invites you to submit comments at <http://www.regulations.gov> (Docket ID FEMA-2012-0012) or by mail to Regulatory Affairs Legal Division, Office of Chief Counsel, FEMA, Room 835, 500 C St SW, Washington, DC 20472-3100. Written comments must be postmarked by June 6, 2017.

AFFIDAVIT OF PUBLICATION

CYPRESS MEDIA, LLC, publishers of
THE KANSAS CITY STAR, a newspaper
published in the City of Kansas City,
County of Jackson, State of Missouri,
confirms that the notice and/or
advertisement of

BOOZ ALLEN HAMILTON
MILES SPENRATH
112 E PECAN ST, SUITE 900
SAN ANTONIO TX 78205
25402278

4872553 C

a true copy of which is hereto attached,
was duly published in the above said newspaper

FOR THE PERIOD OF: 1 Day (s)

COMMENCING: May 10, 2017

ENDING: May 10, 2017

STAR EDITION (S):
5/10/

VOLUME: #137

Subscribed and sworn to before me,
this Saturday, 13 May, 2017 .

I certify that I was duly qualified
as a Notary Public for the State of
Missouri, commissioned in Jackson
County, Missouri. My commission
expires October 3, 2018.



Vickie L. Holden, Notary

Vickie L. Holden
Notary Public - Notary Seal
State of Missouri, Jackson County
Commission #14394648
My Commission Expires October 3, 2018

Public meeting for the National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement

The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program, a federal program established by Congress to provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document.

FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the Draft NPEIS at:

Kansas City Public Library Trails West Branch
11401 East 23rd Street, Independence, MO 64052
Wednesday, May 17, 2017 from 5:00-7:00 p.m. CT

In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>. FEMA invites you to submit comments at <http://www.regulations.gov> (Docket ID FEMA-2012-0012) or by mail to Regulatory Affairs Legal Division, Office of Chief Counsel, FEMA, Room 835, 500 C St SW, Washington, DC 20472-3100. Written comments must be postmarked by June 6, 2017.

Ad # 12104238 Name BOOZ ALLEN HAMILTON
Class 820 PO# Authorized by

Size 78 Lines

T0001
Account 2010273296

PROOF OF PUBLICATION

District of Columbia, ss., Personally appeared before me, a Notary Public in and for the said District, Travona James well known to me to be BILLING SUPERVISOR of The Washington Post, a daily newspaper published in the City of Washington, District of Columbia, and making oath in due form of law that an advertisement containing the language annexed hereto was published in said newspaper on the dates mentioned in the certificate herein.

I Hereby Certify that the attached advertisement was published in The Washington Post, a daily newspaper, upon the following date(s) at a cost of \$951.64 and was circulated in the Washington metropolitan area.

Published 1 time(s). Date(s): 12 of May 2017

Account 2010273296

Witness my hand and official seal this 7th day of June 20 17

My commission expires 5/31/2020



Public meeting for the National Flood Insurance Program Draft Nationwide Programmatic Environmental

Impact Statement The Federal Emergency Management Agency (FEMA) is proposing to implement modifications to the National Flood Insurance Program, a federal program established by Congress to

provide access to federally backed flood insurance protection for property owners and to reduce future flood losses nationwide through sound, community-enforced building and zoning ordinances. FEMA has released a draft Nationwide Programmatic Environmental Impact Statement (NPEIS) and will conduct public meetings to receive comments related to the document. FEMA will hold a public meeting to allow the public an opportunity to learn more and to provide comments on the Draft NPEIS

at: FEMA Headquarters 400 C Street SW, Conference Center Room A, Washington, DC 20472 Friday, May

19, 2017 from 3:00-5:00 p.m. EDT In addition to the public meeting, FEMA has scheduled several webinars. To register for a webinar, visit

[https://www.fema.gov/programmatic-environmental-impact-](https://www.fema.gov/programmatic-environmental-impact-statement)

statement. FEMA invites you to submit comments at <http://www.regulations.gov> (Docket ID FEMA-2012-

0012) or by mail to Regulatory Affairs Legal Division, Office of Chief Counsel, FEMA, Room 835, 500

C St SW, Washington, DC 20472-3100. Written comments must be postmarked by June 6, 2017.

Appendix C
FEMA Bulletins

Receive Updates



FEMA

FEMA Bulletin Week of April 10, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 04/11/2017 02:00 PM EDT



FEMA

FEMA BULLETIN

Week of April 10, 2017

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In this Edition:

- Last Call for Comments on the Public Assistance Deductible Concept
- FEMA Seeks Comments on Nationwide Programmatic Environmental Impact Statement on the NFIP
- FEMA Issues an Update to the Public Assistance Program and Policy Guide
- Preventing Arson at Houses of Worship Webinar
- Coming Soon: Fiscal Year 2016 Fire Prevention & Safety Application Period
- FEMA Congratulates Basic Academy Graduates
- Reminder of Upcoming Deadlines

Last Call for Comments on the Public Assistance Deductible Concept

FEMA continues to solicit comments on the Public Assistance Deductible Supplemental Advance Notice of Proposed Rulemaking (SANPRM) until **April 12, 2017 at 11:59 p.m. ET**. The Public Assistance Deductible will create an incentivized system that encourages additional investments in mitigation, risk-reduction, and preparedness. As the concept is still in the early stages of development, FEMA is seeking comment on all aspects of the deductible, including whether there are

Important Dates & Deadlines



Public Assistance
Deductible Concept
Open Comment Period
Deadline



Increasing Engagement
with Faith-based
Organizations in
Disaster Preparedness
Webinar

alternatives that will better achieve FEMA's objectives of lowering future disaster costs through increased investments in risk-reduction.



Nationwide
Programmatic
Environmental Impact
Statement Open
Comment Period
Deadline

The framework is described in full detail in the [Supplemental Advance Notice of Advance Rulemaking \(SANPRM\)](#) available for comment on

www.Regulations.gov Docket ID: [FEMA_FRDOC_0001](#) and on the Federal Register as Document Number [2017-00467](#).

If you have any questions about the deductible or experience difficulty posting a comment, please contact Colt Hagmaier at william.hagmaier@fema.dhs.gov.

FEMA Seeks Comments on Nationwide Programmatic Environmental Impact Statement on the NFIP

On April 7, FEMA published a [Federal Register](#) notice to seek public comment on a draft [Nationwide Programmatic Environmental Impact Statement \(NPEIS\)](#) about the National Flood Insurance Program (NFIP). As required by the National Environmental Policy Act (NEPA), FEMA developed this draft NPEIS to examine the impacts of proposed improvements and modifications to the NFIP. This draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP.

The NFIP proposed modifications are needed to implement the legislative requirements of the [Biggert-Waters Flood Insurance Reform Act of 2012 \(BW-12\)](#) and the [Homeowner Flood Insurance Affordability Act of 2014 \(HFIAA\)](#), and to demonstrate compliance with the Endangered Species Act (ESA). Today, more than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage. The NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disaster.

The public comment period is open for 60 days from April 7, 2017 to **June 6, 2017**. Download a copy of the draft NPEIS and provide comments directly to FEMA via www.regulations.gov. Search for **Docket ID FEMA-2012-0012**. In addition, public meetings and webinars are scheduled by FEMA to allow the public an opportunity to learn more about the project and to provide comments on the NFIP draft NPEIS. For a list of locations and webinar dates and times, visit www.fema.gov/programmatic-environmental-impact-statement.

FEMA Issues an Update to the Public Assistance Program and Policy Guide

FEMA issued an update to the [Public Assistance Program and Policy Guide \(PAPPG\)](#), effective for all disasters declared on or after April 1, 2017. The Public Assistance Program and Policy Guide (PAPPG) combines all Public Assistance (PA) policy into one consolidated document. The PAPPG also includes an overview of the PA Program implementation process, with links to other publications and documents that provide additional process details.

Receive Updates



FEMA

FEMA Bulletin Week of April 17, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 04/18/2017 02:00 PM EDT



FEMA

FEMA BULLETIN

Week of April 17, 2017

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In this Edition:

- Notice of Funding Opportunity: Fiscal Year 2016 Fire Prevention & Safety Grants Application Period
- Real-Time Emergency Alerts on Your Mobile Device
- FEMA Congratulates National Emergency Management Advanced Academy Graduates
- Reminder of Upcoming Deadlines

Notice of Funding Opportunity: Fiscal Year 2016 Fire Prevention & Safety Grants Application Period

FEMA's annual funding opportunity for the Fire Prevention and Safety (FP&S) grants is now open. FP&S grants support projects that enhance the safety of the public and firefighters from fire and related hazards.

The application period for the Fiscal Year (FY) 2016 FP&S grants will close on **Friday, May 19, 2017, at 5**

Important Dates & Deadlines



Fiscal Year 2016 Fire Prevention & Safety Grants Application Deadline



Nationwide Programmatic Environmental Impact Statement Open Comment Period Deadline

impact of major flooding on their community. The VTTX involves key personnel discussing simulated scenarios in an informal setting, and can be used to assess plans, policies, training, and procedures during a flood and inundation challenge.

The VTTX occurs 12-4 p.m. ET. To participate, send an email to douglas.kahn@fema.dhs.gov with a courtesy copy to fema-emi-iemb@fema.dhs.gov or call 301-447-1381. **The application deadline is May 1, 2017.** Additional information is available at <https://training.fema.gov/programs/emivttx.aspx>.

FEMA Seeks Comments on Nationwide Programmatic Environmental Impact Statement on the NFIP

On April 7, FEMA published a [Federal Register](#) notice to seek public comment on a draft [Nationwide Programmatic Environmental Impact Statement](#) (NPEIS) about the National Flood Insurance Program (NFIP). As required by the National Environmental Policy Act (NEPA), FEMA developed this draft NPEIS to examine the impacts of proposed improvements and modifications to the NFIP. This draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP.

The public comment period is open for 60 days from April 7, 2017 until **June 6, 2017**. Download a copy of the draft NPEIS and provide comments directly to FEMA via www.regulations.gov. Search for **Docket ID FEMA-2012-0012**. In addition, public meetings and webinars are scheduled by FEMA to allow the public an opportunity to learn more about the project and to provide comments on the NFIP draft NPEIS. For a list of locations and webinar dates and times, visit www.fema.gov/programmatic-environmental-impact-statement.

FEMA's Office of External Affairs (OEA) provides this bulletin to highlight the agency's recent and upcoming program and policy activities and announcements. Feedback is welcome at fema-bulletin@fema.dhs.gov. Previous editions are available at www.fema.gov/fema-bulletin. This bulletin is not intended to provide a comprehensive list of policies that are open for public comment, nor does it describe all of the instructions or requirements necessary to submit a comment. For a complete list of instructions and deadlines please click the hyperlinks included. FEMA does not endorse any non-government organizations, entities or services.

OEA's mission is to engage, inform, and educate all of FEMA's stakeholders in support of the Agency's programs and initiatives to achieve its mission. OEA accomplishes its mission by coordinating and maintaining visibility of public and internal communications; advising FEMA program and support offices on decision-making regarding policies, plans, and actions that affect stakeholder, media, and Congressional audiences; and organizing outreach efforts targeted at principal stakeholders to include state, local, tribal, and territorial governments, the private sector, national organizations and associations, and the American public.

[SHARE](#)



FEMA

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Receive Updates



FEMA

FEMA Bulletin Week of April 24, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 04/25/2017 03:30 PM EDT



FEMA

FEMA BULLETIN

Week of April 24, 2017

[View as Webpage](#) | [Subscribe](#)

In this Edition:

- Technical Mapping Advisory Council Report Release
- Webinar on Cost Estimating Principles for Hazard Mitigation Assistance Application Programs
- Webinar on Improving Fire Safety and Arson Awareness for Faith-Based and Community Organizations
- Opening Soon: 2017 FEMA Individual and Community Preparedness Award Application Period
- Spring Can Bring Increased Risk of Severe Weather
- Reminder of Upcoming Deadlines

Technical Mapping Advisory Council Report Release

The 20-member Technical Mapping Advisory Council (TMAC) is a federal advisory committee established to review and make recommendations to FEMA on matters related to the National Flood Mapping Program. This is required by the [Biggert-Waters Flood Insurance Reform Act of 2012 \(BW-12\)](#) and the [Homeowner Flood Insurance Affordability Act of 2014 \(HFIAA\)](#).

Important Dates & Deadlines



Fiscal Year 2016 Fire Prevention & Safety Grants Application Deadline



Nationwide Programmatic Environmental Impact Statement Open

non-profit, voluntary organization, and private sector leaders who are responsible for emergency management or homeland security.

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For more information, contact fema-empp-advanced-academy@fema.dhs.gov.

FEMA Seeks Comments on Nationwide Programmatic Environmental Impact Statement on the National Flood Insurance Program

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The public comment period is open for 60 days until **June 6, 2017**. Download a copy of the draft NPEIS and provide comments directly to FEMA via www.regulations.gov. Search for **Docket ID FEMA-2012-0012**. In addition, public meetings and webinars are scheduled by FEMA to allow the public an opportunity to learn more about the project and to provide comments on the NFIP draft NPEIS. For a list of locations and webinar dates and times, visit www.fema.gov/programmatic-environmental-impact-statement.

FEMA's Office of External Affairs (OEA) provides this bulletin to highlight the agency's recent and upcoming program and policy activities and announcements. Feedback is welcome at fema-bulletin@fema.dhs.gov. Previous editions are available at www.fema.gov/fema-bulletin. This bulletin is not intended to provide a comprehensive list of policies that are open for public comment, nor does it describe all of the instructions or requirements necessary to submit a comment. For a complete list of instructions and deadlines please click the hyperlinks included. FEMA does not endorse any non-government organizations, entities or services.

OEA's mission is to engage, inform, and educate all of FEMA's stakeholders in support of the Agency's programs and initiatives to achieve its mission. OEA accomplishes its mission by coordinating and maintaining visibility of public and internal communications; advising FEMA program and support offices on decision-making regarding policies, plans, and actions that affect stakeholder, media, and Congressional audiences; and organizing outreach efforts targeted at principal stakeholders to include state, local, tribal, and territorial governments, the private sector, national organizations and associations, and the American public.

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FEMA Bulletin Week of May 1, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 05/02/2017 02:00 PM EDT



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Week of May 1, 2017

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In this Edition:

- 2017 FEMA Individual and Community Preparedness Award Application Period Now Open
- 2017 NOAA Hurricane Hunter Awareness Tour
- FEMA Supports National Building Safety Month
- Emergency Management Institute Offers Earthquake Virtual Tabletop Exercise
- Fire Safety Tips: Wildfire Season
- National Small Business Week
- Reminder of Upcoming Deadlines

2017 FEMA Individual and Community Preparedness Award Application Period Now Open

The application period for the 2017 FEMA Individual and Community Preparedness Awards is now open. The awards highlight innovative local practices and achievements by honoring individuals, organizations, and jurisdictions that have made outstanding contributions toward strengthening their community to prepare for, respond to, recover from, and mitigate a disaster.

Important Dates & Deadlines



Fiscal Year 2016 Fire Prevention & Safety Grants Application Deadline



FEMA Individual and Community Preparedness Award Application Deadline Nationwide

funds to include Firefighter Safety Research and Development. For more information on fire prevention grants, visit www.fema.gov/fire-prevention-safety-grants.

National Emergency Management Advanced Academy Applications

EMI is accepting applications for the [National Emergency Management Advanced Academy](#). This program addresses program management and oversight, effective communication, integrated collaboration, and strategic thinking skills. The target audience is mid-level managers who have a minimum of three years of experience in an emergency management position to include government, non-profit, voluntary organization, and private sector leaders who are responsible for emergency management or homeland security.

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For more information, contact fema-empp-advanced-academy@fema.dhs.gov.

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FEMA Bulletin Week of May 8, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 05/09/2017 02:00 PM EDT



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FEMA BULLETIN

Week of May 8, 2017

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In this Edition:

- 2017 Hurricane Preparedness Week
- Emergency Management Institute Offers Advanced Public Information Officer Training
- Reminder of Upcoming Deadlines

2017 Hurricane Preparedness Week

This week is [National Hurricane Preparedness Week](#). It only takes one hurricane to change your life and your community. Hurricanes are one of nature's most powerful and destructive events that the nation faces, and the cause behind eight of the ten costliest disasters in U.S. history. Hurricanes are not just a coastal concern. High winds, heavy rainfall, tornadoes, and flooding can be felt hundreds of miles inland, potentially causing loss of life and catastrophic damage to property.

Hurricane season begins **June 1** and ends November 30. Now is the time to prepare, if you -- or a close family member -- live in an area prone to hurricanes or inland flooding. Make a family emergency communication plan.

Important Dates & Deadlines



Fiscal Year 2016 Fire Prevention & Safety Grants Application Deadline



FEMA Individual and Community Preparedness Award Application Deadline



Nationwide Programmatic Environmental Impact Statement Open

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For more information, contact fema-emp-advanced-academy@fema.dhs.gov.

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FEMA Bulletin Week of May 15, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 05/16/2017 02:00 PM EDT



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Week of May 15, 2017

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In this Edition:

- Mutual Aid Gets a Boost Through New National Incident Management System Products
- Manage the Damage — Preparing for Natural Disasters
- Webinar: Learn about Building a Safe Room
- Historically Black Colleges and Universities Attend Course at Emergency Management Institute
- Apply for the 2018 National Emergency Management Executive Academy
- Reminder of Upcoming Deadlines

Mutual Aid Gets a Boost Through New National Incident Management System Products

FEMA is committed to improving the nation's ability to manage all threats and hazards. As such, FEMA's National Integration Center released a suite of draft National Incident Management System (NIMS) Resource Management guidance documents that enhance the interoperability and effectiveness of mutual aid between jurisdictions and agencies. FEMA is holding a National Engagement period to solicit feedback.

Important Dates & Deadlines



Fiscal Year 2016 Fire Prevention & Safety Grants Application Deadline



FEMA Individual and Community Preparedness Award Application Deadline Nationwide

National Emergency Management Advanced Academy Applications

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The Advanced Academy Program consists of four resident courses and is five days in length. Classes begin in October, November, or December 2017 and are ideally taken sequentially through September 2018. [Applications](#) will be accepted until **May 31, 2017**, with selections in June and announcements in July.

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Emergency Management Institute Offers Advanced Public Information Officer Training

EMI is offering the Advanced Public Information Officer (PIO) course, July 24-28, at the National Emergency Training Center in Emmitsburg, Maryland. The course provides public information officers the opportunity to increase their knowledge and skills for establishing, managing and working in a joint information center (JIC). The training fosters an environment where participants can apply advanced skills during a multi-day functional exercise designed to test and enhance their ability to analyze, coordinate, process, and create information in a fast-paced, realistic environment. Using interactive lectures from subject matter experts and an intense functional exercise, the Advanced PIO course

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FEMA Bulletin Week of May 22, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 05/23/2017 02:00 PM EDT



FEMA

FEMA BULLETIN

Week of May 22, 2017

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In this Edition:

- Building Community Resilience in Puerto Rico
- Apply to Become a Trainer for the National Emergency Management Basic Academy
- Reminder of Upcoming Deadlines

Building Community Resilience in Puerto Rico

In ongoing efforts to build community resilience through strategic public-private partnerships, FEMA's Caribbean Area Division participated in the 2017 Annual Disaster Management Workshop hosted by Tropical Shipping and TOTE Maritime in San Juan, Puerto Rico, on March 29.

More than 150 participants – representing pharmaceutical and manufacturing industries, wholesalers, maritime and ground transportation, federal, state, and territorial partners, and others – learned about FEMA's emergency preparedness resources and grants that are available to U.S. jurisdictions in the Caribbean. Presenters also talked about natural and man-made hazards and vulnerabilities, as well as cybersecurity,

Important Dates & Deadlines



FEMA Individual and Community Preparedness Award Application Deadline



Nationwide Programmatic Environmental Impact Statement Open Comment Period Deadline

National Incident Management System Resource Management

The Advanced Academy Program consists of four resident courses and is five days in length. Classes begin in October, November, or December 2017 and are ideally taken sequentially through September 2018. [Applications](#) will be accepted until **May 31, 2017**, with selections in June and announcements in July.

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FEMA Seeks Comments on Nationwide Programmatic Environmental Impact Statement on the National Flood Insurance Program

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FEMA Seeks Comments on Draft National Incident Management System Resource Management Guidance Documents

FEMA is committed to improving the nation's ability to manage all threats and hazards. As such, FEMA's National Integration Center released a suite of draft National Incident Management System (NIMS) Resource Management guidance documents that enhance the interoperability and effectiveness of mutual aid between jurisdictions and agencies. FEMA is holding a National Engagement period to solicit feedback.

The drafts include the NIMS Guideline for the National Qualification System (NQS), NIMS Job Titles/Position Qualifications and accompanying Position Task Books (PTB), Resource Types, the NIMS Guideline for Mutual Aid, and an updated NIMS Guideline for the Credentialing of Personnel. Documents are available for review and comment through **Friday, June 9, 2017**.

In addition, FEMA is hosting a series of 60-minute webinars to describe the draft documents and answer participants' questions about providing feedback. To review the drafts of the NIMS Resource Management supplemental guidance and tools, and to obtain additional webinar information, visit www.fema.gov/national-incident-management-system/national-engagement. To provide comments on

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FEMA Bulletin Week of May 29, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 05/30/2017 02:00 PM EDT



FEMA BULLETIN

Week of May 29, 2017

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In this Edition:

- FEMA Observes National Dam Safety Awareness Day
- National Oceanic and Atmospheric Administration Releases Hurricane Season Outlook
- Fire Safety Tips: Grilling
- Coming Soon: FEMA Tribal Outreach and Consultation Period on FEMA Tribal Consultation Policy
- Individual and Community Preparedness Awards Application Period Extended
- Reminder of Upcoming Deadlines

FEMA Observes National Dam Safety Awareness Day

FEMA encourages our partners to join us in supporting [National Dam Safety Awareness Day](#) on **Wednesday, May 31**. The day serves as a reminder of the tragic failure of the South Fork Dam in Johnstown, Pennsylvania on May 31, 1889. The incident resulted in the loss of more than 2,200 lives, and was the worst dam failure in the history of the United States.

Approximately 15,000 dams in the United States are classified as high-hazard potential, meaning that their

Important Dates & Deadlines



Individual and Community Preparedness Awards Application Deadline (extended)



Nationwide Programmatic Environmental Impact Statement Open

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FEMA

FEMA Bulletin Week of June 5, 2017

FEMA (Federal Emergency Management Agency) sent this bulletin at 06/06/2017 02:00 PM EDT



FEMA BULLETIN

Week of June 5, 2017

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In this Edition:

- Continuity Guidance Circular Draft Released for National Engagement
- Notice of Funding Opportunity: Fiscal Year 2017 Preparedness Grants
- FEMA Tribal Outreach and Consultation Period on FEMA Tribal Consultation Policy
- Comments Needed for Draft Policy on Floodplain Development
- Hazard Mitigation Assistance Webpage Project
- Online Webinar Series Focuses on Procurements Under Disaster Grants
- FEMA Congratulates Basic Academy Graduates
- Emergency Management Institute Hosts Training e-Forums in June
- Reminder of Upcoming Deadlines

Continuity Guidance Circular Draft Released for National Engagement

FEMA released the draft of an updated Continuity Guidance Circular for national engagement. The document provides recommendations on developing and maintaining the capability to ensure continuity of operations, continuity of government, and enduring constitutional government. National preparedness and sustainment of essential functions is a shared

Important Dates & Deadlines



Individual and Community Preparedness Awards Application Deadline



Nationwide Programmatic Environmental Impact

Appendix D
Public Meeting Announcements

From: NFIP-Programmatic-EIS <nfip-programmatic-eis@fema.dhs.gov>
Sent: Friday, March 31, 2017 12:05 PM
To: rheimbach@jmt.com; tchowdhury@sara-tx.org
Subject: FW: Announcement of Draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP)

Today the Federal Emergency Management Agency (FEMA) announced the availability of the draft National Flood Insurance Program's (NFIP) Nationwide Programmatic Environmental Impact Statement (NPEIS). The NFIP draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP. The purpose for making program modifications to the NFIP is to:

- (a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014; and
- (b) demonstrate compliance with the Endangered Species Act (ESA).

To download a copy of the NFIP draft NPEIS prior to the announcement in the Federal Register, visit: <https://filetransfer.bah.com/fcweb/jsp/downloadFiles.jsp?0398=1490964290398>.

Tracking Number: P5MMQXUX137SCG9B
PIN: 238289

You can also download a copy via the federal e-rulemaking portal (<https://www.regulations.gov>; Docket ID FEMA-2012-0012) on April 7, 2017.

FEMA will hold public meetings to allow the public an opportunity to learn more about the project and to provide comments on the draft NFIP NPEIS at the following locations:

April 2017

- **Brooklyn, New York**
New York Headquarters Fire Department
9 MetroTech Center, Brooklyn, NY 11201
Thursday, April 20, 2017
3:30-5:30 p.m. EDT
- **New Orleans, Louisiana**
New Orleans Public Library
219 Loyola Avenue, New Orleans, LA 70112
Tuesday, April 25, 2017
5:30-7:30 p.m. Central Time (CT)
- **Ft. Lauderdale, Florida**
United Way of Broward County Ansin Building
1300 South Andrews Avenue, Ft Lauderdale, FL 33316
Thursday, April 27, 2017
5:00-7:00 p.m. EDT

May 2017

- **Portland, Oregon**
Multnomah County Library Midland Branch
805 SE 122nd Avenue, Portland, OR 97233
Wednesday, May 10, 2017
5:00-7:00 p.m. Pacific Time (PT)
- **Kansas City, Missouri**
Kansas City Public Library
14 West Tenth Street, Kansas City, MO 64105
Wednesday, May 17, 2017
5:00-7:00 p.m. CT
- **Washington, DC**
FEMA Headquarters
400 C Street SW, Conference Center Room A, Washington, DC 20472
Friday, May 19, 2017
3:00-5:00 p.m. EDT

In addition to the public meetings, FEMA has organized a series of webinars. Similar to the in-person public meetings, FEMA will present information during the webinars about the draft NPEIS and accept comments on the document. Webinars are scheduled for the following dates:

- **Tuesday, April 18, 2017** from 2:00-4:00 p.m. EDT
- **Wednesday, April 26, 2017** from 5:00-7:00 p.m. EDT
- **Tuesday, May 9, 2017** from 5:00-7:00 p.m. PT

To register for a webinar or for more information, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

Comments may be submitted by one of the following methods and must be identified by Docket ID FEMA-2012-0012:

- *Federal eRulemaking Portal*: <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for submitting comments.
- *Mail/Hand Delivery/Courier*: Regulatory Affairs Legal Division, Office of Chief Counsel, Federal Emergency Management Agency, Room 8NE, 500 C Street SW, Washington, DC 20472

The public comment period on the NFIP draft NPEIS starts with a concurrent publication in the Federal Register and will end on June 6, 2017. FEMA will consider all comments recorded at the public meetings and webinars and electronic and written comments on the NFIP draft NPEIS received or postmarked by June 6, 2017. Agencies, interested parties, and the public are invited to submit comments on this Draft NPEIS at any time during the public comment period.

From: NFIP-Programmatic-EIS <nfip-programmatic-eis@fema.dhs.gov>
Sent: Friday, April 07, 2017 8:59 AM
To: 'ernestr@porthuron.org'; 'Elise.Moore@pinalcountyaz.gov'; 'pcorbett@goulstonstorrs.com';
'jwaters@umtowsnip.org'; 'willokelly@gmail.com'; 'kevin.wagner@maryland.gov';
'marc.macy@state.sd.us'; 'maureen.sheehan@gsa.gov'; 'merrie.inderfurth@gmail.com';
'lovephilliplestroy@yahoo.com'; 'david.carlton@atkinsglobal.com'; 'dlasorsa@co.clallam.wa.us';
'hokamura@scd.hawaii.gov'; 'john.callen@nebraska.gov'; 'matt.koch@aecom.com'; 'shanajones1
@charter.net'; 'shuhai.zheng@nebraska.gov'; 'tmm@mail.maricopa.gov'; 'conrad.david.r@gmail.com';
'elaine.sudanowicz@boston.gov'; 'jason.kahn@noaa.gov'; Gilbert, Jennifer (OGA); 'jrefolo@sara-
tx.org'; 'katie.ringland@nebraska.gov'; 'lh-segedy@americanrivers.org'; 'llaster@papionrd.org';
'lrosetti@madeirabeachfl.gov'; 'mwagner@ci.oceanside.ca.us'; 'megp@portsmouthva.gov';
'mmorshed@cityofredlands.org'; 'osmahn.kadri@gsa.gov'; 'rstevens24@cox.net';
'ryan.hodges@dukerealty.com'; 'teri.george@cox.net'; 'tebarnardpe@epix.net';
'vsmith@pewtrusts.org'; 'jlinkogle@longboatkey.org'; 'mainguyd@porthuron.org';
'david.lewis@GOULSTONSTORRS.com'; 'commissioner@coopertowntn.org';
'macsugarland@gmail.com'; 'angela.chaisson@urs.com'; 'cynthia.nurmi@dot.gov'; Blanton, Emily;
'esans@valleywater.org'; 'james.robertson.1@us.af.mil'; Smith, Jonathan; 'jmlemmon@att.net';
'kthewes@davisfloyd.com'; 'laura.shick@hq.dhs.gov'; 'mpitto@rcrcnet.org'; Buchholz, Kurt [USA];
'neiljordan@cox.net'; 'rwilliams@jmt.com'; 'stevedolan@comcast.net'; 'sparrish@regionalflood.org';
'Ecton, A. Marie'; 'Beth.Norton@dhs.gov'; 'director.mdnr@meskwaki-nsn.gov'; 'deb6538@aol.com';
Salerno, Jennifer [USA]; 'jordan.carduner@noaa.gov'; 'johua.carvajal@state.vt.us';
'Keith.Folkets@dfw.wa.gov'; 'Lorena.Solorzano-Vincent@urs.com';
'LORIWOOLFORD@ALLSTATE.COM'; Popkin, Marshall [USA]; 'rheimbach@jmt.com';
'aeastman@leapfrogit.com'; 'ctogami@valleywater.org'; 'cberginnis@floods.org';
'JSolis@cochise.az.gov'; 'kmosler@groupdelsol.com'; 'tfsmith2@bercekandsmith.com';
'ken.zweig@kingcounty.gov'; 'swolf@biologicaldiversity.org'; 'Danny.Bowden@raleighnc.gov';
'twaqar@nahb.org'; 'acouch@scottsdaleaz.gov'; 'tchowdhury@sara-tx.org'; 'gtoth@scottsdaleaz.gov';
'robert.markle@noaa.gov'; Johnson, Amanda; 'bonnie.shorin@noaa.gov'; 'schaedle.candi@epa.gov';
Anderson, Karl; 'christine.shirley@state.or.us'; 'monahan.rosemary@epa.gov';
'timmermann.timothy@epa.gov'; 'walshrogalski.william@epa.gov'; 'peterson.erik@epa.gov';
'blonn.jennifer@epa.gov'; 'shepard.larry@epa.gov'; 'marc.a.guerin@citizensbank.com';
'kajumba.ntale@epa.gov'; 'rferris@pinellascounty.org'; 'jlopez@biologicaldiversity.org';
'ccmays@tva.gov'; 'twcuddy@hotmail.com'; 'wenorton@usgs.gov'; 'eseyller@usgcrp.gov';
'cweaver@usgcrp.gov'; 'rmoore@nrdc.org'; 'mschmitt@nrdc.org'; 'mbuckley11@ymail.com';
'martin.erbele@mbakerintl.com'; 'sgiberson@corelogic.com'; 'youchen.chao@deltacouncil.ca.gov';
'bhartl@biologicaldiversity.org'; 'sbreeden@geiconsultants.com'; 'jfredrickson@cbbf.com';
'nemaadmin@csg.org'; 'info@nasfma.org'
Cc: 'rheimbach@jmt.com'; 'tchowdhury@sara-tx.org'; 'Joshua.carvajal@state.vt.us'
Subject: Update: Announcement of Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)
for the National Flood Insurance Program (NFIP)

This communication provides an update to the Friday, March 31, 2017 communication, Subject: Announcement of Draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program. The Public Meeting location for the Kansas City, Missouri Area has been changed. Please read below for the new meeting location. The meeting date and the meeting time remain the same.

Today the Federal Emergency Management Agency (FEMA) announced the availability of the draft National Flood Insurance Program's (NFIP) Nationwide Programmatic Environmental Impact Statement (NPEIS). The NFIP draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP. The purpose for making program modifications to the NFIP is to:

- (a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014; and
- (b) demonstrate compliance with the Endangered Species Act (ESA).

To download a copy of the NFIP draft NPEIS prior to the announcement in the Federal Register, visit: <https://filetransfer.bah.com/fcweb/jsp/downloadFiles.jsp?0398=1490964290398>.

Tracking Number: P5MMQXUX137SCG9B
PIN: 238289

You can also download a copy via the federal e-rulemaking portal (<https://www.regulations.gov>; Docket ID FEMA-2012-0012) on April 7, 2017.

FEMA will hold public meetings to allow the public an opportunity to learn more about the project and to provide comments on the draft NFIP NPEIS at the following locations:

April 2017

- **Brooklyn, New York**
New York Headquarters Fire Department
9 MetroTech Center, Brooklyn, NY 11201
Thursday, April 20, 2017
3:30-5:30 p.m. EDT
- **New Orleans, Louisiana**
New Orleans Public Library
219 Loyola Avenue, New Orleans, LA 70112
Tuesday, April 25, 2017
5:30-7:30 p.m. Central Time (CT)
- **Ft. Lauderdale, Florida**
United Way of Broward County Ansin Building
1300 South Andrews Avenue, Ft Lauderdale, FL 33316
Thursday, April 27, 2017
5:00-7:00 p.m. EDT

May 2017

- **Portland, Oregon**
Multnomah County Library Midland Branch
805 SE 122nd Avenue, Portland, OR 97233
Wednesday, May 10, 2017
5:00-7:00 p.m. Pacific Time (PT)
- **Kansas City, Missouri Area**
Kansas City Public Library
Trails West Branch
11401 East 23rd Street, Independence MO 64052

Wednesday, May 17, 2017

5:00-7:00 p.m. CT

- **Washington, DC**
FEMA Headquarters
400 C Street SW, Conference Center Room A, Washington, DC 20472
Friday, May 19, 2017
3:00-5:00 p.m. EDT

In addition to the public meetings, FEMA has organized a series of webinars. Similar to the in-person public meetings, FEMA will present information during the webinars about the draft NPEIS and accept comments on the document. Webinars are scheduled for the following dates:

- **Tuesday, April 18, 2017** from 2:00-4:00 p.m. EDT
- **Wednesday, April 26, 2017** from 5:00-7:00 p.m. EDT
- **Tuesday, May 9, 2017** from 5:00-7:00 p.m. PT

To register for a webinar or for more information, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

Comments may be submitted by one of the following methods and must be identified by Docket ID FEMA-2012-0012:

- *Federal eRulemaking Portal*: <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for submitting comments.
- *Mail/Hand Delivery/Courier*: Regulatory Affairs Legal Division, Office of Chief Counsel, Federal Emergency Management Agency, Room 8NE, 500 C Street SW, Washington, DC 20472

The public comment period on the NFIP draft NPEIS starts with a concurrent publication in the Federal Register and will end on June 6, 2017. FEMA will consider all comments recorded at the public meetings and webinars and electronic and written comments on the NFIP draft NPEIS received or postmarked by June 6, 2017. Agencies, interested parties, and the public are invited to submit comments on this Draft NPEIS at any time during the public comment period.

From: NFIP-Programmatic-EIS <nfip-programmatic-eis@fema.dhs.gov>
Sent: Monday, April 17, 2017 10:13 AM
To: afninfo@nativefederation.org; airc.dcalcote@gmail.com; blockwtch1@aol.com; Booth, Milo; bpatterson@oneida-nation.org; Brawley, Randy; Brodoff, Bruce; c_johnhealy_sr@live.com; connier@itccinc.org; dhourihan@itcn.org; fettawa@charter.net; Floyd, Megan; fettawa@freeway.net; glitc@glitc.org; Hall, David A; hfrench@USETINC.ORG; Hirt, Kathryn; Jake.Heflin@iTEMA.org; jchefflin@gmail.com; kcarroll@usetinc.org; kingmanwapato@rushmore.com; LaPlante, Jay; Lehr, Aurora; Lynda@nwtemc.org; m.a.s.t@frontiernet.net; mallen@glitc.org; maria.dadgar@itcaonline.com; Mize, Nancy; Nadeau, Robert; nahc@nahc.ca.gov; Pyle, Stephanie; Reyes, Norma; Robert_Holden@NCAI.org; Roper, Elisa; scampbell@itltrf.org; Sulinckas, William C; theresagregor@yahoo.com; tparrw@atntribes.org; Tzientek@POTAWATOMI.ORG; VanCleve, Ramona; vwarrenmears@npaihb.org; Ward, Erin; Weinberg, Jonathan
Cc: Salerno, Jennifer [USA]; Smith, Jonathan; Gates, Bret
Subject: Announcement of Draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP)

The Federal Emergency Management Agency (FEMA) has announced the availability of the draft National Flood Insurance Program's (NFIP) Nationwide Programmatic Environmental Impact Statement (NPEIS). The NFIP draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP. The purpose for making program modifications to the NFIP is to:

- (a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014; and
- (b) demonstrate compliance with the Endangered Species Act (ESA).

To download a copy of the NFIP draft NPEIS prior to the announcement in the Federal Register, visit: <https://filetransfer.bah.com/fcweb/jsp/downloadFiles.jsp?0398=1490964290398>.

Tracking Number: P5MMQXUX137SCG9B
PIN: 238289

You can also download a copy via the federal e-rulemaking portal (<https://www.regulations.gov>; Docket ID FEMA-2012-0012) on April 7, 2017.

FEMA will hold public meetings to allow the public an opportunity to learn more about the project and to provide comments on the draft NFIP NPEIS at the following locations:

April 2017

- **Brooklyn, New York**
New York Headquarters Fire Department
9 MetroTech Center, Brooklyn, NY 11201
Thursday, April 20, 2017
3:30-5:30 p.m. EDT
- **New Orleans, Louisiana**
New Orleans Public Library

219 Loyola Avenue, New Orleans, LA 70112

Tuesday, April 25, 2017

5:30-7:30 p.m. Central Time (CT)

- **Ft. Lauderdale, Florida**

United Way of Broward County Ansin Building

1300 South Andrews Avenue, Ft Lauderdale, FL 33316

Thursday, April 27, 2017

5:00-7:00 p.m. EDT

May 2017

- **Portland, Oregon**

Multnomah County Library Midland Branch

805 SE 122nd Avenue, Portland, OR 97233

Wednesday, May 10, 2017

5:00-7:00 p.m. Pacific Time (PT)

- **Kansas City, Missouri Area**

Kansas City Public Library

Trails West Branch

11401 East 23rd Street, Independence MO 64052

Wednesday, May 17, 2017

5:00-7:00 p.m. CT

- **Washington, DC**

FEMA Headquarters

400 C Street SW, Conference Center Room A, Washington, DC 20472

Friday, May 19, 2017

3:00-5:00 p.m. EDT

In addition to the public meetings, FEMA has organized a series of webinars. Similar to the in-person public meetings, FEMA will present information during the webinars about the draft NPEIS and accept comments on the document. Webinars are scheduled for the following dates:

- **Tuesday, April 18, 2017** from 2:00-4:00 p.m. EDT
- **Wednesday, April 26, 2017** from 5:00-7:00 p.m. EDT
- **Tuesday, May 9, 2017** from 5:00-7:00 p.m. PT

To register for a webinar or for more information, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

Comments may be submitted by one of the following methods and must be identified by Docket ID FEMA-2012-0012:

- *Federal eRulemaking Portal*: <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for submitting comments.
- *Mail/Hand Delivery/Courier*: Regulatory Affairs Legal Division, Office of Chief Counsel, Federal Emergency Management Agency, Room 8NE, 500 C Street SW, Washington, DC 20472

The public comment period on the NFIP draft NPEIS starts with a concurrent publication in the Federal Register and will end on June 6, 2017. FEMA will consider all comments recorded at the public meetings and webinars and electronic and written comments on the NFIP draft NPEIS received or postmarked by June 6,

2017. Agencies, interested parties, and the public are invited to submit comments on this Draft NPEIS at any time during the public comment period.

From: Hosler, Renita
Sent: Thursday, April 06, 2017 5:10 PM
To: Smith, Jonathan <Jonathan.Smith2@fema.dhs.gov>
Cc: Gates, Bret <Bret.Gates@fema.dhs.gov>
Subject: FW: FINAL EAG for NFIP NPEIS Announcement

Ed –

Notification has been made by the ExCo Team.

Renita

From: Cavanaugh, Brian
Sent: Thursday, April 06, 2017 5:06 PM
To: Hosler, Renita <renita.hosler@fema.dhs.gov>
Subject: RE: FINAL EAG for NFIP NPEIS Announcement

Renita,

Thank you for the heads up and my apologies for the delayed response. No issues on our end. Appropriations staff have the correct info.

Much appreciated,
Brian

Brian J. Cavanaugh
Director, External Coordination &
Chief Appropriations Liaison
FEMA

From: Hosler, Renita
Sent: Thursday, April 06, 2017 3:51:12 PM
To: Koshgarian, Susan; Cavanaugh, Brian; Doolin, Jennifer; Valteau, Margeau
Cc: Booth, Milo; Nadeau, Robert; Ostomel, Caitlin; Mohan, John; Smith, Jonathan
Subject: FW: FINAL EAG for NFIP NPEIS Announcement

All – There has been a change in the Kansas City location.

Brian – the timing on this happened just about 2PM and was only confirmed in the last few minutes. Understand if you have already sent notification to the two appropriations committees.

The FEMA Bulletin story posting on Tuesday will refer all interested parties to FEMA.gov where the correct location will be posted.

Susan, Margeau, Jenn:

Below is the advisory language and I have inserted the new address (highlighted in yellow). Before you hit send you can remove the highlight.

Thanks for you flexibility on this one.
Renita

The following text is for the Congressional Affairs/Intergovernment Affairs Advisory

FEMA PUBLISHES DRAFT NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR NATIONAL FLOOD INSURANCE PROGRAM

On April 7, 2017, the Federal Emergency Management Agency (FEMA) will publish in the Federal Register the draft National Flood Insurance Program's (NFIP) Nationwide Programmatic Environmental Impact Statement (NPEIS) for public comment. As required by the National Environmental Policy Act (NEPA), FEMA developed a draft NPEIS to examine the impacts of proposed modifications to the NFIP. NEPA specifically directs federal agencies to thoroughly assess the environmental consequences of major federal actions that could significantly affect the environment. Because changes to the NFIP are considered to be a major federal action, FEMA prepared this draft NPEIS.

Today, more than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage. The NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disaster.

This draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP.

The purpose for making program modifications to the NFIP is to

(a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA); and

(b) to demonstrate compliance with the Endangered Species Act.

The public can download the draft NPEIS and provide comments directly to FEMA via <https://www.regulations.gov> [Docket ID FEMA-2012-0012].

The Notice of Availability (NOA) was published in the Federal Register on April 7, 2017, and FEMA is currently soliciting comments on the draft NPEIS.

FEMA will hold public meetings to allow the public an opportunity to learn more about the project and to provide comments on the NFIP draft NPEIS at the following locations:

April 2017

- **Brooklyn, New York**

New York Headquarters Fire Department
9 MetroTech Center, Brooklyn, NY 11201
Thursday, April 20, 2017
3:30-5:30 p.m. EDT

- **New Orleans, Louisiana**
New Orleans Public Library
219 Loyola Avenue, New Orleans, LA 70112
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- **Ft. Lauderdale, Florida**
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- **Washington, DC**
FEMA Headquarters
400 C Street SW, FEMA Conference Center Room A, Washington, DC 20472
Friday, May 19, 2017
3:00-5:00 p.m. EDT

In addition to the public meetings, FEMA has organized a series of webinars. Similar to the in-person public meetings, during the webinars, FEMA will present information about NFIP draft NPEIS and accept comments on the document. Webinars will be held on the following dates:

- **Tuesday, April 18, 2017 from 2:00-4:00 p.m. EDT**

Register at:

https://femacqpub1.connectsolutions.com/content/connect/c1/7/en/events/event/shared/default_template/event_landing.html?sco-id=74354077

Conference Bridge #: 800-320-4330

Conference Code: 580648

▪ **Wednesday, April 26, 2017 from 5:00-7:00 p.m. EDT**

Register at: https://fema.connectsolutions.com/ndpeis426/event/event_info.html

Conference Bridge #: 800-320-4330

Conference Code: 373559

▪ **Tuesday, May 9, 2017 from 5:00-7:00 p.m. PT**

Register at:

https://fema.connectsolutions.com/ndpeis59/event/event_info.html Conference

Bridge #: 800-320-4330

Conference Code: 157892

For more information or to register for a webinar, visit <https://www.fema.gov/programmatic-environmental-impact-statement>.

In addition to submitting comments at a public meeting or by attending a webinar, comments may be also be submitted by one of the following methods and must be identified by **Docket ID FEMA-2012-0012**. The deadline to submit any comments is on **June 6, 2017**.

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for submitting comments.
- *Mail/Hand Delivery/Courier:* Regulatory Affairs Legal Division, Office of Chief Counsel, Federal Emergency Management Agency, 500 C Street SW, Room 8NE, Washington, DC 20472


Attachments:

Executive Summary: **National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement**

Federal Register Notice: **National Flood Insurance Program Nationwide Programmatic Environmental Impact Statement**


Appendix E
Public Meeting Presentation






Introduction

- ▶ Purpose of the Public Meeting
 - Review the history of the National Flood Insurance Program
 - Announce the availability of the NFIP draft Nationwide Programmatic Environmental Impact Statement (NPEIS)
 - Provide an overview of the National Environmental Policy Act (NEPA) process
 - Describe FEMA's proposed action and alternatives
 - Receive public comments



FEMA



History of the National Flood Insurance Program

- ▶ After Hurricane Betsy in 1965, Congress developed the Flood Insurance Act of 1968, which created the National Flood Insurance Program, commonly referred to as the NFIP
 - Purpose of the NFIP: to help minimize the long-term risks to persons and property from the effects of flooding
- ▶ Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program



Hurricane Betsy aftermath in Louisiana



The NFIP Today

- ▶ Flooding continues to be the single greatest source of damage from natural hazards in the United States
- ▶ The NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disasters
- ▶ Today, more than 22,000 communities participate in the NFIP, with over 5.1 million policies in effect, providing over \$1.2 trillion in insurance coverage
- ▶ Recent legislation:
 - Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12)
 - Homeowners Flood Insurance Affordability Act of 2014 (HFIAA)



Flooding in Florida



Flooding in North Dakota





Overview of the National Environmental Policy Act

- ▶ The National Environmental Policy Act of 1969 (or NEPA) requires federal agencies to consider and evaluate potential impacts of their actions on the environment as part of their planning and decision making process
 - An Environmental Impact Statement or EIS evaluates any major federal actions that have the potential for significant impact on the natural or physical environment



President Nixon signing NEPA of 1969



FEMA's NFIP Nationwide Programmatic EIS

- ▶ FEMA has prepared a draft Nationwide Programmatic EIS (referred to here as NPEIS)
- ▶ Geographic scope of this NPEIS is nationwide and includes Alaska, Hawaii, and U.S. territories
- ▶ The NFIP draft NPEIS was released on April 7, 2017 and started a 60-day public comment period (ending on June 6, 2017)
- ▶ Download the NFIP draft NPEIS at the federal eRulemaking Portal: <http://www.regulations.gov> (Docket ID FEMA-2012-0012)





Public Involvement History

- ▶ Federal Register Notice of Intent published on May 16, 2012 to initiate scoping
- ▶ Notice of Intent published in the Federal Register on March 25, 2014 to announce webinar meetings
- ▶ The main comment themes included:
 - Socioeconomic effects of the NFIP
 - Improvements in floodplain mapping and FIRMs
 - Economic impacts of transition from subsidized premiums to full risk rated based premiums
 - Updates to clarify community compliance with the Endangered Species Act (ESA)
 - Updates to better address the protection/restoration of natural resources



Purpose and Need

- ▶ Purpose of the Proposed Action:
 - Implement the legislative requirements of BW-12 and HFIAA
 - Demonstrate compliance with the ESA
- ▶ Need for the Proposed Action:
 - For the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure needs to reflect the true risks and costs of flooding
 - To demonstrate compliance with the ESA stems from the many and varying statements from federal agencies and the public about FEMA's compliance with the ESA, and the perception about the nature of the NFIP and its effects on ESA-listed species and designated critical habitats





Proposed Action and Alternatives

► Proposed Action:

The implementation of the NFIP in the United States, as modified by recent legislation and proposed program changes to comply with the requirements of the ESA

- FEMA proposes to implement modifications to the NFIP that would further support the overall goals and objectives of the Program's three primary components:
 - **Insurance**
 - **Floodplain Management**
 - **Mapping**

► Alternatives:

The NFIP draft NPEIS considers a range of reasonable alternatives for modifying the NFIP and address the need to incorporate legislative requirements and to demonstrate compliance with the ESA



Alternatives

		Alternative 1 (No Action)	Alternative 2 (Preferred Alternative)	Alternative 3	Alternative 4
No Action	No Action	X			
Legislatively Required	Phase out of subsidies on certain pre-FIRM properties (non-primary, etc.)		X	X	X
	Phase out of subsidies on all other pre-FIRM properties		X	X	X
	Implementation of a monthly installment plan for non-escrowed policies		X	X	X
LOMC Clarification	Clarification of ESA documentation requirements for LOMCs		X	X	X
ESA-related Changes	Proposed ESA Regulatory Changes (New 44 C.F.R. § 60.3 Performance Standard; Probation Surcharge increase; Clarification on the exception to the no-rise performance standard in the floodway)			X	
	Implementation of ESA-related performance standard through guidance				X
	Floodplain Management Criteria Guidance		X		





Alternative 1 (No Action Alternative)

- ▶ Refers to the current implementation of the NFIP without implementation of the Preferred Alternative
- ▶ Serves as a benchmark against which impacts of the Preferred Alternative and Alternatives can be evaluated
- ▶ Under the No Action Alternative, FEMA would continue the policies and program elements of the existing NFIP and there would be no additional changes to the NFIP as it exists today



Flooding in Tennessee



Hurricane Ike bridge damage in Texas



Alternative 2 (Preferred Alternative)

- ▶ Alternative 2 includes legislatively required changes, floodplain management criteria guidance, and Letter of Map Change (LOMC) clarification
- ▶ The changes included under Alternative 2 are:
 - Phase out subsidies on certain pre-FIRM properties at a rate of 25% premium increases per year
 - Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase





Alternative 2 (Preferred Alternative)

- Implement a monthly installment plan payment option for non-escrowed flood insurance policies
- Clarify that the issuing of certain LOMC requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA
- Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate federal or state laws, including the ESA, as a condition of issuing permits to develop in the floodplain



Alternative 3

- ▶ Alternative 3 includes the legislatively required and LOMC clarification changes identified under Alternative 2 and:
 - Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. § 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible
 - Increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100
 - Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains





Alternative 4

- ▶ Alternative 4 includes the legislatively required and LOMC clarification changes identified under Alternative 2 and:
 - Utilize the existing performance standard in 44 C.F.R. § 60.3(a)(2) to implement a new policy or procedure requiring communities to ensure that, for any development for which a permit to develop in the floodplain is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed development in the floodplain will be undertaken in compliance with the ESA



Potential Impacts

- ▶ The following terms are used in the draft NPEIS to indicate the relative degree of severity of environmental impacts on resources:
 - **No Impact** – No environmental impacts are readily apparent or identified.
 - **Less than Significant** – Indicates that a change to resources would be measurable although the change would be small and localized. Mitigation measures, such as employing best management practices or precautionary measures, would reduce any potential adverse impacts.
 - **Significant** – Changes to resources would be measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts through long-term changes to the resource.





Potential Impacts

- ▶ Through its analysis, FEMA has determined that there would be no impacts to the following resource areas as a result of implementation of the alternatives:
 - Air Quality
 - Noise
 - Geology and Soils
 - Aesthetic/Visual Resources
 - Hazardous Wastes and Materials
 - Climate Change
 - Historic and Cultural Resources
 - Infrastructure



Summary of Potential Impacts

Attribute	Alternative 1 (No Action)	Alternative 2 (Preferred Alternative)	Alternative 3	Alternative 4
Air Quality	No impact	No impact	No impact	No impact
Noise	No impact	No impact	No impact	No impact
Geology and Soils	No impact	No impact	No impact	No impact
Aesthetics/Visual Resources	No impact	No impact	No impact	No impact
Hazardous Wastes and Materials	No impact	No impact	No impact	No impact
Climate Change	No impact	No impact	No impact	No impact
Historic and Cultural Resources	No impact	No impact	No impact	No impact
Infrastructure	No impact	No impact	No impact	No impact
Socioeconomic Resources	Less than significant	Less than significant	Less than significant	Less than significant
Land Use and Planning	Less than significant	No impact	Less than significant beneficial	Less than significant beneficial
Water Resources	Less than significant beneficial	No impact	Less than significant beneficial	Less than significant beneficial
Biological Resources	Less than significant beneficial	Less than significant beneficial	Less than significant beneficial	Less than significant beneficial





Providing Comments

- ▶ The 60-day public comment period for the NFIP draft NPEIS runs through June 6, 2017
- ▶ Several ways to provide comments:
 - Provide verbal comments during the meeting
 - Provide a written comment at the comment table
 - Federal eRulemaking Portal: <https://www.regulations.gov>
 - Docket ID FEMA-2012-0012
 - Submit written comments by mail to:
Regulatory Affairs Legal Division, Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW.
Washington, DC 20472



Providing Comments

- ▶ To provide a verbal comment at this public hearing, register at the sign-in table
 - FEMA is gathering comments and not responding to comments during the public hearing
 - Speakers will be recognized in the order registered
 - Each speaker will be allotted up to 5 minutes to speak
- ▶ To download the NFIP draft NPEIS, visit the federal e-rulemaking portal: **<http://www.regulations.gov>** (Docket ID FEMA-2012-0012)
- ▶ **NFIP NPEIS Project Website:** <https://www.fema.gov/programmatic-environmental-impact-statement>



Appendix F
Transcripts of Public Meetings and Webinars

- - - - - X

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT
STATEMENT

- - - - - X

9 Metrotech Center
Brooklyn, New York

April 20, 2017
3:00 P.M.

STATEMENT GIVEN in the above-entitled
action, was taken at the above time and place,
held before LEONORA L. WALKER, a Notary Public
within and for the State of New York.

FEMA

A P P E A R A N C E S:

BOOZ ALLEN HAMILTON

Representatives for FEMA

1550 Crystal Drive, Suite 1100

Arlington, Virginia 22202

BY: MEGHAN KLASSEN

ALSO PRESENT:

Marshall Popkin - Facilitator

Bret Gates - FEMA Speaker

1 FEMA

2 MR. POPKIN: Thank you for attending the
3 NFIP Draft Public Meeting. My name is Marshall
4 Popkin, and I will serve as your facilitator for
5 this meeting.

6 As a reminder, if you would like to
7 comment on the NFIP Draft NPEIS, please sign in at
8 the sign-in table. After the presentation we will
9 call your name in the order received. FEMA will
10 not be responding to comments tonight.

11 Now we will begin the public meeting with
12 FEMA's presentation.

13 MR. GATES: I would like to welcome you to
14 this public meeting for the draft Nationwide
15 Programmatic Environmental Impact Statement on the
16 proposed improvements and modifications to the
17 National Flood Insurance Program, or NFIP. The
18 development of this draft Nationwide Programmatic
19 Environmental Impact Statement, or draft NPEIS, by
20 the Federal Emergency Management Agency (commonly
21 referred to as FEMA) is pursuant to the National
22 Environmental Policy Act of 1969.

23 My name is Brett Gates and I work for
24 FEMA's Federal Insurance and Mitigation
25 Administration as the project manager for this

1 FEMA

2 NPEIS. FEMA is offering this public meeting for
3 two reasons.

4 First, we want to reach a broad audience
5 given the nationwide nature of our project.

6 Second, we want to give the public a
7 meaningful opportunity to provide comments to FEMA
8 regarding its analysis of the environmental
9 impacts of the NFIP. After this presentation,
10 participants who have registered in advance to
11 comment will be recognized to provide their input.
12 FEMA is gathering comments and won't be responding
13 to comments during the public meeting.

14 Slide two, please. Before we receive your
15 comments, I like to review the purposes for
16 today's meeting.

17 First, to provide information about the
18 National Flood Insurance Program, which provided
19 flood insurance to more than 22,000 communities
20 across the country.

21 Second, to announce the availability of
22 the draft NPEIS.

23 Third, to provide an overview of the NEPA
24 process.

25 Fourth, to describe the proposed action

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and alternatives for this draft NPEIS.

Lastly, to provide instructions on how to submit comments on the draft NPEIS.

MR. GATES: Next slide.

Following the devastating flooding that accompanied hurricane Betsy in 1965, Congress developed the National Flood Insurance Act of 1968, which created the NFIP. The purpose of the NFIP, as identified in the legislation, is to help minimize the long term risks, to persons and property from the effects of flooding. Congress recognized that development in flood-prone areas would continue, that disaster relief was both inadequate and expensive, and that because the cost of flood insurance was so high, only those in high risk areas would buy it. FEMA administers the National Flood Insurance Program.

Next Four.

Flooding continues to be the single greatest source of damage from natural hazards in the United States, resulting in an average of 80 deaths and more than \$8 billion in property damage each year. In spite of this, people continue to live and work in the nation's floodplains, and

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the number of people and amount of property at risk from flooding has increased.

Today, the NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disasters, and implementation of the NFIP is estimated to save the nation \$1.7 billion annually through avoided flood losses.

More than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage.

Legislation passed in 2012 and 2014 to address concerns over the fiscal soundness of the NFIP. The legislation, known as the Biggert-Waters Flood Insurance Reform Act of 2012 (or BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (or HFIAA), requires changes to the NFIP.

In addition, many and varying statements from federal agencies and the public about FEMA's compliance with the Endangered Species Act (commonly known as the ESA) has led to the need to demonstrate compliance with this act.

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Next Slide.

Signed by President Nixon, the National Environmental Policy Act of 1969, referred to as NEPA, requires federal agencies to consider and evaluate potential environmental impact of their actions on the natural and cultural environment as part of their planning and decision making process. An Environmental Impact Statement, referred to as an EIS, is a document prepared to describe the effects of proposed activities and alternatives on the natural and physical environment, including the relationship of people with that environment.

Next slide.

FEMA's Nationwide Programmatic EIS, referred to as NPEIS, provides opportunities for stakeholders, including the public, organizations, states, and NFIP, participating communities to provide their input so that all relevant issues and potential impacts are adequately covered and addressed. The results analysis describes both the beneficial and negative impacts that the proposed action, as well as the alternatives, may have. If significant negative impacts are

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identified in any of those options, mitigation measures to reduce these impacts are recommended.

Due to the geographic extent of this project, FEMA has determined that the NEPA analysis for its proposed action and alternatives should be conducted at a nationwide programmatic level. A programmatic document, such as this NEPA, is prepared when an agency is proposing to carry out a broad action, program, or policy.

The geographic scope of the NFIP, NPEIS is nationwide. This draft NPEIS provides an appropriate level of evaluation for a nationwide action, assesses potential impacts expected from the project as a whole, and, if necessary, identifies mitigation measures that would be implemented at the national level.

The NFIP draft NPEIS was released on April 7, 2017, which is the start date for the 60-day public comment period. The NFIP draft NPEIS can be downloaded from the website posted here on the slide.

Looking at Slide Seven.

For an EIS, the NEPA process starts with a notification from the federal agency of its intent

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2 to evaluate a proposed action. FEMA published a
3 Notice of Intent in the federal register on May
4 16th, 2012. The Notice of Intent started the
5 first phase of public involvement referred to as
6 Scoping. Scoping is the early and open process
7 for determining the scope of issues to be
8 addressed in an EIS, identifying the significant
9 issues related to the proposed action and
10 receiving input from the public.

11 FEMA published a subsequent Notice of
12 Intent on March 25th, 2014, to announce the
13 availability of three public webinar scoping
14 meetings. Over a hundred people registered to
15 attend the webinars.

16 FEMA reviewed and considered the content
17 of all comments to determine the scope of this
18 draft NPEIS. The main comment themes were as
19 follows:

20 Socioeconomic effects of the NFIP;
21 improvements in floodplain mapping and Flood
22 Insurance Rate maps, (referred to as FIRMs);
23 economic impacts of transition from subsidized
24 premiums to full risk rated premiums; updates to
25 clarify community compliance with the ESA; and

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updates to better address the
protection/registration of natural resources.

All scoping materials, including the
Federal Register notice and webinar presentations,
are included in Appendix B of the draft NPEIS.

Next slide, please. Thank you.

Before I begin discussing the proposed
project, I would like to share a little
information about the purpose and need for
modifications to the NFIP. The purpose of the
proposed action is to implement the legislative
requirements of BW-12 and HFIAA which requires
Program changes; and to demonstrate compliance
with the Endangered Species Act.

The need to implement the legislative
requirements of BW-12 and HFIAA which requires
Program changes; and to demonstrate compliance
with the Endangered Species Act.

The need to implement the legislative
requirements of BW-12 and HFIAA arises from the
recent concerns over the fiscal soundness of the
NFIP. Flooding has been, and continues to be, a
serious risk in the United States. Over the
years, the costs and consequences of flooding have

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2 continued to increase. For the NFIP to remain
3 sustainable, and to increase its fiscal soundness,
4 its premium structure must reflect the true risks
5 and costs of flooding. This is a primary driver
6 for many of the legislatively required changes
7 that are assessed as part of this analysis.

8 The need to demonstrate compliance with
9 the ESA stems from the many and varying statements
10 from the federal agencies and the public about
11 FEMA's compliance with the ESA, and the perception
12 about the nature of the NFIP and its effects on
13 ESA-listed species and designated critical
14 habitat. FEMA determined that it is currently in
15 compliance with the ESA, but recognizes the need
16 to demonstrate ESA compliance to the public.

17 Slide nine.

18 For the Proposed Action, FEMA proposes to
19 implement modifications to the NFIP that would
20 support the Program's three primary components:
21 Insurance, floodplain management, and mapping.

22 The NFIP makes federal flood insurance
23 available to property owners or lessees in
24 communities that participate in the NFIP. Through
25 the NFIP, property owners in participating

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communities are able to insure their property
against future flood losses.

As originally established, the National
Flood Insurance act of 1968 authorized FEMA to
provide subsidized flood insurance only for
existing buildings or buildings built prior to the
communities first FIRM (generally referred to as
"pre-firm buildings"). This means that flood
insurance for new development has never been
subsidized by the NFIP (subject to the very
limited, short-term statutory exceptions).

However, subject to the very limited,
short-term statutory exceptions referenced above,
FEMA must apply actuarial rates to all buildings
constructed, or substantially damaged or improved,
on or after the effective date of the initial FIRM
for the community or after December 31st, 1974,
whichever is later (generally referred to as
post-FIRM buildings).

With the passage of the BW-12 and HFIAA,
FEMA is required to phase out the subsidies on
pre-FIRM properties. Some subsidies must be
phased out immediately, some will be phased out at
a rate of 25% premium rate increases per year, and

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2 the rest will be phased out at a rate of five to
3 15% premium rate increases per year.

4 Accordingly, when this phase out is
5 completed, FEMA will not offer subsidized flood
6 insurance for either new or existing floodplain
7 development (subject to certain very limitation
8 short-term statutory exceptions).

9 A community's participation in the NFIP is
10 voluntary. Participation is based on agreement
11 between communities and the federal government.
12 If a community adopts and enforces a floodplain
13 management ordinance that meets certain minimum
14 requirements to reduce future flood risks within
15 an area known as the Special Flood Hazards Area,
16 SFHA, the federal government will make flood
17 insurance available to property owners and lessees
18 in that community.

19 FEMA has no land use authority. The power
20 to regulate development in the floodplain,
21 including requiring and approving permits,
22 inspecting property, and citing violations,
23 requires land use authority. The regulation of
24 land use falls under the states police powers
25 which the Constitution reserves to the states, and

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the states delegate this power down to their representative political subdivision to protect the health, safety, and general welfare of their citizens. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP was designed so that floodplain management would be carried out at the state and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

FEMA is also not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through community's floodplain management regulations and floodplain development permitting process. Before a property owner can undertake any development in the SFHA, they must obtain a permit from the community. The community is responsible for reviewing the proposed development to ensure compliance with their floodplain management ordinance and that all

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necessary permits have been received from federal or state agencies from which approval is required.

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with states and communities to provide accurate flood hazard and risk data to guide them to mitigation actions. The risk zoned shown on the firms are the basis for the establishment of premium rates for flood coverage offered through the NFIP. Flood insurance has been available to property owners or lessees in participating NFIP communities, through the adoption of community-wide floodplain management ordinances. Property owners in participating communities are able to insure their property against future flood losses.

The NPEIS considers alternatives to modify the NFIP and the No Action Alternative. NEPA requires that any agency proposing a major federal action must consider a reasonable range of alternatives to the Proposed Action. Alternatives concerning the future of the NFIP must meet essential technical requirements, comply with governing standards and regulations, and meet

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FEMA's purpose and need. The draft NPEIS considers a range of reasonable alternatives for modifying the NFIP.

Potential program changes to the NFIP are included in all or some of the alternatives. Some of these potential changes are the result of recent legislation amending the NFIP. Other potential program changes were developed to demonstrate compliance with the requirements of the ESA.

The table on the next slide shows the components included in each of the four alternatives.

Next is Slide ten.

This table identifies the alternatives analyzed in the NFIP draft NPEIS and the proposed modifications to the NFIP by alternative.

I will discuss each of the alternatives in more detail in the next few slides.

Slide Eleven.

Alternatives 1 or the No Action Alternatives refers to the current, existing conditions under the NFIP without implementation of the proposed alternative. The No Action

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alternative serves as a benchmark against which impacts of the Preferred Alternative and the other alternatives can be evaluated. Under the No Action alternative, FEMA would continue the policies and the program elements of the existing NFIP, and there would be no additional changes to the NFIP as it exists today.

Slide Twelve.

Alternative 2, includes legislatively required changes, floodplain management criteria guidance, and Letter of Map Change clarification. The first change is to phase out subsidies on certain pre-FIRM properties at a rate of 25% premium increases per year. These pre-FIRM properties include non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties and properties for which the cumulative claims payments exceed the fair market value of the property. BW-12 mandates that the premium rates on these properties be increased by 25% each year until full risk rates are achieved.

The second change includes the phasing out of subsidies on all other pre-FIRM through annual

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premium rate increases of an average rate of at least 5%, but no more than 15% per risk classification, with no individual policy exceeding an 18% premium rate increase.

Slide 13.

The third change involves implementing a monthly installment plan payment option for non-escrowed flood insurance policies. This may help alleviate the affordability concerns of some policyholders who voluntarily choose to purchase flood insurance.

The fourth change involves clarifying that the issuing of certain Letter of Map Change or LOMC requests (map revisions) is contingent on the community or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

The Fifth change involves clarifying that pursuant to 44 C.F.R. Part 60.3 (a)(2), a community must obtain and maintain documentation of compliance with the appropriate federal or state laws, including the ESA, as a condition of issuing permit to develop in the floodplain.

FEMA's preferred alternatives is

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Alternative 2. Implementation of Alternative 2 would meet FEMA's purpose and need, and causes the least environmental impact overall. Alternative 2 is within FEMA's discretion and meets the legislatively required time frame.

The next slide is Slide 14.

Alternative three includes the legislatively required changes and LOMC clarification changes identified under Alternative 2. In addition, Alternative 3 includes proposed ESA regulatory changes that would:

Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. Part 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated habitat will be mitigated to the maximum extent possible;

Increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100, and clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a

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public purpose or result in the restoration of the
natural and beneficial function of floodplains

Slide 15.

Alternative 4 includes the legislatively
required and LOMC clarification changes identified
under Alternative 2. In addition, Alternative 4,
also includes ESA Guidance. The ESA Guidance
would utilize the existing performance standard in
44 C.F.R. Part 60.3 (a)(2), to implement a new
policy or procedure requiring communities to
ensure that, for any development for which a
permit is developed in the floodplain is sought,
the impact to ESA-listed species and designated
critical habitat are identified and assessed, and
if there are any potential adverse impacts to such
species and habitat as a result of such
development, that the community obtain and
maintain documentation that the proposed
development in the floodplain will be undertaken
in compliance with the ESA.

Slide 16.

The draft NPEIS evaluates potential
impacts from implementing each of the four
alternatives. Quantitative and qualitative

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analyses have you been used to determine the intensity and magnitude of the environmental impacts. FEMA subject matter experts determined whether particular impacts were less than significant or significant.

The draft NPEIS uses the following terms to indicate relative degree of severity of environmental impact on resources.

No impact is defined as no environmental impact is readily apparent or identified.

Less than significant is used to indicate that a change to resources would be measurable although the change would be small and localized. Mitigation measures, such as employing best management practices or precautionary measures, would reduce any potential adverse impact.

Significant is used to indicate that changes to resources would be measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts through long-term changes to the resource. Impacts may be both beneficial and adverse.

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Slide 17.

There are a number of resource areas that FEMA has identified as having no impacts as a result of implementation of the alternative. As pointed out in the draft NPEIS, floodplain development is not authorized, funded or carried out by FEMA pursuant to the NFIP, nor does it encourage such floodplain development to occur.

Moreover, FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits and citing violations requires land use authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and permitting process for development in the floodplain.

As such, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain.

Continued implementation of the NFIP, including implementation of the NFIP as modified

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2 by the alternatives, would not include any
3 physical development or ground disturbance in the
4 floodplain, nor would it encourage any development
5 in the floodplain to occur.

6 There would be no impacts to the following
7 resource areas as a result of the implementation
8 of the alternatives: Air quality and noise,
9 geology and soils, aesthetic and visual resources,
10 hazardous wastes and materials, climate change,
11 historic and cultural resources, and
12 infrastructure.

13 Slide 18.

14 This table summarizes the potential
15 impacts that could occur for each alternative.
16 Most of the resources are identified as having no
17 impact. Less than significant impacts were
18 identified for socioeconomic resources, land use
19 and planning, water resources, and biological
20 resources.

21 Slide 19.

22 With this brief overview on the draft
23 NPEIS, I will now describe the public comment
24 period and provide instructions on how to submit
25 comments.

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The public release of the NFIP draft NPEIS on April 7th, 2017, started the 60-day public comment period. The public comment period ends June 6th, 2017.

Comments can be submitted several ways. Provide verbal comments today during this public meeting; provide a written comment at the comment table; provide a comment through the eRulemaking portal at www.regulations.gov under docket ID FEMA-2012-0012 and follow the instructions there, or by mail to the address on the slide. Comments received through any of these methods will be considered equally. Comments need to only be submitted once through any of these methods.

As I mentioned, the 60-day comment period ends June 6th, 2017. You're welcome to submit comments until that date.

Reviewers are requested to provide specific information and comments on factual errors, missing information, or additional considerations that should be corrected or included in the NFIP draft NPEIS.

FEMA will review all of the comments and identify substantive issues that have bearing on

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the NFIP and the environmental impacts of the program. We will then use the comments to prepare the NFIP final NPEIS. The final NPEIS will include a section that discusses how comments were addressed. The draft NPEIS is available for download from Regulations.gov and there is a link on the project website. The project website also includes information about the webinars and other informational materials. The project website is listed on the next slide.

Public involvement is an important part of the environmental planning process. We hope that all interested individuals and organizations whether take this opportunity to identify concerns if they feel should be addressed in the NFIP draft NPEIS.

That concludes my presentation. We will now open the meeting up to comments.

^MR. POPKIN:: Thanks, Bret. There are several ways to provide comments. The first is via verbal comment during today's public meeting. In you wish to submit written comments, you can provide them at the comment table, through the federal eRulemaking Portal, or by mail.

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Individual respondents may request confidentiality. The names, the street addresses, and the city or town information of those providing comments will be part of the administrative record and will be subject to public disclosure unless confidentiality is requested. Such a request must be stated prominently at the beginning of the comment.

We will honor requests to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives of official organizations or businesses, will be available for public inspection in their entirety, consistent with applicable law.

FEMA will need to receive your comments no later than June 6th, 2017 to ensure their consideration.

FEMA is only gathering comments today and will not be responding to comments during the public meeting. We will be taking verbal comments today until 5:30 p.m.; speakers will be called in the order registered. Each registered speaker will have approximately five minutes to provide

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verbal comments. With one minute left, you will receive a signal to begin concluding your comment.

After all register speakers have provided comment, if there is time remaining, you may request additional time to comment. If you would like to speak, but have not registered to do so, please register at the sign-in table.

We are now ready to receive public comments.

(NO PUBLIC COMMENTS).

MR. POPKIN: Since it is now 5:30 we will conclude this public meeting. I would like to remind you that the comment period ends on June 6th, 2017. Comments should be received by that date in order to receive full consideration in the NFIP draft NPEIS. Comments received after that date will be considered to the extent practicable. I am going to turn it over to Brett for closing remarks.

MR. GATES: I would like to thank every one for participating today. The comments FEMA received today will be helpful in our final NPEIS development efforts. FEMA appreciates your continued participation in the NFIP draft NPEIS

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process. Thank you for coming tonight.

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C E R T I F I C A T E

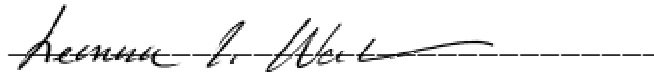
STATE OF NEW YORK

COUNTY OF NASSAU

I, LEONORA L. WALKER, a Notary Public
within and for the State of New York, do hereby
certify that the within is a true and accurate
transcript of the proceedings taken on April 20th,
2017.

I further certify that I am not related to
any of the parties to this action by blood or
marriage; and that I am in no way interested in
the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my
hand this 20th Day of APRIL, 2017.



LEONORA L. WALKER

A	21:23,25	appreciates	benchmark	17:13,24 18:7
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1 UNITED STATES OF AMERICA
2 FEDERAL EMERGENCY MANAGEMENT AGENCY

3 * * *

4 PUBLIC MEETING

5 * * *

6 NATIONAL FLOOD INSURANCE PROGRAM
7 DRAFT NATIONWIDE PROGRAMMATIC IMPACT STATEMENT

8 * * *

9 WEDNESDAY

10 MAY 10, 2017

11 5:00 P.M.

12 * * *

13 PORTLAND, OREGON

14 * * *

15 The Public Meeting convened in the Meeting
16 Room at the Midland Library, 805 S.E. 122nd Avenue,
17 Portland, Oregon.

18
19 PANELISTS:

20 Bret Gates, Presenter

21 Jennifer Salerno, Facilitator

22
23 REPORTED BY:

24 Robin L. Nodland, FAPR, CSR, RDR, CRR

25 * **

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1 P R O C E E D I N G S

2 5:27 p.m.

3 MS. SALERNO: Hi, everyone. Thank
4 you for attending today's NFIP draft NPEIS public
5 meeting. My name's Jennifer Salerno, and I will
6 serve as your facilitator tonight.

7 Just a reminder, if you'd like to
8 comment on the document, please -- we already asked
9 all of you to please place a check mark next to your
10 name. We'll call everyone in the order received
11 after the presentation. FEMA is not responding to
12 comments tonight.

13 Now we'll begin the presentation from
14 Bret Gates.

15 MR. GATES: Thank you.

16 So I'd like to welcome you to this
17 public meeting for the draft Nationwide Programmatic
18 Environmental Impact Statement on proposed
19 improvements and modifications to the National Flood
20 Insurance Program, or NFIP. The development of this
21 draft Nationwide Programmatic Environmental Impact
22 Statement, or draft NPEIS, by the Federal Emergency
23 Management Agency, commonly referred to as FEMA, is
24 pursuant to the National Environmental Policy Act of
25 1969.

1 My name is Bret Gates, and I work for
2 FEMA'S Federal Insurance Mitigation Administration
3 as the project manager for this NPEIS.

4 FEMA is offering this public meeting
5 for two reasons. First, we want to reach a broad
6 audience, given the nationwide nature of our
7 project. Second, we want to give the public a
8 meaningful opportunity to provide comments to FEMA
9 regarding its analysis of environmental impacts of
10 the NFIP.

11 After this presentation, participants
12 who have registered to comment in advance will be
13 recognized to provide their input. FEMA is
14 gathering comments and won't be responding to
15 questions or comments during this public meeting.
16 I'll call out each slide so you can follow along,
17 and she's going to flip them.

18 Before we receive your comments, I
19 would like to review the purpose for today's
20 meeting:

21 First, to provide information about
22 the NFIP, which provides flood insurance to more
23 than 22,000 communities across the country;

24 Second, to announce the availability
25 of the draft NPEIS;

1 Third, to provide an overview of the
2 NEPA process;

3 Fourth, to describe the proposed
4 action and alternatives for the draft NPEIS;

5 And lastly, how to submit comments on
6 the draft NPEIS.

7 Slide three.

8 Following the devastating flooding
9 that accompanied Hurricane Betsy in 1965, Congress
10 developed the National Flood Insurance Act of 1968,
11 which created the NFIP. The purpose of the NFIP, as
12 identified in the legislation, is to help minimize
13 the long-term risk to persons and property from the
14 effects of flooding. Congress recognized that
15 development in flood-prone areas would continue,
16 that disaster relief was both inadequate and
17 expensive, and because the cost of flood insurance
18 was so high, only those in high-risk areas would buy
19 it. FEMA administers the NFIP.

20 Slide four.

21 Flooding continues to be the single
22 greatest source of damage from natural hazards in
23 the United States, resulting in an average of 80
24 deaths and more than \$8 billion in property damage
25 each year. In spite of this, people continue to

1 live and work in the nation's flood plains, and the
2 number of people and amount of property at risk from
3 flooding has increased.

4 Today, the NFIP serves as the
5 foundation for the national efforts to reduce the
6 loss of life and property from flood disasters. The
7 implementation of the NFIP is estimated to save the
8 nation roughly \$1.7 billion annually through avoided
9 flood losses. More than 22,000 communities
10 participate in the NFIP, with more than 5.1 million
11 NFIP policies in effect, providing over \$1.2
12 trillion in insurance coverage.

13 Legislation was passed in 2012 and
14 2014 to address concerns over the fiscal soundness
15 of the NFIP. This legislation, known as the
16 Biggert-Waters Flood Insurance Reform Act of 2012,
17 or BW-12, and the Homeowner Flood Insurance
18 Affordability Act of 2014, or HFIAA, requires
19 changes to the NFIP. In addition, many and varying
20 statements from federal agencies and the public
21 about FEMA's compliance with the Endangered Species
22 Act, commonly known as ESA, has led to this need to
23 demonstrate compliance with the Act.

24 Slide five.

25 Signed by President Nixon, the

1 National Environmental Policy Act of 1969, referred
2 to as NEPA, requires federal agencies to consider
3 and evaluate potential environmental impacts of
4 their actions on the natural and cultural
5 environment as part of their planning and
6 decision-making process. An environmental impact
7 statement, referred to as an EIS, is a document
8 prepared to describe the effects of proposed
9 activities and alternatives on the natural and
10 physical environment, including the relationship of
11 people with that environment.

12 Slide six.

13 FEMA's Nationwide Programmatic EIS,
14 referred to as an NPEIS, provides opportunities for
15 stakeholders, including the public, organizations,
16 states, and NFIP-participating communities to
17 provide their input so that all relevant issues and
18 potential impacts are adequately covered and
19 addressed. The resulting analysis describes both
20 the beneficial and negative impacts thqat the
21 proposed action, as well as any alternatives, may
22 have. If significant negative impacts are
23 identified in any of the options, mitigation
24 measures to reduce these impacts are recommended.

25 Due to the geographic extent of the

1 project, FEMA has determined that NEPA analysis for
2 its proposed action and alternatives should be
3 conducted at a nationwide programmatic level. A
4 programmatic document, such as this NPEIS, is
5 prepared when an agency is proposing to carry out a
6 broad action, program, or policy. This draft NPEIS
7 provides an appropriate level of evaluation for a
8 nationwide action, assesses potential impacts
9 expected from the program as a whole, and, if
10 necessary, identifies mitigation measures that would
11 be implemented at the national level. The draft
12 NPEIS was released on April 7, 2017, which is the
13 start date for the 60-day public comment period.
14 The draft document can be downloaded from the
15 website posted here on the slide.

16 Slide seven.

17 For an EIS, the NEPA process starts
18 with the notification from the federal agency of its
19 intent to evaluate a proposed action. FEMA
20 published a Notice of Intent in the Federal Register
21 on May 16, 2012. The Notice of Intent started the
22 first phase of public involvement referred to as
23 scoping. Scoping is the early and open process for
24 determining the scope of issues to be addressed in
25 an EIS, identifying the significant issues related

1 to a proposed action and receiving input from the
2 public.

3 FEMA published a subsequent Notice of
4 Intent on March 25th, 2014, to announce the
5 availability of three public webinar scoping
6 meetings. Over a hundred people registered to
7 attend the webinars. FEMA reviewed and considered
8 the content of all comments to determine the scope
9 of this document. The main comment themes were as
10 follows:

11 Socioeconomic effects of the NFIP;
12 Improvements in floodplain mapping
13 and flood insurance rate maps, referred to as FIRMs;

14 Economic impacts of transition from
15 subsidized premiums to full risk premiums;

16 Updates to clarify community
17 compliance with the ESA; and

18 Updates to better address the
19 protection and restoration of natural resources.

20 All scoping materials, including the
21 Federal Register notices and webinar presentations,
22 are included in Appendix B of the draft document.

23 Slide eight.

24 Before I begin discussing the
25 proposed project, I would like to share a little

1 information about the purpose and the need for
2 modifications to the NFIP. The purpose of the
3 proposed action is to implement the legislative
4 requirements of BW-12 and HFIAA, which require
5 program changes, and to demonstrate compliance with
6 the Endangered Species Act.

7 The need to implement the legislative
8 requirements of BW-12 and HFIAA arises from the
9 recent concerns over the fiscal soundness of the
10 NFIP. Flooding has been, and continues to be, a
11 serious risk in the United States. Over the years,
12 the costs and consequences of flooding have
13 continued to increase. For the NFIP to remain
14 sustainable and to increase its fiscal soundness,
15 its premium structure must reflect the true risks
16 and costs of flooding. This is a primary driver for
17 many of the legislative requirement changes that are
18 assessed as part of the analysis.

19 The need to demonstrate compliance
20 with the Endangered Species Act stems from the many
21 and varied statements from public agencies and the
22 public about FEMA's compliance with the ESA and the
23 perception about the nature of the NFIP and its
24 effects on ESA-listed species and designated
25 critical habitat. FEMA determined that it's

1 currently in compliance with the ESA, but recognizes
2 the need to demonstrate ESA compliance to the
3 public.

4 Slide nine.

5 For the proposed action, FEMA
6 proposes to implement modifications to the NFIP that
7 would support the program's three primary
8 components: insurance, floodplain management, and
9 mapping.

10 The NFIP makes federal flood
11 insurance available to property owners or lessees in
12 communities that then participate in the NFIP.
13 Through the NFIP, property owners and participating
14 communities are able to insure their property
15 against future flood losses.

16 As originally established, the
17 National Flood Insurance Act of '68 authorized FEMA
18 to provide subsidized flood insurance only for
19 existing buildings or buildings built prior to the
20 community's first FIRM, generally referred to as
21 pre-FIRM buildings. This means that flood insurance
22 for new development has never been subsidized by the
23 NFIP, subject to very limited, short-term statutory
24 exceptions.

25 However, subject to the very limited,

1 short-term statutory exceptions referenced above,
2 FEMA must apply actuarial rates to all buildings
3 constructed or substantially damaged or improved on
4 or after the effective date of the initial FIRM for
5 the community, or after December 31st, 1974,
6 whichever is later, and these are generally referred
7 to as post-FIRM buildings.

8 With the passage of BW-12 and HFIAA,
9 FEMA is required to phase out the subsidies on
10 pre-FIRM properties. Some subsidies must be phased
11 out immediately, some will be phased out at a rate
12 of 25 percent premium rate increases per year, and
13 the rest will be phased out at a rate of between 5
14 and 15 percent premium rate increases per year.
15 Accordingly, when this phaseout is completed, FEMA
16 will not offer subsidized flood insurance for either
17 new or existing floodplain development, subject to
18 very limited, short-term statutory exceptions.

19 The community's participation in the
20 NFIP is voluntary. Participation is based on an
21 agreement between communities and the federal
22 government. If a community adopts and enforces a
23 floodplain management ordinance that meets certain
24 minimum requirements to reduce future flood risks
25 with an area known as the Special Flood Hazard Area,

1 the federal government will make flood insurance
2 available to property owners and lessees in that
3 community.

4 FEMA has no land use authority. The
5 power to regulate development in the floodplain,
6 including requiring and approving permits,
7 inspecting property, and citing land violations,
8 requires land use authority. Land use regulation
9 falls under the state's police powers, which the
10 Constitution reserves to the states, and the states
11 delegate this power down to their respective
12 political subdivisions to protect the health,
13 safety, and general welfare of their citizens.

14 FEMA has no direct involvement in the
15 administration of local floodplain management
16 ordinances. The NFIP was designed so that
17 floodplain management would be carried out at the
18 state and local levels, where land use authority
19 resides. For the most part, local governments bear
20 the responsibility for protecting residents from
21 flood hazards, working to reduce flood damage, and
22 preserving floodplain functions and resources.

23 FEMA is also not authorized by
24 statute to act as a permitting authority.
25 Therefore, floodplain development is regulated at

1 the community level through the community's
2 floodplain management regulations and floodplain
3 development permitting process. Before a property
4 owner can undertake any development in the SFHA,
5 they first must obtain a permit from the community.
6 The community is responsible for reviewing the
7 proposed development to ensure compliance with their
8 floodplain ordinance and that all necessary permits
9 have been received from federal or state agencies
10 from which approval is required.

11 Through its Flood Hazard Mapping
12 Program, FEMA identifies flood hazards, assesses
13 flood risks, and collaborates with states and
14 communities to provide accurate flood hazard and
15 risk data to guide them to mitigation actions. The
16 risk zones shown on the FIRMs are the basis for the
17 establishment of the NFIP flood insurance premium
18 rates. Flood insurance has been available to
19 property owners and lessees in participating NFIP
20 communities through the adoption of community-wide
21 floodplain management ordinances. Property owners
22 in participating communities are able to insure
23 their property against future flood losses.

24 The NPEIS considered alternatives to
25 modify the NFIP and the No Action Alternative. NEPA

1 requires that any agency proposing a major federal
2 action must consider a reasonable range of
3 alternatives to the proposed action. Alternatives
4 concerning the future of the NFIP must meet
5 essential technical requirements, comply with
6 governing standards and regulations, and meet FEMA's
7 purpose and need. The draft document considers a
8 range of reasonable alternatives for modifying the
9 NFIP.

10 Potential program changes to the NFIP
11 are included in all or some of the alternatives.
12 Some of these potential changes are the result of
13 recent legislative -- legislation amending the NFIP.
14 Other potential program changes were developed to
15 demonstrate compliance with the requirements of the
16 ESA.

17 Slide ten.

18 This table identifies the
19 alternatives analyzed in the draft document and the
20 proposed modifications to the NFIP by alternative.
21 I'll discuss each of the alternatives in more detail
22 in the next few slides.

23 Slide 11.

24 Alternative 1, or the No Action
25 Alternative, refers to the current, existing

1 conditions under the NFIP without implementation of
2 the Proposed Alternative. The No Action Alternative
3 serves as a benchmark against which impacts of the
4 Preferred Alternative and the Other Alternatives can
5 be evaluated. Under the No Action Alternative, FEMA
6 would continue the policies and program elements of
7 the existing NFIP and there would be no additional
8 changes to the NFIP as it exists today.

9 Slide 12.

10 Alternative 2 includes legislatively
11 required changes, floodplain management criteria
12 guidance, and Letter of Map Change Clarification.
13 The first change is to phase out subsidies on
14 certain pre-FIRM properties at a rate of 25 percent
15 premium increases per year. These pre-FIRM
16 properties include non-primary residences, business
17 properties, severe repetitive loss properties,
18 substantially damaged or improved properties, and
19 properties for which the cumulative claims payments
20 exceed the fair market value of the property. BW-12
21 mandates that the premium rates of these properties
22 be increased by 25 percent each year until full risk
23 rates are achieved.

24 The second change includes the
25 phasing out of subsidies on all other pre-FIRM

1 properties through annual premium rate increases of
2 an average of at least 5 percent, but no more than
3 15 percent, per risk classification, with no
4 individual policy exceeding an 18 percent premium
5 rate increase.

6 Slide 13.

7 The third change involves
8 implementing a monthly installment plan payment
9 option for non-escrowed flood insurance policies.
10 This may help alleviate affordability concerns of
11 some policyholders who voluntarily choose to
12 purchase flood insurance.

13 The fourth change involves clarifying
14 that the issuing of certain Letter of Map Changes,
15 or LOMC requests -- that is map revisions -- is
16 contingent on the community, or the project proponent
17 on the community's behalf, submitting documentation
18 of compliance with the ESA.

19 The fifth change involves clarifying
20 that pursuant to 44 CFR Part 60.3(a)(2), a community
21 must obtain and maintain documentation of compliance
22 with the appropriate federal or state laws,
23 including the ESA, as a condition of issuing permits
24 to develop in the floodplain.

25 FEMA's preferred alternative is

1 Alternative 2. Implementation of Alternative 2
2 would meet FEMA's purpose and need, and causes the
3 least environmental impact overall. Alternative 2
4 is within FEMA's discretion and meets the
5 legislatively required time frame.

6 Slide 14.

7 Alternative 3 includes the
8 legislatively required changes and Letter of Map
9 Change clarification changes identified under
10 Alternative 2. In addition, Alternative 3 includes
11 proposed ESA regulatory changes that would:

12 Establish a new ESA-related
13 performance standard in the minimum floodplain
14 management criteria at 44 CFR Part 60.3 that would
15 require communities to obtain and maintain
16 documentation that any adverse impacts caused by
17 proposed development, including fill, to ESA-listed
18 species and designated habitat will be mitigated to
19 the maximum extent possible;

20 Increase the probation surcharge
21 applicable to NFIP communities placed on probation
22 from the current \$50 to \$100; and

23 Clarify that the exception to the
24 no-rise performance standard in the floodway applies
25 only to projects that serve as a public purpose or

1 result in the restoration of the natural and
2 beneficial functions of floodplains.

3 Slide 15.

4 Alternative 4 includes the
5 legislatively required and Letter of Map Change
6 clarification changes identified under Alternative
7 2. In addition, Alternative 4 also includes ESA
8 Guidance. The ESA Guidance would utilize the
9 existing performance standard under 44 CFR Part
10 60.3(a)(2) to implement a new policy or procedure
11 requiring communities to ensure two things:

12 First, that for any development for
13 which a permit to develop in the floodplain is
14 sought, the impacts to ESA-listed species and
15 designated critical habitat are identified and
16 assessed; and

17 Second, if there are any potential
18 adverse impacts to such species and habitat as a
19 result of such development, that the community
20 obtain and maintain documentation that the proposed
21 development in the floodplain will be undertaken in
22 compliance with the ESA.

23 Slide 16.

24 The document evaluates potential
25 impacts from implementing each of the four

1 alternatives. Quantitative and qualitative analyses
2 have been used to determine the intensity and
3 magnitude of the environmental impacts. FEMA
4 subject matter experts determined whether particular
5 impacts were less than significant or significant.

6 The document uses the following terms
7 to indicate relative degree of severity of
8 environmental impacts on resources:

9 No impact is defined as no
10 environmental impacts are readily apparent or
11 identified.

12 Less than significant is used to
13 indicate that a change to resources would be
14 measurable, although the change would be small and
15 localized. Mitigation measures, such as employing
16 best management practices or precautionary measures,
17 would reduce any potential adverse impacts.

18 Significant is used to indicate the
19 changes to resources would be measurable and would
20 have substantial consequences on a local and
21 regional level. Impacts would exceed regulatory
22 standards. Mitigation measures to offset the
23 adverse impacts would be required to reduce impacts
24 through long-term changes to the resource. Impacts
25 may be both beneficial and adverse.

1 Slide 17.

2 There are a number of resource areas
3 that FEMA has identified as having no impacts as a
4 result of the implementation of the alternatives.
5 As pointed out in the document, floodplain
6 development is not authorized, funded, or carried
7 out by FEMA pursuant to the NFIP, nor does it
8 encourage such development to occur.

9 Moreover, FEMA has no land use
10 authority. The power to regulate development in the
11 floodplain includes requiring and approving permits
12 and citing violations requiring land use authority.
13 Therefore, floodplain development is regulated at
14 the community level through the community's
15 floodplain management regulations and permitting
16 processes for development in the floodplain. As
17 such, FEMA has no role in the issuance, denial, or
18 enforcement of individual permits, nor does it have
19 the land use authority necessary to prescribe the
20 types of development that may take place in the
21 floodplain.

22 Continuing implementation of the
23 NFIP, including implementation of NFIP as modified
24 by the alternatives, would not include any physical
25 development or ground disturbance in the floodplain,

1 nor would it encourage any development in the
2 floodplain to occur.

3 There will be no impacts to the
4 following resource areas as a result of
5 implementation of the alternatives: Air quality and
6 noise, geology and soils, aesthetic/visual
7 resources, hazardous wastes and materials, climate
8 change, historic and cultural resources, and
9 infrastructure.

10 Slide 18.

11 This table summarizes the potential
12 impacts that could occur for each alternative. Most
13 of the resources are identified as having no impact.
14 Less than significant impacts were identified for
15 socioeconomic resources, land use/planning, water
16 resources, and biological resources.

17 Slide 19.

18 With this brief overview of the draft
19 document, I will now describe the public comment
20 period and provide instructions for how to provide
21 public comments. The public release of the NFIP
22 draft NPEIS on April 7, 2017, started the 60-day
23 public comment period. The public comment period
24 ends June 6, 2017. Comments can be submitted
25 several ways:

1 You may provide verbal comments today
2 during this public meeting; or

3 You can provide written comment at
4 the comment table; or

5 You can provide comments through the
6 eRulemaking Portal at www.regulations.gov under
7 docket ID FEMA-2012-0012 and following instructions
8 there; or

9 By mail to the address on the slide.

10 Comments received through any of
11 these methods will be considered equally. Comments
12 need only to be submitted once through any of these
13 methods.

14 So as I mentioned, the 60-day comment
15 period ends June 6, 2017. You are welcome to submit
16 comments until that date.

17 Reviewers are requested to provide
18 specific information and comments on factual errors,
19 missing information, or additional considerations
20 that should be corrected or included in the draft
21 document.

22 FEMA will review all of the comments and
23 identify substantive issues that have bearing on the
24 NFIP and environmental impacts of the program. We will
25 then use the comments to prepare the NFIP final NPEIS.

1 The final NPEIS will include a section that discusses
2 how comments were addressed. The draft document is
3 available for download from regulations.gov, and there's
4 a link to the project website. The website also
5 includes information about webinars and other
6 informational materials. The project website is listed
7 on the next slide.

8 Public involvement is an important part of
9 the environmental planning process. We hope that all
10 interested individuals and organizations will take this
11 opportunity to identify concerns they feel should be
12 addressed in the final NFIP and NPEIS.

13 That concludes my presentation, and we will
14 open up the meeting now for comments.

15 MS. SALERNO: Thanks, Bret.

16 As Bret mentioned, there are several
17 ways to provide comments. The first is via verbal
18 comments during today's public meeting. If you wish
19 to submit written comments, you can leave them at
20 the comment table here on the right -- we have
21 comment forms you can fill out and leave with us --
22 through the federal eRulemaking Portal, or by mail.

23 Individual respondents may request
24 confidentiality. The names, street addresses, city
25 or town information of those providing comments will

1 be part of the administrative record and will be
2 subject to public disclosure unless confidentiality
3 is requested. Such a request must be stated
4 prominently at the beginning of the comment. We
5 will honor the requests to the extent allowed by
6 law. All submissions from organizations or
7 businesses, and from individuals identifying
8 themselves as representatives or officials of
9 organizations or businesses, will be available for
10 public inspection in their entirety, consistent with
11 applicable law.

12 FEMA will need to receive your
13 comments no later than June 6, 2017, to ensure their
14 consideration.

15 FEMA's only gathering comments today
16 and will not be responding to comments during the
17 public meeting. We will be taking verbal comments
18 today until 7:00 p.m. Speakers will be called in
19 the order registered.

20 I normally read about how you have
21 five minutes to speak. Since no one has signed up
22 yet, you can have the floor.

23 So we're now ready to receive your
24 public comments. Would anyone like to make a
25 comment?

1 Yes, miss. Would you mind stating
2 your name and who you're with.

3 OLIVIA: I'm with the community, and
4 I speak for myself --

5 MS. SALERNO: We need your name.

6 OLIVIA: My name is Olivia, and I
7 live off of 122nd and Southeast Division. And this
8 is my first meeting, public meeting.

9 And I was wondering if the Federal
10 Emergency Management Agency, FEMA, does that only
11 apply to flame or hurricane victims or -- et cetera,
12 et cetera, which I really don't know. Can you come
13 up with the rest?

14 MS. SALERNO: We can try to answer
15 your questions. We're just taking comments today.

16 OLIVIA: Okay. Do you think Federal
17 Emergency Management Agency would also cover
18 organized crime or human trafficking?

19 MS. SALERNO: Thank you. We're only
20 taking comments today.

21 OLIVIA: Oh. Are you recording
22 something?

23 Where can I get my answers at? Is
24 there a website?

25 MS. SALERNO: They'll be in the back

1 of the -- when we write the final document, we'll
2 respond to all of the comments that were provided
3 today, and the answers will be there.

4 OLIVIA: Okay.

5 Anybody else have a comment?

6 Okay. So also, does FEMA also apply
7 to sex slavery right here in our community?

8 Also, what does FEMA, like, cover,
9 besides flood? Because that's all I see. It's a
10 comment, question to myself, all I'm thinking.

11 So I see that all over the world it
12 only covers flooding and tsunamis and earthquakes,
13 but I only see FEMA helping Americans and its
14 citizens that have migrated here only when it's made
15 national news that we help other countries. So we
16 have to help ourselves now.

17 Second of all, how would any of you
18 feel if your daughter or niece or granddaughter was
19 a victim of sexual assault in a community where
20 somebody's family money runs long and hard, and
21 there's nothing to do about it? And the more you
22 ask, the more you comment, the more you question,
23 the more you're harassed by Portland Police.

24 How is it -- does FEMA cover, like,
25 police departments not serving and protecting their

1 community, even if a criminal has not been charged
2 with sexual assault?

3 Okay. That's all the questions I
4 have.

5 MS. SALERNO: Thank you, Olivia.

6 Are there any other comments on the
7 document?

8 OLIVIA: I have a question --
9 comment. So I was just reading right here, I mean,
10 I feel that this organized crime that's going around
11 here, that was once called Mafia back in the day, I
12 feel that it's a problematic environmental impact
13 because it's victimizing our young ladies and our
14 girls.

15 MS. SALERNO: If there are no more
16 comments, we'll wrap up this presentation. We will
17 be here until 7:00 p.m., and we thank you for
18 attending.

19 OLIVIA: Is FEMA responsible also for
20 the -- what is that -- the Willamette River?

21 I'm not from Portland. So I have a
22 lot of questions. This is like -- I'm used to
23 coming from a controlled environment, the South, a
24 military base.

25 (Reporter requests clarification.).

1 OLIVIA: I was just wondering, how is
2 there a roofing company, when FEMA hasn't even been
3 involved in no windstorm or anything, is making more
4 than a trucking company? We should ask FEMA.

5 I don't see anybody over here with
6 any brand-new roofs, even though we advertise that
7 right. Maybe we should contract with them, the
8 county, the state. They can get perks for their tax
9 write-off if they would, like, service the state to
10 do, you know, weatherized roofing and stuff like
11 that.

12 MS. SALERNO: Thank you.

13 OLIVIA: Does that make you feel
14 uncomfortable, sir, talking about human trafficking,
15 sex slavery, white slavery? Because it's not just,
16 like, thugs doing it now; it's like professionals
17 participating in it.

18 Who else?

19 Make you uncomfortable? I'm not
20 asking for an answer, just a comment.

21 MS. SALERNO: We're not allowed to
22 comment today.

23 OLIVIA: Because you'd have to
24 retract your statement if you're wrong, huh?

25 MS. SALERNO: It's not the purpose of

1 a public meeting for NEPA.

2 OLIVIA: Where can I go for debate on
3 this? I just want to know how many girls are going
4 to have to disappear? How many girls are going to
5 have to be victimized by the system? How many girls
6 are going to fight their way out of apartments for
7 four days and cameras from taking down a parking lot
8 at a clinic on 125th and Division? They're not even
9 vandalized. The signs are still up, and
10 professionally they're not taken off.

11 How is it that somebody -- I thought
12 the strip clubs would be an issue for FEMA, maybe.
13 And how is it filmed, and there's no police forum
14 when you get off the track? Isn't that a known
15 property for known prostitutes? Isn't that known
16 from south -- northeast, three blocks, go four
17 blocks, now you're in chino (phonetic) territory.

18 And if a guy's not convicted of sex
19 crimes, at least give him some downers to stay off
20 the damn playground with drugs and booze.

21 This man is a nuisance, y'all. And I
22 need FEMA to step in, because I'm having a
23 problematic problem right now.

24 MS. SALERNO: (Indicating.)

25 (MEETING ADJOURNED AT 6:00 P.M.)

1 CERTIFICATE

2 I, Robin L. Nodland, an Oregon Certified
3 Shorthand Reporter, a Registered Diplomate Reporter,
4 and a Certified Realtime Reporter, do hereby certify
5 that I reported in stenotype the proceedings had
6 upon the hearing of this matter, previously
7 captioned herein, before the aforementioned
8 panelists; that I transcribed my stenotype notes
9 through computer-aided transcription; and that the
10 foregoing transcript constitutes a full, true and
11 accurate record of all proceedings had during the
12 hearing of said matter, and of the whole thereof.

13 Witness my hand at Portland, Oregon, this
14 19th day of May, 2017.

15
16  

17 Robin L. Nodland

18 Oregon CSR No. 90-0056

19 Expires 3/31/20
20
21
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25

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1 NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
2 NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
3 FEDERAL EMERGENCY MANAGEMENT AGENCY
4 PUBLIC HEARING

5
6 TRANSCRIPT OF PROCEEDINGS

7
8 Local Public Hearing
9 May 17, 2017
10 5:00 p.m. to 7:00 p.m.
11 Independence, Missouri
12 Kansas City Public Library
13 Trails West Branch

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23 REPORTED BY:
24 BETH A. KALTENBERGER
25 CSR, CCR, RPR, CRR

1 Present at Public Hearing:

2

3 Mr. Bret Gates

4 Ms. Lindsey Veas

5 Mr. Ken Sessa

6 Mr. Miles Spenrath

7 Ms. Karin Jacoby

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1 P R O C E E D I N G S

2 MS. VEAS: Thank you for attending today's
3 NFIP draft NPEIS public meeting. My name is Lindsey
4 Veas and I will serve as your facilitator for this
5 meeting.

6 A reminder, if you would like to comment on
7 the NFIP draft NPEIS, please sign in at the sign-in
8 table. After the presentation, we will call your name
9 in the order received. FEMA will not be responding to
10 comments today.

11 Now we will begin the public meeting with
12 FEMA's presentation.

13 MR. GATES: I would like to welcome you to
14 this public meeting for the draft Nationwide
15 Programmatic Environmental Impact Statement on
16 proposed improvements and modifications to the
17 National Flood Insurance Program, or NFIP. The
18 development of this draft Nationwide Programmatic
19 Environmental Impact Statement, or draft NPEIS, by the
20 Federal Emergency Management Agency (commonly referred
21 to as FEMA) is pursuant to the National Environmental
22 Policy Act of 1969.

23 My name is Bret Gates and I work for FEMA's
24 Federal Insurance and Mitigation Administration as the
25 project manager for this NPEIS. FEMA is offering this

1 public meeting for two reasons. First, we want to
2 reach a broad audience given the nationwide nature of
3 our project. Second, we want to give the public a
4 meaningful opportunity to provide comments to FEMA
5 regarding its analysis of the environmental impacts on
6 the NFIP. After this presentation, participants who
7 have registered in advance to comment will be
8 recognized to provide their input. FEMA is gathering
9 comments and won't be responding to comments during
10 the public meeting.

11 Slide 2.

12 Before we receive your comments, I would
13 like to review the purposes for today's meeting.

14 First, to provide information about the
15 National Flood Insurance Program, which provides flood
16 insurance to more than 22,000 communities across the
17 country.

18 Second, to announce the availability of the
19 draft NPEIS.

20 Third, to provide an overview of the NEPA
21 process.

22 Fourth, to describe the proposed action and
23 alternatives for this draft NPEIS.

24 Lastly, to provide instructions on how to
25 submit comments on the draft NPEIS.

1 Slide 3.

2 Following the devastating flooding that
3 accompanied Hurricane Betsy in 1965, Congress
4 developed the National Flood Insurance Act of 1968,
5 which created the NFIP. The purpose of the NFIP, as
6 identified in the legislation, is to help minimize the
7 long-term risks to persons and property from the
8 effects of flooding. Congress recognized that
9 development in flood-prone areas would continue, that
10 disaster relief was both inadequate and expensive, and
11 that because the cost of flood insurance was so high,
12 only those in high-risk areas would buy it. FEMA
13 administers the National Flood Insurance Program.

14 Slide 4.

15 Flooding continues to be the single
16 greatest source of damage from natural hazards in the
17 United States, resulting in an average of 80 deaths
18 and more than \$8 billion in property damage each year.
19 In spite of this, people continue to live and work in
20 the nation's floodplains, and the number of people and
21 amount of property at risk from flooding has
22 increased.

23 Today, the NFIP serves as the foundation
24 for national efforts to reduce the loss of life and
25 property from flood disasters, and implementation of

1 the NFIP is estimated to save the nation roughly \$1.7
2 billion annually through avoided flood losses.

3 More than 22,000 communities participate in
4 the NFIP, with more than 5.1 million NFIP policies in
5 effect, providing over \$1.2 trillion in insurance
6 coverage.

7 Legislation was passed in 2012 and 2014 to
8 address concerns over the fiscal soundness of the
9 NFIP. This legislation, known as the Biggert-Waters
10 Flood Insurance Reform Act of 2012 (or BW-12) and the
11 Homeowner Flood Insurance Affordability Act of 2014
12 (or HFIAA), requires changes to the NFIP. In
13 addition, many and varying statements from federal
14 agencies and the public about FEMA's compliance with
15 the Endangered Species Act (commonly known as the ESA)
16 has led to the need to demonstrate compliance with
17 this Act.

18 Slide 5.

19 Signed by President Nixon, the National
20 Environmental Policy Act of 1969, referred to as NEPA,
21 requires federal agencies to consider and evaluate
22 potential environmental impacts of their actions on
23 the natural and cultural environment as part of their
24 planning and decision making process. An
25 Environmental Impact Statement, referred to as an EIS,

1 is a document prepared to describe the effects of
2 proposed activities and alternatives on the natural
3 and physical environment, including the relationship
4 of people with that environment.

5 Slide 6.

6 FEMA's Nationwide Programmatic EIS,
7 referred to as NPEIS, provides opportunities for
8 stakeholders, including the public, organizations,
9 states, and NFIP participating communities to provide
10 their input so that all relevant issues and potential
11 impacts are adequately covered and addressed. The
12 resulting analysis describes both the beneficial and
13 negative impacts that the proposed action, as well as
14 the alternatives, may have. If significant negative
15 impacts are identified in any of these options,
16 mitigation measures to reduce these impacts
17 are recommended.

18 Due to the geographic extent of this
19 project, FEMA has determined that the NEPA analysis
20 for its Proposed Action and Alternatives should be
21 conducted at a nationwide programmatic Level. A
22 programmatic document, such as this NPEIS, is prepared
23 when an agency is proposing to carry out a broad
24 action, program, or policy. The geographic scope of
25 the NFIP NPEIS is nationwide. This draft NPEIS

1 provides an appropriate level of evaluation for a
2 nationwide action, assesses potential impacts
3 expected from the program as a whole, and, if
4 necessary, identifies mitigation measures that would
5 be implemented at the national level.

6 The NFIP draft NPEIS was released on
7 April 7, 2017, which is the start date for the 60-day
8 public comment period. The NFIP draft NPEIS can be
9 downloaded from the website posted here on the slide.

10 Slide 7.

11 For an EIS, the NEPA process starts with a
12 notification from the federal agency of its intent to
13 evaluate a Proposed Action. FEMA published a Notice
14 of Intent in the Federal Register on May 16, 2012.
15 The Notice of Intent started the first phase of public
16 involvement, referred to as Scoping. Scoping is the
17 early and open process for determining the scope of
18 issues to be addressed in an EIS, identifying the
19 significant issues related to a proposed action, and
20 receiving input from the public.

21 FEMA published a subsequent Notice of
22 Intent on March 25, 2014 to announce the availability
23 of three public webinar scoping meetings. Over 100
24 people registered to attend the webinars.

25 FEMA reviewed and considered the content of

1 all comments to determine the scope of this draft
2 NPEIS. The main comment themes were as follows:

3 Socioeconomic effects of the NFIP;

4 Improvements in floodplain mapping and
5 Flood Insurance Rate Maps (referred to as FIRMs);

6 Economic impacts of transition from
7 subsidized premiums to full risk rated premiums;

8 Updates to clarify community compliance
9 with the ESA; and updates to better address the
10 protection/restoration of natural resources.

11 All scoping materials, including the
12 Federal Register notices and webinar presentations,
13 are included in Appendix B of the draft document.

14 Slide 8.

15 Before I begin discussing the proposed
16 project, I would like to share a little information
17 about the purpose and need for modifications to the
18 NFIP. The purpose of the Proposed Action is to
19 implement the legislative requirements of BW-12 and
20 HFIAA which requires Program changes; and to
21 demonstrate compliance with the Endangered Species
22 Act.

23 The need to implement the legislative
24 requirements of BW-12 and HFIAA arises from the recent
25 concerns over the fiscal soundness of the NFIP.

1 Flooding has been, and continues to be, a serious
2 risk in the United States. Over the years, the costs
3 and consequences of flooding have continued to
4 increase. For the NFIP to remain sustainable and to
5 increase its fiscal soundness, its premium structure
6 must reflect the true risks and costs of flooding.
7 This is a primary driver for many of the legislatively
8 required changes that are assessed as part of this
9 analysis.

10 The need to demonstrate compliance with the
11 Endangered Species Act stems from the many and varying
12 statements from federal agencies and the public about
13 FEMA's compliance with the ESA, and the perception
14 about the nature of the NFIP and its effects on
15 ESA-listed species and designated critical habitat.
16 FEMA determined that it is currently in compliance
17 with the ESA, but recognizes the need to demonstrate
18 ESA compliance to the public.

19 Slide 9.

20 For the Proposed Action, FEMA proposes to
21 implement modifications to the NFIP that would support
22 the Program's three primary components: Insurance,
23 floodplain management, and mapping.

24 The NFIP makes federal flood insurance
25 available to property owners or lessees in communities

1 that participate in the NFIP. Through the NFIP,
2 property owners in participating communities are able
3 to insure their property against future flood losses.

4 As originally established, the National
5 Flood Insurance Act of 1968 authorized FEMA to provide
6 subsidized flood insurance only for existing buildings
7 or buildings built prior to the community's first FIRM
8 (generally referred to as "pre-FIRM buildings"). This
9 means that flood insurance for new development has
10 never been subsidized by the NFIP (subject to the very
11 limited, short-term statutory exceptions).

12 However, subject to the very limited, short
13 term statutory exceptions referenced above, FEMA must
14 apply actuarial rates to all buildings constructed, or
15 substantially damaged or improved, on or after the
16 effective date of the initial FIRM for the community
17 or after December 31, 1974, whichever is later
18 (generally referred to as "post-FIRM buildings").

19 With the passage of the BW-12 and HFIAA,
20 FEMA is required to phase out the subsidies on
21 pre-FIRM properties. Some subsidies must be phased
22 out immediately, some will be phased out at a rate of
23 25 percent premium rate increases per year, and the
24 rest will be phased out at a rate of 5 to 15 percent
25 premium rate increases per year. Accordingly, when

1 this phaseout is completed, FEMA will not offer
2 subsidized flood insurance for either new or existing
3 floodplain development (subject to certain very
4 limited, short term statutory exceptions).

5 A community's participation in the NFIP is
6 voluntary. Participation is based on an agreement
7 between communities and the federal government. If a
8 community adopts and enforces a floodplain management
9 ordinance that meets certain minimum requirements to
10 reduce future flood risks within an area known as the
11 Special Flood Hazard Area (SFHA), the federal
12 government will make flood insurance available to
13 property owners and lessees in that community.

14 FEMA has no land use authority. The power
15 to regulate development in the floodplain, including
16 requiring and approving permits, inspecting property,
17 and citing violations requires land use authority.

18 Land use regulation falls under the state's
19 police powers, which the Constitution reserves to the
20 states, and the states delegate this power down to
21 their respective political subdivisions to protect the
22 health, safety, and general welfare of their citizens.
23 FEMA has no direct involvement in the administration
24 of local floodplain management ordinances. The NFIP
25 was designed so that floodplain management would be

1 carried out at the state and local levels, where land
2 use authority resides. For the most part, local
3 governments bear the responsibility for protecting
4 residents from flood hazards, working to reduce flood
5 damage, and preserving floodplain functions and
6 resources.

7 FEMA is also not authorized by statute to
8 act as a permitting authority. Therefore, floodplain
9 development is regulated at the community level
10 through the community's floodplain management
11 regulations and floodplain development permitting
12 process. Before a property owner can undertake any
13 development in the SFHA, they must obtain a permit
14 from the community. The community is responsible for
15 reviewing the proposed development to ensure
16 compliance with their floodplain management ordinance
17 and that all necessary permits have been received from
18 federal or state agencies from which approval is
19 required.

20 Through its Flood Hazard Mapping Program,
21 FEMA identifies flood hazards, assesses flood risks,
22 and collaborates with states and communities to
23 provide accurate flood hazard and risk data to guide
24 them to mitigation actions. The risk zones shown on
25 the FIRMS are the basis for the establishment of NFIP

1 flood insurance premium rates.

2 Flood insurance has been available to
3 property owners or lessees in participating NFIP
4 communities through the adoption of community-wide
5 floodplain management ordinances. Property owners in
6 participating communities are able to insure their
7 property against future flood losses.

8 The NPEIS considers alternatives to modify
9 the NFIP and the No Action Alternative. NEPA requires
10 that any agency proposing a major action must consider
11 a reasonable range of alternatives to the Proposed
12 Action. Alternatives concerning the future of the
13 NFIP must meet essential technical requirements,
14 comply with governing standards and regulations, and
15 meet FEMA's purpose and need. The draft NPEIS
16 considers a range of reasonable alternatives for
17 modifying the NFIP.

18 Potential program changes to the NFIP are
19 included in all or some of the alternatives. Some of
20 these potential changes are the result of recent
21 legislation amending the NFIP. Other potential
22 program changes were developed to demonstrate
23 compliance with the requirements of the ESA.

24 Slide 10.

25 This table identifies the Alternatives

1 analyzed in the draft document and the proposed
2 modifications to the NFIP by alternative.

3 I will discuss each of the alternatives in
4 more detail in the next few slides.

5 Slide 11.

6 Alternative 1 or the No Action Alternative
7 refers to the current, existing conditions under the
8 NFIP without implementation of the Proposed
9 Alternative. The No Action alternative serves as a
10 benchmark against which impacts of the Preferred
11 Alternative and the other Alternatives can be
12 evaluated. Under the No Action Alternative, FEMA
13 would continue the policies and program elements of
14 the existing NFIP and there would be no additional
15 changes to the NFIP as it exists today.

16 Slide 12.

17 Alternative 2 includes legislatively
18 required changes, floodplain management criteria
19 guidance, and Letter of Map Change clarification. The
20 first change is to phase out subsidies on certain
21 pre-FIRM properties at a rate of 25 percent premium
22 increases per year. These pre-FIRM properties include
23 non-primary residences, business properties, severe
24 repetitive loss properties, substantially damaged or
25 improved properties, and properties for which the

1 cumulative claims payments exceed the fair market
2 value of the property. BW-12 mandates that the
3 premium rates on these properties be increased by 25
4 percent each year until full risk rates are achieved.

5 The second change includes the phasing out
6 of subsidies on all other pre-FIRM properties through
7 annual premium rate increases of an average rate of at
8 least 5 percent, but no more than 15 percent, per risk
9 classification, with no individual policy exceeding an
10 18 percent premium rate increase.

11 Slide 13.

12 The third change involves implementing a
13 monthly installment plan payment option for
14 non-escrowed flood insurance policies. This may help
15 alleviate the affordability concerns of some
16 policyholders who voluntarily choose to purchase flood
17 insurance.

18 The fourth change involves clarifying that
19 the issuing of certain Letter of Map Change or LOMC
20 requests, that is, map revisions, is contingent on the
21 community, or the project proponent on the community's
22 behalf, submitting documentation of compliance with
23 the ESA.

24 The fifth change involves clarifying that
25 pursuant to 44 C.F.R. Part 60.3(a)(2), a community

1 must obtain and maintain documentation of compliance
2 with the appropriate federal or state laws, including
3 the ESA, as a condition of issuing permits to develop
4 in the floodplain.

5 FEMA's preferred alternative is
6 Alternative 2. Implementation of Alternative 2 would
7 meet FEMA's purpose and need, and causes the least
8 environmental impact overall. Alternative 2 is within
9 FEMA's discretion and meets the legislatively required
10 timeframe.

11 Slide 14.

12 Alternative 3 includes the legislatively
13 required changes and LOMC clarification changes
14 identified under Alternative 2. In addition,
15 Alternative 3 would include Proposed ESA Regulatory
16 Changes that would:

17 Establish a new ESA-related performance
18 standard in the minimum floodplain management criteria
19 at 44 C.F.R. Part 60.3 that would require communities
20 to obtain and maintain documentation that any adverse
21 impacts caused by proposed development, including
22 fill, to ESA-listed species and designated critical
23 habitat will be mitigated to the maximum extent
24 possible;

25 Increase the probation surcharge applicable

1 to NFIP communities placed on probation from 50 to
2 100; and clarify that the exception to the no-rise
3 performance standard in the floodway applies only to
4 projects that serve a public purpose or result in the
5 restoration of the natural and beneficial functions of
6 floodplains.

7 Slide 15.

8 Alternative 4 includes the legislatively
9 required and letter of map change clarification
10 changes identified under Alternative 2. In addition.
11 Alternative 4 also includes ESA Guidance. The ESA
12 Guidance would utilize the existing performance
13 standard in 44 C.F.R. Part 60.3(a)(2) to implement a
14 new policy or procedure requiring communities to
15 ensure any development for which a permit to develop
16 in the floodplain is sought, the impacts to ESA-listed
17 species and designated critical habitat are identified
18 and assessed and, second, if there are any potential
19 adverse impacts to such species and habitat as a
20 result of such development, that the community obtain
21 and maintain documentation that the proposed
22 development in the floodplain will be undertaken in
23 compliance with the ESA.

24 Slide 16.

25 The document evaluates potential impacts

1 from implementing each of the four alternatives.
2 Quantitative and qualitative analyses have been used
3 to determine the intensity and magnitude of the
4 environmental impacts. FEMA subject matter experts
5 determined whether particular impacts were less than
6 significant or significant.

7 The document uses the following terms to
8 indicate relative degree of severity of environmental
9 impacts on resources.

10 No Impact is defined as no environmental
11 impact is readily apparent or identified.

12 Less than Significant is used to indicate
13 that a change to resources would be measurable
14 although the change would be small and localized.
15 Mitigation measures, such as employing best management
16 practices or precautionary measures, would reduce any
17 potential adverse impacts.

18 Significant is used to indicate that
19 changes to resources would be measurable and would
20 have substantial consequences on a local and regional
21 level. Impacts would exceed regulatory standards.
22 Mitigation measures to offset the adverse impacts
23 would be required and reduce impacts through long-term
24 changes to the resource. Impacts may be both
25 beneficial and adverse.

1 Slide 17.

2 There are a number of resource areas that
3 FEMA has identified as having no impacts as a result
4 of implementation of the alternatives. As pointed out
5 in the document, floodplain development is not
6 authorized, funded, or carried out by FEMA pursuant to
7 the NFIP, nor does it encourage such floodplain
8 development to occur. Moreover, FEMA has no land use
9 authority. The power to regulate development in the
10 floodplain, including requiring and approving permits
11 and citing violations requires land use authority.
12 Therefore, floodplain development is regulated at the
13 community level through the community's floodplain
14 management regulations and permitting process for
15 development in the floodplain. As such, FEMA has no
16 role in the issuance, denial, or enforcement of
17 individual permits, nor does it have the land use
18 authority necessary to prescribe the types of
19 development that may take place in the floodplain.

20 Continued implementation of the NFIP,
21 including implementation of the NFIP as modified by
22 the alternatives, would not include any physical
23 development or ground disturbance in the floodplain,
24 nor would it encourage any development in the
25 floodplain to occur.

1 There would be no impacts to the following
2 resource areas as a result of implementation of the
3 alternatives: Air Quality and noise, Geology and
4 Soils, Aesthetic and Visual Resources, Hazardous
5 Wastes and Materials, Climate Change, Historic and
6 Cultural Resources, and Infrastructure.

7 Slide 18.

8 This table summarizes the potential impacts
9 that could occur for each alternative. Most of the
10 resources are identified as having no impact. Less
11 than significant impacts were identified for
12 socioeconomic resources, land use planning, water
13 resources, and biological resources.

14 Slide 19.

15 With this brief overview on the draft
16 document, I will now describe the public comment
17 period and provide instructions on how to submit
18 comments. The public release of the NFIP draft
19 NPEIS on April 7, 2017 started the 60-day public
20 comment period. The public comment period ends
21 June 6, 2017. Comments can be submitted several ways.
22 you may provide verbal comments today during this
23 public meeting, provide a written comment at the
24 comment table, provide a comment through the
25 eRulemaking Portal at www.regulations.gov under

1 Docket ID FEMA-2012-0012 and following the
2 instructions there, or by mail to the address on the
3 slide.

4 Comments received through any of these
5 methods will be considered equally. Comments need to
6 only be submitted once through any of these methods.

7 As I mentioned, the 60-day comment period
8 will end June 6, 2017. You are welcome to submit
9 comments until that date.

10 Reviewers are requested to provide specific
11 information and comments on factual errors, missing
12 information, or additional considerations that should
13 be corrected or included in the draft document.

14 FEMA will review all of the comments and
15 identify substantive issues that have bearing on the
16 NFIP and environmental impacts of the Program. We
17 will then use the comments to prepare the NFIP final
18 NPEIS. The final NPEIS will include a section that
19 discusses how comments were addressed.

20 The draft NPEIS is available for download
21 from Regulations.gov and there is a link on the
22 project website. The project website also includes
23 information about the webinars and other informational
24 materials. The project website is listed on the
25 next slide.

1 Public involvement is an important part of
2 the environmental planning process. We hope that all
3 interested individuals and organizations will take
4 this opportunity to identify concerns they feel should
5 be addressed in the NFIP draft NPEIS.

6 That concludes my presentation. We will
7 now open the meeting up to comments.

8 MS. VEAS: Thanks, Bret.

9 As mentioned, there are several
10 ways to provide comments. The first is via verbal
11 comment during today's meeting. If you wish to submit
12 written comments, you can provide them at the comment
13 table located at the back of the room, through the
14 federal eRulemaking Portal, or by mail.

15 Individual respondents may request
16 confidentiality. The names, street addresses, and
17 city or town information of those providing comments
18 will be part of the administrative record, and will be
19 subject to public disclosure unless confidentiality is
20 requested. Such a request must be stated prominently
21 at the beginning of the comment. We will honor
22 requests to the extent allowed by law. All
23 submissions from organizations or businesses, and from
24 individuals identifying themselves as representatives
25 or officials of organizations or businesses, will be

1 available for public inspection in their entirety,
2 consistent with applicable law.

3 FEMA will need to receive your comments no
4 later than June 6, 2017 to ensure their consideration.

5 FEMA is only gathering comments today and
6 will not be responding to comments during the public
7 meeting. We will be taking verbal comments today
8 until 7:00 p.m. Speakers will be called in the
9 order registered. Each registered speaker will have
10 five minutes to provide verbal comments.

11 If you would like to speak but have not
12 registered to do so, please register at the sign-in
13 table.

14 We are now ready to receive public
15 comments.

16 THE WITNESS: My name is Karin Jacoby. I'm
17 a levy and flood protection attorney here in Kansas
18 City, working for the firm Husch Blackwell, and I'm
19 here today on behalf of our many levy clients,
20 municipalities with levies, levy districts,
21 owner/operators, and submitting these comments for the
22 record on their behalf, so thank you for the meeting
23 and for the presentation.

24 To begin, I would like to request an
25 extension of comments beyond the current due date of

1 June 6th, in part, due to the complexity, and that the
2 final meeting is May 19th in Washington, D.C., which
3 only allows for a few days prior to the end of the
4 comment period.

5 Second, we have some concerns with scoping
6 on this process. The initial scoping meeting in
7 November of 2009 occurred in November of 2009. Since
8 then Biggert-Waters 12 and HFIAA took place following
9 which there were some webinar scoping meetings, but
10 there were no additional scoping meetings that we were
11 aware of after EO 13690, the Federal Flood Risk
12 Management Standard, which because that amends the
13 Floodplain Management Executive Order 11988, which is
14 listed as being a consideration in the NPEIS scoping,
15 we thought that at that time there should have been
16 additional scoping meetings, recognizing that the
17 FFRMS can have significant implications for levied
18 areas and land use.

19 Again, additional time is sought to address
20 those concerns seeing that the floodplain management
21 criteria guidance and EL11988 and through that FFRMS
22 is being considered in the NPEIS and, in fact, is part
23 of the preferred alternative, the floodplain
24 management criteria guidance.

25 So after these most recent public meetings,

1 time is needed to assess implications to levied areas
2 and to people, property and productivity that levies
3 protect.

4 Lastly, considering that the NFIP is now
5 being reauthorized, consideration should be given to
6 incorporating those potential reforms prior to a
7 record of decision being made. Considering that the
8 last EIS was in 1976, it seems reasonable to wait for
9 this new reauthorization and to update the scope
10 accordingly.

11 And, finally, while it is understood that
12 FEMA does not have land-use authority, it must be
13 recognized that there are implications for land use
14 and zoning, as such a no-impact for land use and
15 zoning seems inappropriate.

16 Thank you. Appreciate the opportunity to
17 provide these comments for the record.

18 MS. VEAS: I would like to remind you that
19 the comment period ends on June 6, 2017. Comments
20 should be received by that date in order to receive
21 full consideration in the NFIP draft NPEIS. Comments
22 received after that date will be considered to the
23 extent practicable. I am going to turn it over to
24 Bret for closing remarks.

25 MR. GATES: I would like to thank everyone

1 for participating today. The comments FEMA received
2 today will be helpful in our Final NPEIS development
3 efforts. FEMA appreciates your continued
4 participation in the NFIP draft NPEIS process.

5 Thank you for coming tonight.

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CERTIFICATE OF REPORTER

I, Beth A. Kaltenberger, a Certified Court
Reporter for the state of Missouri, Certified
Shorthand Reporter, Registered Professional Reporter
and Certified Realtime Reporter, do hereby certify
that the Public Hearing aforementioned was held on the
time and in the place previously described.

IN WITNESS WHEREOF, I have hereunto set my
hand this 30th day of May, 2017.

BETH A. KALTENBERGER, RPR, CRR
MISSOURI CCR 1335

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COURT REPORTING

Transcript of **Hearing**

May 19, 2017

FEMA Hearing

Alderson Reporting
1-800-367-3376
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<http://www.aldersonreporting.com>

Alderson Reference Number: 69594

1 NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
2 NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT
3 STATEMENT

4

5

6

PUBLIC MEETING

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9

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Date: May 19, 2017

11

Time: 3:00 p.m.

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Public Meeting held in the above-referenced
matter on Friday, May 19, 2017, commencing at 3:15 p.m.,
at FEMA Headquarters, 400 C Street SW, Washington, DC
20472

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FACILITATORS:

2

MS. JENNIFER SALERNO

3

MR. BRET GATES

4

5

PARTICIPANTS

6

MR. JOHN McSHANE

7

MR. ANDRE McDONALD

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1 MS. SALERNO: Thank you all for attending
2 today's NFIP draft NPEIS public meeting. My name is
3 Jennifer Salerno and I will serve as your facilitator
4 for the meeting.

5 A reminder. If you would like to comment on
6 the NFIP draft NPEIS, please sign in at the sign-in
7 table. After the presentation, we will call your name
8 in the order received. FEMA will not be responding to
9 comments.

10 Now we will begin the public meeting with
11 FEMA's presentation.

12 MR. GATES: Thank you, Jen.

13 I would like to welcome you all to this public
14 meeting for the draft Nationwide Programmatic
15 Environmental Impact Statement on proposed improvements
16 and modifications to the National Flood Insurance
17 Program, or NFIP. The development of this draft
18 Nationwide Programmatic Environmental Impact Statement,
19 or draft NPEIS, by the Federal Emergency Management
20 Agency -- commonly referred to as FEMA -- is pursuant to
21 the National Environmental Policy Act of 1969.

22 My name is Bret Gates, and I work for FEMA's

1 Federal Insurance and Mitigation Administration as the
2 project manager for this NPEIS.

3 FEMA is offering this public meeting for two
4 reasons: First, we want to reach a broad audience given
5 the nationwide nature of our project; second, we want to
6 give the public a meaningful opportunity to provide
7 comments to FEMA regarding its analysis of the
8 environmental impacts of the NFIP. After this
9 presentation, participants who have registered in
10 advance to comment will be recognized to provide their
11 input. FEMA is gathering comments and won't be
12 responding to questions or comments during the public
13 meeting.

14 I will call out the slide numbers so that you
15 all could follow along.

16 Before we receive your comments, I would like
17 to review the purposes for today's meeting:

18 First, to provide information about the NFIP,
19 which provides flood insurance to more than 22,000
20 communities across the country; second, to announce the
21 availability of the draft NPEIS; third to provide an
22 overview of the NEPA process; fourth, to describe the

1 proposed actions and alternatives for this draft NPEIS;
2 and, lastly, to provide instruction for how to submit
3 comments on the draft NPEIS.

4 Slide 3. Following the devastating flooding
5 that accompanied Hurricane Betsy in 1965, Congress
6 developed the National Flood Insurance Act of 1968,
7 which created the NFIP. The purpose of the NFIP, as
8 identified in the legislation, is to help minimize the
9 long-term risks to persons and property from the effects
10 of flooding. Congress recognized that development of
11 flood-prone areas would continue, that disaster relief
12 was both inadequate and expensive, and because the cost
13 of flood insurance was so high, only those in high-risk
14 areas would buy it. FEMA administers the NFIP.

15 Slide 4. Flooding continues to be the single
16 greatest source of damage from natural hazards in the
17 United States, resulting in an average of 80 deaths and
18 more than \$8 billion in property damage each year. In
19 spite of this, people continue to live and work in the
20 nation's floodplains, and the number of people and
21 amount of property at risk for flooding has increased.

22 Today, the NFIP serves as the foundation for

1 national efforts to reduce the loss of life and property
2 from flood disasters. The implementation of the NFIP is
3 estimated to save nation the roughly \$1.7 billion
4 annually through avoided flood losses. More than 22,000
5 communities participate in the NFIP, with more than 5.1
6 million NFIP policies in effect, providing over \$1.2
7 trillion in insurance coverage.

8 Legislation was passed in 2012 and 2014 to
9 address concerns over the fiscal soundness of the NFIP.
10 This legislation, known as Biggert-Waters Flood
11 Insurance Reform Act of 2012, or BW-12, and the
12 Homeowner Flood Insurance Affordability Act of 2014, or
13 HFIAA, requires changes to the NFIP. In addition, many
14 and varying statements from federal agencies and the
15 public about FEMA's compliance with the Endangered
16 Species Act, commonly ESA, has led to the need to
17 demonstrate compliance with the act.

18 Slide 5. Signed by President Nixon, the
19 National Environmental Policy Act of 1969, referred to
20 as NEPA, requires federal agencies to consider and
21 evaluate potential environmental impacts of their
22 actions on the natural and cultural environment as part

1 of their planning and decisionmaking process. An
2 Environmental Impact Statement, referred to as an EIS,
3 is a document prepared to describe the effects of
4 proposed activities and alternatives on the natural and
5 physical environment, including the relationship of
6 people with that environment.

7 Slide 6. FEMA's Nationwide Programmatic
8 Environmental Impact Statement, or EIS, referred to as
9 an NPEIS, provides opportunities for stakeholders,
10 including the public, organizations, states, and NFIP
11 participating communities to provide their input so that
12 all relevant issues and potential impacts are adequately
13 covered and addressed. The resulting analysis describes
14 both the beneficial and negative impacts that the
15 proposed action, as well as the alternatives, may have.
16 If significant negative impacts are identified in any of
17 these options, mitigation measures to reduce these
18 impacts are recommended.

19 Due to the geographic extent of the project,
20 FEMA has determined that the NEPA analysis for its
21 Proposed Action and Alternatives should be conducted at
22 a nationwide programmatic level. A programmatic

1 document, such as the NPEIS, is prepared when an agency
2 is proposing to carry out a broad action, program, or
3 policy. This draft NPEIS provides an appropriate level
4 of evaluation for a nationwide action, assesses
5 potential impacts expected from the program as a whole,
6 and, if necessary, identifies mitigation measures that
7 would be implemented at the national level.

8 The draft NPEIS was released on April 7, 2017,
9 which is the start of the 60-day public comment period.
10 The draft document NPEIS can be downloaded from the Web
11 site posted here on the slide.

12 Slide 7. For an EIS, the NEPA process starts
13 with a notification from the federal agency of its
14 intent to evaluate a Proposed Action. FEMA first
15 published a Notice of Intent in the Federal Register on
16 May 16, 2012. The Notice of Intent started the first
17 phase of public involvement, referred to as scoping.
18 Scoping is the early and open process for determining
19 the scope of issues to be addressed in an EIS,
20 identifying the significant issues related to a proposed
21 action, and receiving input from the public. FEMA
22 established or published a subsequent Notice of Intent

1 on March 25, 2014, to announce the availability of three
2 public webinar scoping meetings. Over 100 people
3 registered to attend the webinars. FEMA reviewed and
4 considered the content of all comments to determine the
5 scope of the document. The main comment themes were as
6 follows: Socioeconomic effects of the NFIP;
7 improvements in floodplain mapping and Flood Insurance
8 Rate Maps, referred to as FIRMs; economic impacts of
9 transition from subsidized premiums to full-risk-rated
10 premiums; updates to clarify community compliance with
11 the ESA; and, updates to better address protection and
12 restoration of natural resources. All scoping
13 materials, including the Federal Register notices and
14 webinar presentations, are included Appendix B of the
15 draft document.

16 Slide 8. Before I begin discussing the
17 proposed project, I would like to share a little
18 information about the purpose and need for the
19 modifications to the NFIP. The purpose of the Proposed
20 Action is to implement the legislative requirements of
21 BW-12 and HFIAA which requires program changes; and, to
22 demonstrate compliance with Endangered Species Act.

1 The need to implement the legislative
2 requirements of BW-12 and HFIAA arises from the recent
3 concerns over the fiscal soundness of the NFIP.

4 Flooding has been, and continues to be, a serious risk
5 in the United States. Over the years, the costs and
6 consequences of flooding have continued to increase.
7 For the NFIP to remain sustainable and to increase its
8 fiscal soundness, its premium structure must reflect the
9 true risks and costs of flooding. This is the primary
10 driver for many of the legislatively required changes
11 that are assessed as part of the analysis.

12 The need to demonstrate compliance with the
13 Endangered Species Act stems from many and varying
14 statements from federal agencies and the public about
15 FEMA's compliance with the ESA, and the perception about
16 the nature of the NFIP and its effects on ESA-listed
17 species and designated critical habitat. FEMA
18 determined that it is currently in compliance with the
19 ESA, but recognizes the need to demonstrate ESA
20 compliance to the public.

21 Slide 9. For the Proposed Action, FEMA
22 proposes to implement modifications to the NFIP that

1 would support the program's three primary components:

2 Insurance, floodplain management, and mapping.

3 The NFIP makes flood insurance available to
4 property owners or lessees in communities that
5 participate in the NFIP. Through the NFIP, property
6 owners in participating communities are able to insure
7 their property against future flood losses. As
8 originally established, the National Flood Insurance Act
9 of 1968 authorized FEMA to provide subsidized flood
10 insurance only for existing buildings or buildings built
11 prior to the community's first, FIRM, generally referred
12 to as pre-FIRM buildings. This means that flood
13 insurance for new development has never been subsidized
14 by the NFIP subject to the very limited, short-term
15 exceptions. However, subject to very limited,
16 short-term statutory exceptions referenced above, FEMA
17 must apply actuarial rates to all buildings constructed,
18 or substantially damaged or improved, on or after the
19 effective date of the initial FIRM for the community or
20 after December 31, 1974, whichever is later, generally
21 referred to as post-FIRM buildings.

22 With the passage of the BW-12 and HFIAA, FEMA's

1 required to phase out the subsidies on pre-FIRM
2 properties. Some subsidies must be phased out
3 immediately, some will be phased out at a rate of 25
4 percent premium rate increases per year, and the rest
5 will be phased out at a rate between 5 and 15 percent
6 premium rate increases per year. Accordingly, when this
7 phase-out is completed, FEMA will not offer flood
8 insurance for either new or existing floodplain
9 development, subject to certain very limited, short-term
10 statutory exceptions.

11 A community's participation is voluntary.
12 Participation is based on an agreement between
13 communities and the federal government. If a community
14 adopts and enforces a floodplain management ordinance
15 that meets certain minimum requirements to reduce future
16 flood risks within an area known as the Special Flood
17 Hazard Area, or SFHA, the Federal Government will make
18 flood insurance available to property owners and lessees
19 in that community.

20 FEMA has no land use authority. The power to
21 regulate development in the floodplain, including
22 requiring and approving permits, inspecting property,

1 and citing violations requires land use authority. The
2 regulation of land use falls under the state's police
3 powers, which the Constitution reserves to the states,
4 and the states delegate this power down to their
5 respective political subdivisions to protect the health,
6 safety, and general welfare of their citizens. FEMA has
7 no direct involvement in the administration of local
8 floodplain management ordinances. The NFIP was designed
9 so that floodplain management would be carried out at
10 the state and local levels, where land use authority
11 resides. For the most part, local governments bear the
12 responsibility for protecting citizens from flood
13 hazards, working to reduce flood damage, and preserving
14 floodplain functions and resources.

15 FEMA's also not authorized by statute to act as
16 a permitting authority. Therefore, floodplain
17 development is regulated at the community level through
18 the community's floodplain management regulations and
19 floodplain development permitting process. Before a
20 property owner can undertake any development in the
21 SFHA, they must first obtain a permit from the
22 community. The community is responsible for reviewing

1 the proposed development to ensure compliance with their
2 local floodplain management ordinance and that all
3 necessary permits have been received from federal or
4 state agencies from which approval is required.

5 Through its Flood Hazard Mapping Program, FEMA
6 identifies flood hazards, assesses flood risks, and
7 collaborates with states and communities to provide
8 accurate flood hazard and risk data to guide them to
9 mitigation actions. The risks zones shown on the FIRMs
10 are the basis for the establishment of NFIP flood
11 insurance premium rates. Flood insurance has been
12 available to property owners or lessees in participating
13 communities through the adoption of the community-wide
14 floodplain management ordinances. Property owners in
15 participating communities are able to insure their
16 property against future flood losses. The NPEIS
17 consideration alternatives to modify the NFIP and the No
18 Action Alternative. NEPA requires that any agency
19 proposing a major federal action must consider
20 reasonable range of alternatives to the Proposed Action.
21 Alternatives concerning the future of NFIP must meet
22 essential technical requirements, comply with governing

1 standards and regulations, and meet FEMA's purpose and
2 need. The draft document considers a range of
3 reasonable alternatives for modifying the NFIP.
4 Potential program changes to the NFIP are included in
5 all or some of the alternatives. Some of the potential
6 changes are the result of recent legislation amending
7 the NFIP. Other potential program changes were
8 developed to demonstrate compliance with the
9 requirements of the ESA.

10 Slide 10. This table identifies the
11 Alternatives analyzed in the draft document and the
12 proposed modifications to the NFIP by alternative. I
13 will discuss each of the alternatives in more detail in
14 the next few slides.

15 Slide 11. Alternative 1, or the No Action
16 Alternative, refers to the current existing conditions
17 under the NFIP without implementation of the Proposed
18 Alternative. The No Action alternative serves as a
19 benchmark against which impacts of the Preferred
20 Alternative and other Alternatives can be evaluated.
21 Under the No Action Alternative, FEMA would continue the
22 policies and program elements of the existing NFIP and

1 there would be no additional changes to the NFIP as it
2 exists today.

3 Slide 12. Alternative 2 includes legislatively
4 required changes, floodplain management criteria
5 guidance, and Letter of Map Change clarification. The
6 first change is to phase out subsidies on certain
7 pre-FIRM properties at a rate of 25 percent premium
8 increases per year. These pre-FIRM properties include
9 non-primary residences, business properties, severe
10 repetitive loss properties, substantially damaged or
11 improved properties, and properties for which the
12 cumulative claims payments exceed the fair market value
13 of the property. The BW-12 mandates that the premium
14 rates on these properties be increased by 25 percent
15 each year until full risk rates are achieved.

16 The second change includes the phasing out of
17 subsidies on all other pre-FIRM properties through
18 annual premium rate increases of an average rate of at
19 least 5 percent, but no more than 15 percent, per risk
20 classification, with no individual policy exceeding an
21 18 percent premium rate increase.

22 Slide 13. The third change involves

1 implementing a monthly installment plan payment option
2 for non-escrowed flood insurance policies. This may
3 help alleviate the affordability concerns of some
4 policyholders who voluntary choose to purchase flood
5 insurance.

6 The fourth change involves clarifying that the
7 issuing of certain Letter of Map Change, or LOMC
8 requests -- map revisions -- is contingent on the
9 community, or the project proponent on the community's
10 behalf, submitting documentation of compliance with the
11 ESA.

12 The fifth change involves clarifying that
13 pursuant to 44 CFR part 60.3(a)(2), a community must
14 obtain and maintain documentation of compliance with the
15 appropriate federal or state laws, including the ESA, as
16 a condition of issuing permits to develop the
17 floodplain.

18 FEMA's preferred alternative is Alternative 2.
19 Implementation of Alternative 2 would meet FEMA's
20 purpose and need, and causes the least environmental
21 impact overall. Alternative 2 is within FEMA's
22 discretion and meets the legislatively required

1 timeframe.

2 Slide 14. Alternative 3 includes the
3 legislatively required changes and Letter of Map Change
4 clarification changes identified under Alternative 2.
5 In addition, Alternative 3 includes Proposed ESA
6 Regulatory Changes that would: Establish a new
7 ESA-related performance standard in the minimum
8 floodplain management criteria at 44 CFR, part 60.3,
9 that would require communities to obtain and maintain
10 documentation that any adverse impacts caused by
11 proposed development, including fill, to ESA-listed
12 species and designated habitat will be mitigated to the
13 maximum extent possible; increase the probation
14 surcharge applicable to NFIP communities placed on
15 probation from \$50 to \$100; and, clarify that the
16 exception to the no-rise performance standard in the
17 floodway applies only to projects that serve a public
18 purpose or result in the restoration of the natural and
19 beneficial functions of floodplains.

20 Slide 15. Alternative 4 includes the
21 legislatively required and LOMC clarification changes
22 identified under Alternative 2. In addition,

1 Alternative 4 also includes ESA Guidance. The ESA
2 Guidance would utilize the existing performance standard
3 in 44 CFR, part 60.3(a)(2) to implement a new policy or
4 procedure requiring communities to ensure two things:
5 First, that for any development for which a permit to
6 develop in the floodplain is sought, the impacts to
7 ESA-listed species and designated critical habitat are
8 identified and assessed; and, second, if there are any
9 potential adverse impacts to such species and habitat as
10 a result of such development, that the community obtain
11 and maintain documentation that the proposed development
12 in the floodplain will be undertaken in compliance with
13 the ESA.

14 Slide 16. This document evaluates potential
15 impacts from implementing each of the four alternatives.
16 Quantitative and qualitative analyses have been used to
17 determine the intensity and magnitude of the
18 environmental impacts. FEMA subject matter experts
19 determined whether particular impacts were less than
20 significant or significant.

21 This document uses the following terms to
22 indicate relative degrees of severity of environmental

1 impacts on the resources:

2 No impact is defined as no environmental
3 impacts are readily apparent or identified.

4 Less than Significant is used to indicate that
5 a change to resources would be measurable although the
6 change would be small and localized. Mitigation
7 measures, such as employing best management practices or
8 precautionary measures, would reduce any potential
9 adverse impacts.

10 Significant is used to indicate that changes to
11 resources would be measurable and would have substantial
12 consequences on a local and regional level. Impacts
13 would exceed regulatory standards. Mitigation measures
14 to offset the adverse impacts would be required to
15 reduce impacts through long-term changes to the
16 resources. Impacts may be both beneficial and adverse.

17 Slide 17. There are a number of resource areas
18 that FEMA's identified as having no impacts as a result
19 of the implementation of the alternatives. As pointed
20 out in the document, floodplain development is not
21 authorized, funded, or carried out by FEMA pursuant to
22 the NFIP, nor does it encourage such floodplain

1 development to occur. Moreover, FEMA has no land use
2 authority. The power to regulate development in the
3 floodplain includes requiring and approving permits and
4 citing violations requires land use authority.
5 Therefore, floodplain development is regulated at the
6 community level through the community's floodplain
7 management regulations and permitting process for
8 developing in the floodplain. As such, FEMA has no role
9 in the issuance, denial, or enforcement of individual
10 permits, nor does it have land use authority necessary
11 to prescribe the types of development that may take
12 place in the floodplains.

13 Continued implementation of the NFIP, including
14 implementation of the NFIP as modified by the
15 alternatives, would not include any physical development
16 or ground disturbance in the floodplain, nor would it
17 encourage any development in the floodplain to occur.

18 There would be no impacts to the following
19 resource areas as a result of implementation of the
20 alternatives: Air quality and noise, geology and soils,
21 aesthetic/visual resources, hazardous wastes and
22 materials, climate change, historic and cultural

1 resources, and infrastructure.

2 Slide 18. This table summarizes the potential
3 impacts that could occur for each alternative. Most of
4 the resources are identified as having no impact. Less
5 than significant impacts were identified for
6 socioeconomic resources, land use and planning, water
7 resources, and biological resources.

8 Slide 19. With this brief overview on the
9 draft document, I will now describe the public comment
10 period and provide instructions on how to submit
11 comments. The public release of the NFIP draft NPEIS on
12 April 7, 2017 started the 60-day public comment period.
13 The public comment period ends June 6, 2017.

14 Comments can be submitted several ways. You
15 may provide verbal comments today during the public
16 meeting; provide a written comment at the comment table;
17 provide a comment through eRulemaking Portal at
18 www.regulations.gov under Docket ID FEMA-2012-0012 and
19 following the instructions there; or, by mail to the
20 address on the slide. Comments received through any of
21 these methods will be considered equally. Comments need
22 to only be submitted once through any of these methods.

1 As I mentioned, the 60-day period ends June 6.

2 You are welcome to submit comments until that date.

3 Reviewers are requested to provide specific information
4 and comments on factual errors, missing information, or
5 additional considerations that should be corrected or
6 included in the NFIP draft document.

7 FEMA will review all of the comments and
8 identify substantive issues that have bearing on the
9 NFIP and the environmental impacts of the program. We
10 will then use the comments to prepare the final NPEIS.
11 The final NPEIS will include a section that discusses
12 how the comments were addressed. The document is
13 available for download from Regulations.gov. There's a
14 link on the project website. The project website also
15 includes information about the now past webinars and
16 other information materials. The project website is
17 listed on the next slide.

18 Public involvement is an important part of the
19 environmental planning process. We hope that all
20 interested individuals and organizations will take this
21 opportunity to identify concerns they feel should be
22 addressed in the final NFIP and NPEIS.

1 That concludes my presentation. We will now
2 open up the floor for comments.

3 MS. SALERNO: Thanks, Bret.

4 As mentioned, there are several ways to provide
5 comments. The first is via verbal comment during
6 today's meeting. If you wish to submit written
7 comments, you can provide them at the comment table
8 which is located in the back corner -- we have comment
9 cards there -- through the eRulemaking portal, or by
10 mail.

11 Individual respondents may request
12 confidentiality. The names, street address, and city or
13 town information of those providing comments will be
14 part of the administrative record, and will be subject
15 to public disclosure unless confidentiality is
16 requested. Such a request must be stated prominently at
17 the beginning of the comment. We will honor requests to
18 the extent allowed by law. All submissions from
19 organizations or businesses, and from individuals
20 identifying themselves as representatives or officials
21 of organizations or businesses, will be available for
22 public inspection in their entirety, consistent with

1 applicable law.

2 FEMA will need to receive your comments no
3 later than June 6, 2017 to ensure their consideration.

4 FEMA is only gathering comments today and will
5 not be responding to comments during the public meeting.
6 We will be taking verbal comments today until 5 p.m.
7 Speakers will be called in the order they registered;
8 and each speaker will have 5 minutes to provide their
9 comments. If you would like to speak and have not
10 signed up to do so, we'll call you.

11 We are now ready to receive public comments.
12 We've received one request for a speaker, and it is John
13 McShane.

14 MR. McSHANE: Good afternoon. I have some
15 written comments that I will provide as well. In
16 listening to Bret's wonderful presentation, I have a few
17 other thoughts I wanted to share as well. So let me
18 read this letter: To Whom It May Concern.

19 First, I commend FEMA for preparing a PEIS in
20 order to more effectively implement the NFIP and improve
21 compliance with environmental laws such as the Clean
22 Water and Endangered Species Act.

1 I believe that Alternative 3 is the best course
2 of action for the NFIP to achieve the goals of
3 floodplain management, and is consistent with both
4 Executive Order 11988, Floodplain Management, and
5 Section 1302(c) of the 1968 National Flood Insurance
6 Act.

7 The goals of Flood Plain Management are not
8 only to reduce the loss of life and property caused by
9 floods, but also to protect and restore the natural
10 resources and functions of floodplains. These dual
11 goals were first espoused in the 1970s by the Federal
12 Interagency Flood Plain Management Task Force, which was
13 tasked with developing a unified national program for
14 floodplain management.

15 For example, Alternative 3 will "clarify that
16 the exception to the no-rise performance standard in the
17 floodway applies only to projects that serve a public
18 purpose or result in the restoration of a natural and
19 beneficial functions of the floodplains."

20 This will allow important projects to move
21 forward to protect and restore the natural functions of
22 floodplains that were often adversely impacted by

1 structural flood risk reduction projects in the past.

2 Although floodplains comprise just 2 percent of
3 the land area in their natural state, riverine and
4 coastal floodplains provide approximately 25 percent of
5 all terrestrial ecosystem service benefits, including
6 improving water quality, promoting groundwater recharge,
7 and providing habitats for fish and wildlife. In that
8 regard, I would like to submit for the record a paper
9 that was published by the American Water Resources
10 Association, "Shifting the Paradigm for the 21st
11 Century, Protecting and Restoring the Natural Resources
12 and Functions of Floodplains," which provides additional
13 information on the economic and environmental values of
14 protecting and restoring naturally-functioning
15 floodplains.

16 Thank you.

17 MS. SALERNO: Thank you, John.

18 MR. McSHANE: And if I may, I have a couple of
19 additional.

20 MS. SALERNO: You have plenty of time,

21 MR. McSHANE: This whole issue about total
22 flood damage in the United States of \$8 billion -- this

1 has been a topic that has been discussed for many, many
2 decades. When I served on the Federal Interagency
3 Floodplain Management Task Force, this was actually one
4 of its projects, to try to determine exactly -- or at
5 least within certain boundaries -- what total flood
6 losses are. \$8 billion is way too low. NOAA, the
7 National Weather Service, recognizes this. We had
8 extensive discussions with them. Their methodology was
9 not comprehensive, and they fully admit to this.

10 I would urge FEMA to undertake a study to try
11 to determine total flood losses in the United States;
12 and, my personal opinion, that's direct losses -- direct
13 and indirect losses. There was a recent study that
14 proposed that perhaps the real flood losses in the
15 United States, direct and indirect, are between 30 and
16 \$50 billion a year, which is not insignificant.

17 Another point I would like to make is the
18 terminology "natural and beneficial functions of
19 floodplains" -- again, this is something that's been
20 discussed for many, many years. There are natural
21 resources and there are functions of floodplains. A
22 good example of a natural function is the flood storage

1 and conveyance function, quite clear. A natural
2 resource would be something like a wetland. It is not a
3 function. It is a natural resource.

4 So I would hope that, in writing the final
5 EPIS, that you consider using the terminology "natural
6 resources and functions of floodplains," because they
7 are different. And I have spelled that out in the
8 paper. The paper I mentioned is -- I am the author of
9 the said paper, and I have spelled it out as clearly as
10 I possibly could.

11 So. Any questions? You can ask me a question.
12 Right? Thank you very much.

13 MS. SALERNO: Thank you.

14 MR. McSHANE: Under 2 minutes.

15 MR. McDONALD: John, your estimate of the flood
16 losses, shouldn't we also study the economic benefits of
17 -- and could those losses be offset by --

18 MR. McSHANE: Absolutely. And the Corps has
19 done studies on the benefits of levees and other
20 structural measures. And they're certainly significant.
21 I don't deny that.

22 MR. McDONALD: I know the Mississippi River and

1 the tributaries have a BCR of about 50 compared to
2 mitigation and those sort of things that have a score of
3 about 4.

4 MR. McSHANE: And if we include all the
5 costs -- all the costs of structural measures -- and all
6 the benefits of nonstructural measures, when we're
7 looking at the equation here, that's important to
8 consider as well. Thank you.

9 MS. SALERNO: Thank you, John.
10 And can I have you repeat your name.

11 MR. McDONALD: Andre McDonald.

12 MR. McSHANE: Thank you.

13 MS. SALERNO: Would anyone else like to make a
14 comment?

15 As there are no comments, we will conclude this
16 public meeting. Any comments?

17 MR. McDONALD: Not at this time.

18 MS. SALERNO: Okay.

19 MR. McDONALD: Reserve the right to comment
20 later.

21 MS. SALERNO: That's right.

22 I would like to remind you that the comment

1 period does indeed end on June 6, 2017. Comments should
2 be received by that date in order to receive full
3 consideration in the document. Comments received after
4 that date will be considered to the extent practicable.

5 I am going to turn it over to Bret for the
6 closing remarks.

7 MR. GATES: I would like to thank everyone for
8 participating today. The comments received today will
9 be helpful in the final NPEIS development efforts. FEMA
10 appreciates your continued participation in the NFIP
11 draft NPEIS process. And thank you for coming in today.

12 (Whereupon, the meeting was adjourned at 3:50
13 p.m.)

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NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Webinar Transcript (April 18, 2017)

Participants:

<u>First Name</u>	<u>Last Name</u>	<u>Organization</u>
Becky	Hayat	NRDC
Beth	Norton	FEMA HOST
Chad	Berginnis	ASFPM
Donna	Mahon	HUD Environmental
Eileen	Shader	American Rivers, Director of River Restoration
Erik	Anderson	Support Team
Jeff	Cox	Columbus, Ohio state govt
jenn	salerno	SUPPORT TEAM FACILITATOR
Joel	Scata	NRDC
John	Moyle	NJDEP, Bureau of Dam Safety
Jonathan	Smith	FEMA
Justin	Craven	FEMA
Justin	Fredrickson	California Farm Bureau Federation
Karl	Anderson	FEMA
Katherine	Zeringue	FEMA
Kathy	Schaefer	Public
Nicholas	Dorochoff	FEMA
Renee	VanSickle	Columbus, Ohio state govt
Sabrina	McBride	FEMA
Sarah	Bruce	Senior Planner at City of Hillsboro, Oregon
Sharon	Loper	FEMA

21 participants on the webinar; 2 registered attendees did not join the webinar.

[Slide 1]: Slide on screen for public to view

SUPPORT TEAM (2:00 p.m.): Thank you for joining today's NFIP draft NPEIS webinar. My name is Jennifer Salerno and I will serve as your facilitator for this webinar.

A few administrative items:

- You should be able to view the presentation on the computer screen or we sent the file via email shortly before the webinar.
- We will be muting the participant phone lines until the end of the presentation.
- If you would like to comment, please notify us in the Chat feature and we will call your name in the order received.

Now we will begin the webinar.

FEMA (2:01 p.m.): I would like to welcome you to this webinar for the draft Nationwide Programmatic Environmental Impact Statement on proposed improvements and modifications to the National Flood Insurance Program, or NFIP. The development of this draft Nationwide Programmatic Environmental Impact Statement, or draft NPEIS, by the Federal Emergency Management Agency (and I'll refer to as FEMA from now on) is pursuant to the National Environmental Policy Act of 1969. My name is Bret

Gates and I work for FEMA's Federal Insurance and Mitigation Administration as the project manager for this NPEIS. FEMA is offering this public meeting for two reasons. First, we want to reach a broad audience given the nationwide nature of our project. Second, we want to give the public a meaningful opportunity to provide comments to FEMA regarding its analysis of the environmental impacts of the NFIP. After this presentation, participants who have registered in advance to comment will be recognized to provide their input. FEMA is gathering comments and won't be responding to comments during this webinar. For this webinar, I will call out the slide numbers so you can follow easily.

[Slide 2]: Before we receive your comments, I would like to review the purposes for today's meeting.

- First, to provide information about the National Flood Insurance Program, which provides flood insurance to more than 22,000 communities across the country.
- Second, to announce the availability of the draft NPEIS.
- Third, to provide an overview of the NEPA process.
- Fourth, to describe the proposed action and alternatives for this draft NPEIS.
- Lastly, to provide instructions on how to submit comments on the draft NPEIS.

[Slide 3]: Following the devastating flooding that accompanied Hurricane Betsy in 1965, Congress developed the National Flood Insurance Act of 1968, which created the NFIP. The purpose of the NFIP, as identified in the legislation, is to help minimize the long-term risks to persons and property from the effects of flooding. Congress recognized that development in flood-prone areas would continue, that disaster relief was both inadequate and expensive, and that because the cost of flood insurance was so high, only those in high-risk areas would buy it. FEMA administers the National Flood Insurance Program.

[Slide 4]: Flooding continues to be the single greatest source of damage from natural hazards in the United States, resulting in an average of 80 deaths and more than \$8 billion in property damage each year. In spite of this, people continue to live and work in the nation's floodplains, and the number of people and amount of property at risk from flooding has increased.

Today, the NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disasters, and implementation of the NFIP is estimated to save the nation roughly \$1.7 billion annually through avoided flood losses.

More than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage.

Legislation was passed in 2012 and 2014 to address concerns over the fiscal soundness of the NFIP. This legislation, known as the Biggert-Waters Flood Insurance Reform Act of 2012 (or BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (or HFIAA), requires changes to the NFIP. In addition, many and varying statements from federal agencies and the public about FEMA's compliance with the Endangered Species Act (commonly known as the ESA) has led to the need to demonstrate compliance with this Act.

[Slide 5]: Signed by President Nixon, the National Environmental Policy Act of 1969, referred to as NEPA, requires federal agencies to consider and evaluate potential environmental impacts of their actions on the natural and cultural environment as part of their planning and decision making process. An Environmental Impact Statement, referred to as an EIS, is a document prepared to describe the effects of proposed activities and alternatives on the natural and physical environment, including the relationship of people with that environment.

[Slide 6]: FEMA's Nationwide Programmatic EIS, referred to as the NPEIS, provides opportunities for stakeholders, including the public, organizations, states, and NFIP participating communities to provide their input so that all relevant issues and potential impacts are adequately covered and addressed. The resulting analysis describes both the beneficial and negative impacts that the proposed action, as well as the alternatives, may have. If significant negative impacts are identified in any of these options, mitigation measures to reduce these impacts are recommended.

Due to the geographic extent of this project, FEMA has determined that the NEPA analysis for its Proposed Action and Alternatives should be conducted at a nationwide programmatic level. A programmatic document, such as this NPEIS, is prepared when an agency is proposing to carry out a broad action, program, or policy. This draft NPEIS provides an appropriate level of evaluation for a nationwide action, assesses potential impacts expected from the program as a whole, and, if necessary, identifies mitigation measures that would be implemented at the national level.

The NFIP draft NPEIS was released on April 7, 2017, which is the start date for the 60-day public comment period. The NFIP draft NPEIS can be downloaded from the website posted here on the slide.

[Slide 7]: For an EIS, the NEPA process starts with a notification from the federal agency of its intent to evaluate a Proposed Action. FEMA published a Notice of Intent in the Federal Register on May 16, 2012. The Notice of Intent started the first phase of public involvement, referred to as Scoping. Scoping is the early and open process for determining the scope of issues to be addressed in an EIS, identifying the significant issues related to a proposed action, and receiving input from the public.

FEMA published a subsequent Notice of Intent on March 25, 2014 to announce the availability of three public webinar scoping sessions. Over 100 people registered to attend the webinars.

FEMA reviewed and considered the content of all comments to determine the scope of this document. The main comment themes were as follows:

- Socioeconomic effects of the NFIP;
- Improvements in floodplain mapping and Flood Insurance Rate Maps (referred to as FIRMs);

- Economic impacts of transition from subsidized premiums to full risk rated premiums;
- Updates to clarify community compliance with the ESA; and
- Updates to better address the protection/restoration of natural resources.

All scoping materials, including the Federal Register notices and webinar presentations, are included in Appendix B of the draft document.

[Slide 8]: Before I begin discussing the proposed project, I would like to share a little information about the purpose and need for modifications to the NFIP. The purpose of the Proposed Action is to implement the legislative requirements of BW-12 and HFIAA which requires Program changes; and to demonstrate compliance with the Endangered Species Act.

The need to implement the legislative requirements of BW-12 and HFIAA arises from the recent concerns over the fiscal soundness of the NFIP. Flooding has been, and continues to be, a serious risk in the United States. Over the years, the costs and consequences of flooding have continued to increase. For the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure must reflect the true risks and costs of flooding.

This is a primary driver for many of the legislatively required changes that are assessed as part of this analysis.

The need to demonstrate compliance with the Endangered Species Act stems from the many and varying statements from federal agencies and the public about FEMA's compliance with the ESA, and the perception about the nature of the NFIP and its effects on ESA-listed species and designated critical habitat. FEMA determined that it is currently in compliance with the ESA, but recognizes the need to demonstrate ESA compliance to the public.

[Slide 9]: For the Proposed Action, FEMA proposes to implement modifications to the NFIP that would support the Program's three primary components: insurance, floodplain management, and mapping.

The NFIP makes federal flood insurance available to property owners or lessees in communities that participate in the NFIP. Through the NFIP, property owners in participating communities are able to insure their property against future flood losses.

As originally established, the National Flood Insurance Act of 1968 authorized FEMA to provide subsidized flood insurance only for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings"). This means that flood insurance for new development has never been subsidized by the NFIP (subject to the very limited, short-term statutory exceptions).

However, subject to the very limited, short term statutory exceptions referenced above, FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later (generally referred to as "post-FIRM buildings").

With the passage of the BW-12 and HFIAA, FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25% premium rate increases per year, and the rest will be phased out at a rate of 5-15% premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to certain very limited, short term statutory exceptions).

A community's participation in the NFIP is voluntary. Participation is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance that meets certain minimum requirements to reduce future flood risks within an area known as the Special Flood Hazard Area (or SFHA), the federal government will make flood insurance available to property owners and lessees in that community.

FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. Land use regulations falls under the state's police powers, which the Constitution reserves to the states, and the states delegate this power down to their respective political subdivisions to protect the health, safety, and general welfare of their citizens. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP was designed such that floodplain management would be carried out at the state and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

FEMA is also not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process. Before a property owner can undertake any development in the SFHA, they must obtain a permit from the community. The community is responsible for reviewing the proposed development to ensure compliance with their floodplain management ordinance and that all necessary permits have been received from federal or state agencies from which approval is required.

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with states and communities to provide accurate flood hazard and risk data to provide them to mitigation actions. The risk zones shown on the FIRMs are the basis for the establishment of premium NFIP flood insurance rates. Flood insurance has been available to property owners or lessees in participating NFIP communities through the adoption of community-wide floodplain management ordinances. Property owners in participating communities are able to insure their property against future flood losses.

The NPEIS considered alternatives to modify the NFIP and the No Action Alternative.

NEPA requires that any agency proposing a major federal action must consider a reasonable range of alternatives to the Proposed Action. Alternatives concerning the future of the NFIP must meet essential technical requirements, comply with governing standards and regulations, and meet FEMA's purpose and need. The draft document considers a range of reasonable alternatives for modifying the NFIP.

Potential program changes to the NFIP are included in all or some of the alternatives. Some of these potential changes are the result of recent legislation amending the NFIP. Other potential program changes were developed to demonstrate compliance with the requirements of the ESA.

[Slide 10]: This table identifies the Alternatives analyzed in the NFIP draft NPEIS and the proposed modifications to the NFIP by alternative.

I will discuss each of the alternatives in more detail in the next few slides.

[Slide 11]: Alternative 1 or the No Action Alternative refers to the current, existing conditions under the NFIP without implementation of the Proposed Alternative.

The No Action alternative serves as a benchmark against which impacts of the Preferred Alternative and the other Alternatives can be evaluated. Under the No Action Alternative, FEMA would continue the policies and program elements of the existing NFIP and there would be no additional changes to the NFIP as it exists today.

[Slide 12]: Alternative 2 includes legislatively required changes, floodplain management criteria guidance, and Letter of Map Change clarification. The first change is to phase out subsidies on certain pre-FIRM properties at a rate of 25% premium increases per year. These pre-FIRM properties include non-primary residences, building properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property. BW-12 mandates that the premium rates on these properties be increased by 25% each year until full risk rates are achieved.

The second change includes the phasing out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.

[Slide 13]: The third change involves implementing a monthly installment plan option for non-escrowed flood insurance policies. This may help alleviate the affordability concerns of some policyholders who voluntarily choose to purchase flood insurance.

The fourth change involves clarifying that the issuing of certain Letter of Map Change or LOMC requests (that is map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

The fifth change involves clarifying that pursuant to 44 C.F.R. Part 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate federal or state laws, including the ESA, as a condition of issuing permits to develop in the floodplain.

FEMA's preferred alternative is Alternative 2. Implementation of Alternative 2 would meet FEMA's purpose and need, and causes the least environmental impact overall. Alternative 2 is within FEMA's discretion and meets the legislatively required timeframe.

[Slide 14]: Alternative 3 includes the legislatively required changes and LOMC clarification changes identified under Alternative 2. In addition, Alternative 3 includes Proposed ESA Regulatory Changes that would:

- Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. Part 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible;
- It would also increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100; and
- Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains.

[Slide 15]: Alternative 4 includes the legislatively required and LOMC clarification changes identified under Alternative 2. In addition, Alternative 4 also includes ESA Guidance.

The ESA Guidance would utilize the existing performance standard in 44 C.F.R. Part 60.3(a)(2) to implement a new policy or procedure requiring communities to ensure that, two things: first, for any development for which a permit to develop in the floodplain is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, second, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed development in the floodplain will be undertaken in compliance with the ESA.

[Slide 16]: The document evaluates potential impacts from implementing each of the four alternatives. Quantitative and qualitative analyses have been used to determine the intensity and magnitude of the environmental impacts. FEMA subject matter experts determined whether particular impacts were less than significant or significant.

The document uses the following terms to indicate relative degree of severity of environmental impacts on resources.

- No Impact is defined as no environmental impact readily apparent or identified.

- Less than Significant is used to indicate that a change to resources would be measurable although the change would be small and localized. Mitigation measures, such as employing best management practices or precautionary measures, would reduce any potential adverse impacts.
- Significant is used to indicate that changes to resources would be measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts through long-term changes to the resource. Impacts may be both beneficial and adverse.

[Slide 17]: There are a number of resource areas that FEMA has identified as having no impacts as a result of implementation of the alternatives. As pointed out in the document, floodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP, nor does it encourage such development to occur. Moreover, FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits and citing violations requires land use authority.

Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and permitting process for development in the floodplain. As such, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain.

Continued implementation of the NFIP, including implementation of the NFIP as modified by the alternatives, would not include any physical development or ground disturbance in the floodplain, nor would it encourage any development in the floodplain to occur.

There would be no impacts to the following resource areas as a result of the implementation of the alternatives:

- Air Quality and noise,
- Geology and Soils,
- Aesthetic/Visual Resources,
- Hazardous Wastes and Materials,
- Climate Change,
- Historic and Cultural Resources, and
- Infrastructure.

[Slide 18]: This table summarizes the potential impacts that could occur for each alternative. Most of the resources are identified as having no impact. Less than significant impacts were identified for socioeconomic resources, land use and planning, water resources, and biological resources.

[Slide 19]: With this brief overview on the draft document, I will now describe the public comment period and provide instructions on how to submit comments. The public release of the NFIP draft NPEIS on April 7 started the 60-day public comment period. This period will end June 6. Comments can be submitted several ways.

- You may provide verbal comments today during this webinar,
- Provide a comment through the eRulemaking Portal at www.regulations.gov under the FEMA Docket number, or
- By mail to the address on the slide.

Comments received through any of these methods will be considered equally. Comments need to only be submitted once through any of these methods.

As I mentioned, the 60-day comment period ends **June 6, 2017**. You are welcome to submit comments until that date.

Reviewers are requested to provide specific information and comments on factual errors, missing information, or additional considerations that should be corrected or included in the document.

FEMA will review all of the comments and identify substantive issues that have bearing on the NFIP and the environmental impacts of the Program. We will then use the comments to prepare the NFIP final NPEIS. The final NPEIS will include a section that discusses how comments were addressed.

The draft NPEIS is available for download from Regulations.gov and there is a link on the project website. The project website also includes information about the webinars and other informational materials. The project website is listed on the next slide.

Public involvement is an important part of the environmental planning process. We hope that all interested individuals and organizations will take this opportunity to identify concerns they feel should be addressed in the NFIP final NPEIS.

That concludes my presentation. We will now open the meeting up to comments.

SUPPORT TEAM (2:26 p.m): Thanks Bret. There are several ways to provide comments. The first is via verbal comment during today's public meeting. If you wish to submit written comments, you can provide them at the comment table, through the federal eRulemaking Portal mentioned earlier, or by mail.

Individual respondents may request confidentiality. The names, street addresses, and city or town information of those providing comments will be part of the administrative record, and will be subject to public disclosure unless confidentiality is requested. Such a request must be stated prominently at the beginning of the comment. We will honor requests to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety, consistent with applicable law.

FEMA will need to receive your comments no later than **June 6, 2017** to ensure their consideration.

[Slide 20]: FEMA is only gathering comments today and will not be responding to comments during the webinar. We will be taking verbal comments today until 4 p.m.; speakers will be called in the order registered. Each registered speaker will have approximately 5 minutes to provide verbal comments. With one minute left, you will receive a signal to begin concluding your comment.

After all registered speakers have provided comments, if there is time remaining, you may request additional time to comment. If you would like to speak but have not registered to do so, please use the Chat feature on the computer screen. FEMA will identify when it is your turn to comment.

We are now ready to receive public comments.

We have no one registered to speak. If you would like to make a comment, please let me us know in the Chat feature. We will then unmute the lines to receive your comment.

SUPPORT TEAM (2:40 p.m.): Reminder, FEMA is accepting comments on the NFIP draft NPEIS. If you would like to make a comment, please notify us in the Chat feature on the screen.

SUPPORT TEAM (3:02 p.m.): FEMA is accepting comments on the NFIP draft NPEIS. If you would like to make a comment, please notify us in the Chat feature on the screen.

SUPPORT TEAM (3:18 p.m.): FEMA is experiencing technical difficulties using the AdobeConnect. If you have requested to comment using the Chat feature or by raising your hand, please let us know as we will be unmuting the lines. If you would like to make a comment, please let us know using your phone.

COMMENTER: I would like to make a comment.

SUPPORT TEAM: Yes, please.

COMMENTER: My name is Chad Berginnis and I'm the Executive Director of the Association of State Floodplain Managers. Admittedly, I have not read all of the 600 pages in depth, but I am having trouble finding this aspect and it may be problematic. I could not find the judicial history of the ESA and the NFIP. The basic tenets of impact statements is to identify areas of controversy. A judicial proceeding would be considered controversial, such as the key deer ruling. In reviewing the document, Section 1.2 discusses implications to agencies and the public but does not mention any of the judiciary proceedings. Further, in Section 4.1, there is no mention of these judiciary

issues either. I find that the history of the judiciary issues for the NFIP and ESA should be addressed and without addressing them, it is problematic.

SUPPORT TEAM: Thank you for your comment.

A reminder, FEMA is accepting comments on the NFIP draft NPEIS. If you would like to make a comment, please let us know.

SUPPORT TEAM (3:18 p.m.): This is the webinar for the NFIP draft NPEIS. If you would like to make a comment, please notify us using your phone. We will go back on mute if there are no comments.

SUPPORT TEAM (3:35 p.m.): This is the webinar for the NFIP draft NPEIS. We are experiencing technical difficulties with our AdobeConnect. If you would like to make a comment, please let us know using your phone.

SUPPORT TEAM (4:00 p.m.): Since it is now 4:00 p.m., we will conclude this public meeting. I would like to remind you that the comment period ends on **June 6, 2017**. Comments should be received by that date in order to receive full consideration in the document.

Comments received after that date will be considered to the extent practicable. I am going to turn it over to Bret for closing remarks.

FEMA: Well, I would like to thank everyone for participating today. The comments FEMA received today will be helpful in our final NPEIS development efforts. FEMA appreciates your continued participation in the NPEIS process. Thank you for calling in today.

MEETING CONCLUDED AT 4:01 p.m.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Webinar Transcript (April 26, 2017)

Participants:

<u>First Name</u>	<u>Last Name</u>	<u>Organization</u>
Astrid	Caldas	Union of Concerned Scientists
Blaine	Chesterfield	Mount Vernon, WA
Bret	Gates	FEMA
Jennifer	Salerno	SUPPORT TEAM FACILITATOR
Lindsey	Veas	SUPPORT TEAM
Susan	Hathaway	DHS

[Slide 1]: Slide on screen for public to view

SUPPORT TEAM (5:07 p.m.): Thank you for joining today's NFIP draft NPEIS webinar. My name is Jennifer Salerno and I will serve as your facilitator for this meeting.

If you would like to comment on the NFIP draft NPEIS, please click the "raise your hand" icon found at the top of the screen or send a note via the Chat feature. After the presentation, we will call your name in the order received. FEMA will not be responding to comments.

We will be muting the phone lines now. However, we will unmute the phone lines after the presentation.

Now we will begin the webinar with FEMA's presentation.

FEMA (5:08 p.m.): I would like to welcome you to this webinar for the draft Nationwide Programmatic Environmental Impact Statement on proposed improvements and modifications to the National Flood Insurance Program, or NFIP. The development of this draft Nationwide Programmatic Environmental Impact Statement, or draft NPEIS, by the Federal Emergency Management Agency (and I'll refer to as FEMA from now on) is pursuant to the National Environmental Policy Act of 1969. My name is Bret

Gates and I work for FEMA's Federal Insurance and Mitigation Administration as the project manager for this NPEIS. FEMA is offering this public meeting for two reasons. First, we want to reach a broad audience given the nationwide nature of our project. And second, we want to give the public a meaningful opportunity to provide comments to FEMA regarding its analysis of the environmental impacts of the NFIP. After this presentation, participants who have registered to comment in advance will be recognized to provide their input. FEMA is gathering comments and won't be responding to questions or comments during this webinar. For this webinar, I will call out the slide numbers so you can follow easily.

[Slide 2]: Before we receive your comments, I would like to review the purposes for today's meeting.

- First, to provide information about the National Flood Insurance Program, which provides flood insurance to more than 22,000 communities across the country.
- Second, to announce the availability of the draft NPEIS.
- Third, to provide an overview of the NEPA process.
- Fourth, to describe the proposed action and alternatives for this draft NPEIS.
- And lastly, to provide instructions on how to submit comments on the draft NPEIS.

[Slide 3]: Following the devastating flooding that accompanied Hurricane Betsy in 1965, Congress developed the National Flood Insurance Act of 1968, which created the NFIP. The purpose of the NFIP, as identified in the legislation, is to help minimize the long-term risks to persons and property from the effects of flooding. Congress recognized that development in flood-prone areas would continue, that disaster relief was both inadequate and expensive, and that because the cost of flood insurance was so high, only those in the high-risk areas would buy it. FEMA administers the National Flood Insurance Program.

[Slide 4]: Flooding continues to be the single greatest source of damage from natural hazards to the United States, resulting in an average of 80 deaths and more than \$8 billion dollars in property damage each year. In spite of this, people continue to live and work in the nation's floodplains, and the number of people and amount of property at risk from flooding has increased.

Today, the NFIP serves as the foundation for national efforts to reduce the loss of life and property from flood disasters. The implementation of the NFIP is estimated to save the nation roughly \$1.7 billion annually through avoided flood losses.

More than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage.

Legislation was passed in 2012 and 2014 to address concerns over the fiscal soundness of the NFIP. This legislation, known as the Biggert-Waters Flood Insurance Reform Act of 2012 (or BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (or HFIAA), requires changes to the NFIP. In addition, many and varying statements from federal agencies and the public about FEMA's compliance with the Endangered Species Act (commonly known as the ESA) has led to the need to demonstrate compliance with this Act.

[Slide 5]: Signed by President Nixon, the National Environmental Policy Act of 1969, referred to as NEPA, requires federal agencies to consider and evaluate potential environmental impacts of their actions on the natural and cultural environment as part of their planning and decision making process. An Environmental Impact Statement, referred to as an EIS, is a document prepared to describe the effects of proposed activities and alternatives on the natural and physical environment, including the relationship of people with that environment.

[Slide 6]: FEMA's Nationwide Programmatic EIS, referred to as the NPEIS, provides opportunities for stakeholders, including the public, organizations, states, and NFIP participating communities to provide their input so that all relevant issues and potential impacts are adequately covered and addressed. The resulting analysis describes both the beneficial and negative impacts that the proposed action, as well as the alternatives, may have. If significant negative impacts are identified in any of these options, mitigation measures to reduce these impacts are recommended.

Due to the geographic extent of this project, FEMA has determined that the NEPA analysis for its Proposed Action and Alternatives should be conducted at a nationwide programmatic level. A programmatic document, such as this NPEIS, is prepared when an agency is proposing to carry out a broad action, program, or policy. This draft NPEIS provides an appropriate level of evaluation for a nationwide action, assesses potential impacts expected from the program as a whole, and, if necessary, identifies mitigation measures that would be implemented at the national level.

The NFIP draft NPEIS was released on April 7, 2017, which is the start date for the 60-day public comment period. The NFIP draft NPEIS can be downloaded from the website posted here on the slide.

[Slide 7]: For an EIS, the NEPA process starts with a notification from the federal agency of its intent to evaluate a Proposed Action. FEMA published a Notice of Intent in the Federal Register on May 16, 2012. The Notice of Intent started the first phase of public involvement, referred to as Scoping. Scoping is the early and open process for determining the scope of issues to be addressed in an EIS, identifying the significant issues related to a proposed action, and receiving input from the public.

FEMA published a subsequent Notice of Intent on March 25, 2014 to announce the availability of three public webinar scoping sessions. Over 100 people registered to attend the webinars.

FEMA reviewed and considered the content of all comments to determine the scope of this document. The main comment themes were as follows:

- Socioeconomic effects of the NFIP;
- Improvements in floodplain mapping and Flood Insurance Rate Maps (referred to as FIRMs);

- Economic impacts of transition from subsidized premiums to full risk rated premiums;
- Updates to clarify community compliance with the ESA; and
- Updates to better address the protection/restoration of natural resources.

All scoping materials, including the Federal Register notices and webinar presentations, are included in Appendix B of the draft document.

[Slide 8]: Before I begin discussing the proposed project, I would like to share a little information about the purpose and need for modifications to the NFIP. The purpose of the Proposed Action is to implement the legislative requirements of BW-12 and HFIAA which requires Program changes; and to demonstrate compliance with the Endangered Species Act.

The need to implement the legislative requirements of BW-12 and HFIAA arises from the recent concerns over the fiscal soundness of the NFIP. Flooding has been, and continues to be, a serious risk in the United States. Over the years, the costs and consequences of flooding have continued to increase. For the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure must reflect the true risks and costs of flooding.

This is a primary driver for many of the legislatively required changes that are assessed as part of this analysis.

The need to demonstrate compliance with the Endangered Species Act stems from the many and varying statements from federal agencies and the public about FEMA's compliance with the ESA, and the perception about the nature of the NFIP and its effects on ESA-listed species and designated critical habitat. FEMA determined that it is currently in compliance with the ESA, but recognizes the need to demonstrate ESA compliance to the public.

[Slide 9]: For the Proposed Action, FEMA proposes to implement modifications to the NFIP that would support the Program's three primary components: insurance, floodplain management, and mapping.

The NFIP makes federal flood insurance available to property owners or lessees in communities that participate in the NFIP. Through the NFIP, property owners in participating communities are able to insure their property against future flood losses.

As originally established, the National Flood Insurance Act of 1968 authorized FEMA to provide subsidized flood insurance only for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings"). This means that flood insurance for new development has never been subsidized by the NFIP (subject to the very limited, short-term statutory exceptions).

However, subject to the very limited, short term statutory exceptions referenced above, FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for that community or after December 31, 1974, whichever is later (generally referred to as "post-FIRM buildings").

With the passage of the BW-12 and HFIAA, FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25% premium rate increases per year, and the rest will be phased out at a rate between 5 to 15% premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to certain very limited, short term statutory exceptions).

A community's participation in the NFIP is voluntary. Participation is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance that meets certain minimum requirements to reduce future flood risks within an area known as the Special Flood Hazard Area (or SFHA), the federal government will make flood insurance available to property owners and lessees in that community.

FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. Land use regulations fall under the state's police powers, which the Constitution reserves to the states, and the states delegate this power down to their respective political subdivisions to protect the health, safety, and general welfare of their citizens. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP was designed such that floodplain management would be carried out at the state and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

FEMA is also not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process. Before a property owner can undertake any development in the SFHA, they must obtain first a permit from the community. The community is responsible for reviewing the proposed development to ensure compliance with their floodplain management ordinance and that all necessary permits have been received from federal or state agencies from which approval is required.

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with states and communities to provide accurate flood hazard and risk data to provide them to mitigation actions. The risk zones shown on the FIRMs are the basis for the establishment of NFIP flood insurance premium rates. Flood insurance has been available to property owners or lessees in participating NFIP communities through the adoption of community-wide floodplain management ordinances. Property owners in participating communities are able to insure their property against future flood losses.

The NPEIS considered alternatives to modify the NFIP and the No Action Alternative.

NEPA requires that any agency proposing a major federal action must consider a reasonable range of alternatives to the Proposed Action. Alternatives concerning the future of the NFIP must meet essential technical requirements, comply with governing standards and regulations, and meet FEMA's purpose and need. The draft document considers a range of reasonable alternatives for modifying the NFIP.

Potential program changes to the NFIP are included in all or some of the alternatives. Some of these potential changes are the result of recent legislation amending the NFIP. Other potential program changes were developed to demonstrate compliance with the requirements of the ESA.

[Slide 10]: This table identifies the Alternatives analyzed in the NFIP draft NPEIS and the proposed modifications to the NFIP by alternative.

I will discuss each of the alternatives in more detail in the next few slides.

[Slide 11]: Alternative 1 or the No Action Alternative refers to the current, existing conditions under the NFIP without implementation of the Proposed Alternative.

The No Action alternative serves as a benchmark against which impacts of the Preferred Alternative and the other Alternatives can be evaluated. Under the No Action Alternative, FEMA would continue the policies and program elements of the existing NFIP and there would be no additional changes to the NFIP as it exists today.

[Slide 12]: Alternative 2 includes legislatively required changes, floodplain management criteria guidance, and Letter of Map Change clarification. The first change is to phase out subsidies on certain pre-FIRM properties at a rate of 25% premium increases per year. These pre-FIRM properties include non-primary residences, building properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property. BW-12 mandates that the premium rates on these properties be increased by 25% each year until full risk rates are achieved.

The second change includes the phasing out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.

[Slide 13]: The third change involves implementing a monthly installment plan option for non-escrowed flood insurance policies. This may help alleviate the affordability concerns of some policyholders who voluntarily choose to purchase flood insurance.

The fourth change involves clarifying that issuing of certain Letter of Map Change or LOMC requests (that is map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

The fifth change involves clarifying that pursuant to 44 C.F.R. Part 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate federal or state laws, including the ESA, as a condition of issuing permits to develop in the floodplain.

FEMA's preferred alternative is Alternative 2. Implementation of Alternative 2 would meet FEMA's purpose and need, and causes the least environmental impact overall. Alternative 2 is within FEMA's discretion and meets the legislatively required timeframe.

[Slide 14]: Alternative 3 includes the legislatively required changes and LOMC clarification changes identified under Alternative 2. In addition, Alternative 3 includes Proposed ESA Regulatory Changes that would:

- Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. Part 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible;
- It would also increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100; and
- Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains.

[Slide 15]: Alternative 4 includes the legislatively required and Letter of Map Change clarification changes identified under Alternative 2. In addition, Alternative 4 also includes ESA Guidance.

The ESA Guidance would utilize the existing performance standard in 44 C.F.R. Part 60.3(a)(2) to implement a new policy or procedure requiring communities to ensure two things: first, for any development for which a permit to develop in the floodplain is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, second, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed development in the floodplain will be undertaken in compliance with the ESA.

[Slide 16]: The document evaluates potential impacts from implementing each of the four alternatives. Quantitative and qualitative analyses have been used to determine the intensity and magnitude of the environmental impacts. FEMA subject matter experts determined whether particular impacts were less than significant or significant.

The document uses the following terms to indicate relative degree of severity of environmental impacts on resources.

- No Impact is defined as no environmental impact are readily apparent or identified.

- Less than Significant is used to indicate that a change to resources would be measurable although the change would be small and localized. Mitigation measures, such as employing best management practices or precautionary measures, would reduce any potential adverse impacts.
- Significant is used to indicate that changes to resources would be measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts through long-term changes to the resource. Impacts may be both beneficial and adverse.

[Slide 17]: There are a number of resource areas that FEMA has identified as having no impacts as a result of implementation of the alternatives. As pointed out in the document, floodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP, nor does it encourage such development to occur. Moreover, FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits and citing violations requires land use authority.

Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and permitting process for development in the floodplain. As such, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain.

Continued implementation of the NFIP, including implementation of the NFIP as modified by the alternatives, would not include any physical development or ground disturbance in the floodplain, nor would it encourage any development in the floodplain to occur.

There would be no impacts to the following resource areas as a result of the implementation of the alternatives:

- Air Quality and noise,
- Geology and Soils,
- Aesthetic/Visual Resources,
- Hazardous Wastes and Materials,
- Climate Change,
- Historic and Cultural Resources, and
- Infrastructure.

[Slide 18]: This table summarizes the potential impacts that could occur for each alternative. Most of the resources are identified as having no impact. Less than significant impacts were identified for socioeconomic resources, land use and planning, water resources, and biological resources.

[Slide 19]: With this brief overview on the draft document, I will now describe the public comment period and provide instructions on how to submit comments. The public release of the NFIP draft NPEIS on April 7 started the 60-day public comment period. This period will end June 6. Comments can be submitted several ways.

- You may provide verbal comments today during this webinar,
- Provide a comment through the eRulemaking Portal at www.regulations.gov under the FEMA Docket number, or
- By mail to the address on the slide.

Comments received through any of these methods will be considered equally. Comments need to only be submitted once through any of these methods.

As I mentioned, the 60-day comment period ends **June 6, 2017**. You are welcome to submit comments until that date.

Reviewers are requested to provide specific information and comments on factual errors, missing information, or additional considerations that should be corrected or included in the document.

FEMA will review all of the comments and identify substantive issues that have bearing on the NFIP and the environmental impacts of the Program. We will then use the comments to prepare the NFIP final NPEIS. The final NPEIS will include a section that discusses how comments were addressed.

The draft NPEIS is available for download from Regulations.gov and there is a link on the project website. The project website also includes information about the webinars and other informational materials. The project website is listed on the next slide.

Public involvement is an important part of the environmental planning process. We hope that all interested individuals and organizations will take this opportunity to identify concerns they feel should be addressed in the final NPEIS.

This concludes my presentation. We will now open the meeting up to comments.

SUPPORT TEAM (5:33 p.m.): Thanks Bret. There are several ways to provide comments. The first is via verbal comment during today's public meeting. If you wish to submit written comments, you can provide them through the federal eRulemaking Portal mentioned earlier, or by mail.

Individual respondents may request confidentiality. The names, street addresses, and city or town information of those providing comments will be part of the administrative record, and will be subject to public disclosure unless confidentiality is requested. Such a request must be stated prominently at the beginning of the comment. We will honor requests to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety, consistent with applicable law.

FEMA will need to receive your comments no later than **June 6, 2017** to ensure their consideration.

[Slide 20]: FEMA is only gathering comments today and will not be responding to comments during the webinar. We will be taking verbal comments today until 7 p.m. Currently, we do not have any one registered to speak.

If you would like to speak but have not registered to do so, please use the Chat feature or click on the "raise your hand" icon at the top of your screen. FEMA will identify when it is your turn to comment.

Thanks to everyone on the webinar. It looks like there are no comments from the participants. We will be staying on the line until 7 p.m. If you would like to make a comment, please let us know. We will be muting the line but will return at 6 p.m.

SUPPORT TEAM (6:00 p.m.): Reminder, this is the NFIP draft NPEIS public meeting webinar. If you would like to make a comment, please notify us as we will be taking any comments until 7 p.m.

Not hearing any comment requests, we will be muting the phone line and will return at 6:30 p.m.

SUPPORT TEAM (6:33 p.m.): This is a webinar for the National Flood Insurance Program's Nationwide Draft Programmatic

Environmental Impact Statement. If you would like to make a comment, please let us know.

Not hearing any comments, we will be muting the phone line and will return a little before 7 p.m.

SUPPORT TEAM (6:57 p.m.): Since it is almost 7 p.m., we will be concluding this webinar. I would like to remind you that the comment period ends on June 6. Comments should be received by that date in order to receive full consideration in the document.

Comments received after that date will be considered to the extent practicable. I am going to turn it over to Bret for closing remarks.

FEMA (6:59 p.m.): I would like to thank everyone for participating today. FEMA appreciates your continued participation in the NPEIS process. Thank you for calling in today.

MEETING CONCLUDED AT 7:00 p.m.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) DRAFT
NATIONWIDE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Webinar Transcript (May 9, 2017)

Participants:

<u>First Name</u>	<u>Last Name</u>	<u>Organization</u>
Andre	McDonald	
Beryl	Gomez	ATVCI
Beth	Norton	FEMA HOST (SUPPORT TEAM)
Bret	Gates	FEMA
Eliza	Ghitis	Northwest Indian Fisheries Commission
Janelle	Lemen	National Rural Electric Cooperative Association
Jenn	Salerno	FACILITATOR
Jonathan	Smith	FEMA OEHP
Mark	Ribeau	
Sarah	Bruce	Senior Planner at City of Hillsboro, Oregon

Nine participants on the webinar; only 1 registered attendee did not join the webinar.

[Slide 1]: Slide on screen for public to view

SUPPORT TEAM (5:00 p.m.): Thank you for joining today's NFIP draft NPEIS webinar. My name is Jennifer Salerno and I will serve as your facilitator for this webinar.

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Now we will begin the webinar with FEMA's presentation.

FEMA (5:01 p.m.): I would like to welcome you to this webinar for the draft Nationwide Programmatic Environmental Impact Statement on proposed improvements and modifications to the National Flood Insurance Program, or NFIP. The development of this draft Nationwide Programmatic Environmental Impact Statement, or draft NPEIS, by the Federal Emergency Management Agency (and I'll refer to as FEMA from now on) is pursuant to the National Environmental Policy Act of 1969. My name is Bret

Gates and I work for FEMA's Federal Insurance and Mitigation Administration as the project manager for this NPEIS. FEMA is offering this public meeting for two reasons. First, we want to reach a broad audience given the nationwide nature of our project. Second, we want to give the public a meaningful opportunity to provide comments to FEMA regarding its analysis of the environmental impacts of the NFIP. After this presentation, participants who have registered in advance to comment will be recognized to provide their input. FEMA is gathering comments and won't be responding to comments during this webinar. For this webinar, I will call out the slide numbers so you can follow along.

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More than 22,000 communities participate in the NFIP, with more than 5.1 million NFIP policies in effect, providing over \$1.2 trillion in insurance coverage.

Legislation was passed in 2012 and 2014 to address concerns over the fiscal soundness of the NFIP. This legislation, known as the Biggert-Waters Flood Insurance Reform Act of 2012 (or BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (or HFIAA), requires changes to the NFIP. In addition, many and varying statements from federal agencies and the public about FEMA's compliance with the Endangered Species Act (commonly known as the ESA) has led to the need to demonstrate compliance with this Act.

[Slide 5]: Signed by President Nixon, the National Environmental Policy Act of 1969, referred to as NEPA, requires federal agencies to consider and evaluate potential environmental impacts of their actions on the natural and cultural environment as part of their planning and decision making process. An Environmental Impact Statement, referred to as an EIS, is a document prepared to describe the effects of proposed activities and alternatives on the natural and physical environment, including the relationship of people with that environment.

[Slide 6]: FEMA's Nationwide Programmatic EIS, referred to as the NPEIS, provides opportunities for stakeholders, including the public, organizations, states, and NFIP participating communities to provide their input so that all relevant issues and potential impacts are adequately covered and addressed. The resulting analysis describes both the beneficial and negative impacts that the proposed action, as well as the alternatives, may have. If significant negative impacts are identified in any of these options, mitigation measures to reduce these impacts are recommended.

Due to the geographic extent of this project, FEMA has determined that the NEPA analysis for its Proposed Action and Alternatives should be conducted at a nationwide programmatic level. A programmatic document, such as this NPEIS, is prepared when an agency is proposing to carry out a broad action, program, or policy. This draft NPEIS provides an appropriate level of evaluation for a nationwide action, assesses potential impacts expected from the program as a whole, and, if necessary, identifies mitigation measures that would be implemented at the national level.

The draft NPEIS was released on April 7, 2017, which is the start date for the 60-day public comment period. The NFIP draft document can be downloaded from the website posted here on the slide.

[Slide 7]: For an EIS, the NEPA process starts with a notification from the federal agency of its intent to evaluate a Proposed Action. FEMA published a Notice of Intent in the Federal Register on May 16, 2012. The Notice of Intent started the first phase of public involvement, referred to as Scoping. Scoping is the early and open process for determining the scope of issues to be addressed in an EIS, identifying the significant issues related to a proposed action, and receiving input from the public.

FEMA published a subsequent Notice of Intent on March 25, 2014 to announce the availability of three public webinar scoping meetings. Over 100 people registered to attend the webinars.

FEMA reviewed and considered the content of all comments to determine the scope of this document. The main comment themes were as follows:

- Socioeconomic effects of the NFIP;
- Improvements in floodplain mapping and Flood Insurance Rate Maps (referred to as FIRMs);

- Economic impacts of transition from subsidized premiums to full risk rated premiums;
- Updates to clarify community compliance with the ESA; and
- Updates to better address the protection/restoration of natural resources.

All scoping materials, including the Federal Register notices and webinar presentations, are included in Appendix B of the draft document.

[Slide 8]: Before I begin discussing the proposed project, I would like to share a little information about the purpose and need for modifications to the NFIP. The purpose of the Proposed Action is to implement the legislative requirements of BW-12 and HFIAA which requires Program changes; and to demonstrate compliance with the Endangered Species Act.

The need to implement the legislative requirements of BW-12 and HFIAA arises from the recent concerns over the fiscal soundness of the NFIP. Flooding has been, and continues to be, a serious risk in the United States. Over the years, the costs and consequences of flooding have continued to increase. For the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure must reflect the true risks and costs of flooding.

This is a primary driver for many of the legislatively required changes that are assessed as part of this analysis.

The need to demonstrate compliance with the Endangered Species Act stems from the many and varying statements from federal agencies and the public about FEMA's compliance with the ESA, and the perception about the nature of the NFIP and its effects on ESA-listed species and designated critical habitat. FEMA determined that it is currently in compliance with the ESA, but recognizes the need to demonstrate ESA compliance to the public.

[Slide 9]: For the Proposed Action, FEMA proposes to implement modifications to the NFIP that would support the Program's three primary components: insurance, floodplain management, and mapping.

The NFIP makes federal flood insurance available to property owners or lessees in communities that participate in the NFIP. Through the NFIP, property owners in participating communities are able to insure their property against future flood losses.

As originally established, the National Flood Insurance Act of 1968 authorized FEMA to provide subsidized flood insurance only for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings"). This means that flood insurance for new development has never been subsidized by the NFIP (subject to the very limited, short-term statutory exceptions).

However, subject to the very limited, short term statutory exceptions referenced above, FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later (generally referred to as "post-FIRM buildings").

With the passage of the BW-12 and HFIAA, FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25% premium rate increases per year, and the rest will be phased out at a rate of 5-15% premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to certain very limited, short term statutory exceptions).

A community's participation in the NFIP is voluntary. Participation is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance that meets certain minimum requirements to reduce future flood risks within an area known as the Special Flood Hazard Area (or SFHA), the federal government will make flood insurance available to property owners and lessees in that community.

FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. Land use regulations falls under the state's police powers, which the Constitution reserves to the states, and the states delegate this power down to their respective political subdivisions to protect the health, safety, and general welfare of their citizens. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP was designed such that floodplain management would be carried out at the state and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

FEMA is also not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process. Before a property owner can undertake any development in the SFHA, they must obtain a permit from the community. The community is responsible for reviewing the proposed development to ensure compliance with their floodplain management ordinance and that all necessary permits have been received from federal or state agencies from which approval is required.

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with states and communities to provide accurate flood hazard and risk data to provide them to mitigation actions. The risk zones shown on the FIRMs are the basis for the establishment of premium NFIP flood insurance rates. Flood insurance has been available to property owners or lessees in participating NFIP communities through the adoption of community-wide floodplain management ordinances. Property owners in participating communities are able to insure their property against future flood losses.

The NPEIS considered alternatives to modify the NFIP and the No Action Alternative.

NEPA requires that any agency proposing a major federal action must consider a reasonable range of alternatives to the Proposed Action. Alternatives concerning the future of the NFIP must meet essential technical requirements, comply with governing standards and regulations, and meet FEMA's purpose and need. The draft document considers a range of reasonable alternatives for modifying the NFIP.

Potential program changes to the NFIP are included in all or some of the alternatives. Some of these potential changes are the result of recent legislation amending the NFIP. Other potential program changes were developed to demonstrate compliance with the requirements of the ESA.

[Slide 10]: This table identifies the Alternatives analyzed in the NFIP draft NPEIS and the proposed modifications to the NFIP by alternative.

I will discuss each of the alternatives in more detail in the next few slides.

[Slide 11]: Alternative 1 or the No Action Alternative refers to the current, existing conditions under the NFIP without implementation of the Proposed Alternative.

The No Action alternative serves as a benchmark against which impacts of the Preferred Alternative and the other Alternatives can be evaluated. Under the No Action Alternative, FEMA would continue the policies and program elements of the existing NFIP and there would be no additional changes to the NFIP as it exists today.

[Slide 12]: Alternative 2 includes legislatively required changes, floodplain management criteria guidance, and Letter of Map Change clarification. The first change is to phase out subsidies on certain pre-FIRM properties at a rate of 25% premium increases per year. These pre-FIRM properties include non-primary residences, building properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property. BW-12 mandates that the premium rates on these properties be increased by 25% each year until full risk rates are achieved.

The second change includes the phasing out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.

[Slide 13]: The third change involves implementing a monthly installment plan option for non-escrowed flood insurance policies. This may help alleviate the affordability concerns of some policyholders who voluntarily choose to purchase flood insurance.

The fourth change involves clarifying that the issuing of certain Letter of Map Change or LOMC requests (that is map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

The fifth change involves clarifying that pursuant to 44 C.F.R. Part 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate federal or state laws, including the ESA, as a condition of issuing permits to develop in the floodplain.

FEMA's preferred alternative is Alternative 2. Implementation of Alternative 2 would meet FEMA's purpose and need, and causes the least environmental impact overall. Alternative 2 is within FEMA's discretion and meets the legislatively required timeframe.

[Slide 14]: Alternative 3 includes the legislatively required changes and LOMC clarification changes identified under Alternative 2. In addition, Alternative 3 includes Proposed ESA Regulatory Changes that would:

- Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. Part 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible;
- It would also increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100; and
- Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains.

[Slide 15]: Alternative 4 includes the legislatively required and LOMC clarification changes identified under Alternative 2. In addition, Alternative 4 also includes ESA Guidance.

The ESA Guidance would utilize the existing performance standard in 44 C.F.R. Part 60.3(a)(2) to implement a new policy or procedure requiring communities to ensure that, two things: first, for any development for which a permit to develop in the floodplain is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, second, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed development in the floodplain will be undertaken in compliance with the ESA.

[Slide 16]: The document evaluates potential impacts from implementing each of the four alternatives. Quantitative and qualitative analyses have been used to determine the intensity and magnitude of the environmental impacts. FEMA subject matter experts determined whether particular impacts were less than significant or significant.

The document uses the following terms to indicate relative degree of severity of environmental impacts on resources.

- No Impact is defined as no environmental impact readily apparent or identified.

- Less than Significant is used to indicate that a change to resources would be measurable although the change would be small and localized. Mitigation measures, such as employing best management practices or precautionary measures, would reduce any potential adverse impacts.
- Significant is used to indicate that changes to resources would be measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts through long-term changes to the resource. Impacts may be both beneficial and adverse.

[Slide 17]: There are a number of resource areas that FEMA has identified as having no impacts as a result of implementation of the alternatives. As pointed out in the document, floodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP, nor does it encourage such development to occur. Moreover, FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits and citing violations requires land use authority.

Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and permitting process for development in the floodplain. As such, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain.

Continued implementation of the NFIP, including implementation of the NFIP as modified by the alternatives, would not include any physical development or ground disturbance in the floodplain, nor would it encourage any development in the floodplain to occur.

There would be no impacts to the following resource areas as a result of the implementation of the alternatives:

- Air Quality and noise,
- Geology and Soils,
- Aesthetic/Visual Resources,
- Hazardous Wastes and Materials,
- Climate Change,
- Historic and Cultural Resources, and
- Infrastructure.

[Slide 18]: This table summarizes the potential impacts that could occur for each alternative. Most of the resources are identified as having no impact. Less than significant impacts were identified for socioeconomic resources, land use and planning, water resources, and biological resources.

[Slide 19]: With this brief overview on the draft document, I will now describe the public comment period and provide instructions for how to submit comments. The public release of the NFIP draft NPEIS on April 7th started the 60-day public comment period. The public comment period will end June 6, 2017.

Comments can be submitted several ways.

- You may provide verbal comments today during this public webinar,
- You can provide comments through the eRulemaking Portal at www.regulations.gov under the FEMA Docket Number FEMA-2012-0012 and follow the instructions there, or
- By mail to the address on the slide.

Comments received through any of these methods will be considered equally. Comments need to only be submitted once through any of these methods.

As I mentioned, the 60-day comment period ends **June 6, 2017**.

You are welcome to submit comments until that date.

Reviewers are requested to provide specific information and comments on factual errors, missing information, or additional considerations that should be corrected or included in the draft document.

FEMA will review all of the comments and identify substantive issues that have bearing on the NFIP and the environmental impacts of the Program. We will then use the comments to prepare the NFIP final NPEIS. The final NPEIS will include a section that discusses how the comments were addressed.

The draft document is available for download from Regulations.gov and there is a link on the project website. The project website also includes information about the webinars and other informational materials. The project website is listed on the next slide.

Public involvement is an important part of the environmental planning process. We hope that all interested individuals and organizations will take this opportunity to identify concerns they feel should be addressed in the NFIP final NPEIS.

That concludes my presentation. We will now open the meeting up to comments.

SUPPORT TEAM (5:26 p.m): Thanks Bret. There are several ways to provide comments. The first is via verbal comment during today's public meeting. If you wish to submit written comments, you can provide them at the comment table, through the federal eRulemaking Portal mentioned earlier, or by mail.

Individual respondents may request confidentiality. The names, street addresses, and city or town information of those providing comments will be part of the administrative record, and will be subject to public disclosure unless confidentiality is requested. Such a request must be stated prominently at the beginning of the comment. We will honor requests to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety, consistent with applicable law.

FEMA will need to receive your comments no later than **June 6, 2017** to ensure their consideration.

[Slide 20]: FEMA is only gathering comments today and will not be responding to comments during the webinar. We will be taking verbal comments today until 7 p.m.

If you would like to speak but have not registered to do so, please use the Chat feature or click on the "raise your hand" icon at the top of your screen. FEMA will identify when it is your turn to comment.

We are now ready to receive public comments.

Again, if you would like to speak but have not registered to do so, please use the Chat feature or click on the "raise your hand" icon at the top of your screen. I am not seeing any raised hands or comments.

Sarah Bruce has raised her hand. Let me unmute the lines for you to comment. Technical difficulties Sarah, we accidentally hung up the line while unmuting the phone. If you could repeat your question, we would appreciate it.

SARAH BRUCE (5:35 p.m.): My comments are around why the affordability legislation is being included in this NPEIS. I intuitively get why the ESA is happening, and I know that is something then needs to be addressed and is how I am coming at

this via the Oregon Biological Opinion. It is how I found out about this effort. The affordability questions and why the Homeowner Flood Insurance Affordability Act and Biggert-Waters, why those are part of this PEIS effort isn't entirely clear to me. I will go back and read the document. But just as far as the summary, that's not obvious to me from the outset.

SUPPORT TEAM: Thank you Sarah. I see that Mark has a comment.

MARK RYBEAU (5:36 p.m.): Yes I would. Much of the draft EIS basically refers back to the state and local government as having permit authority, which is correct. However, FEMA has a process for dealing with Letters of Map Revision based on fill, they are called LOMRF or LOMR-F, which they accept absent any comment or input from the local government. Now these are applications provided by the landowner and the applications provide elevation information to demonstrate that the land has been filled to at or above the base flood elevation. And FEMA issues a LOMR-F, which the applicant then takes back to the local government official who is responsible for issuing the building permit and said "see this, I'm no longer in the floodplain". And the local government official has no option but to issue a building permit. FEMA needs to understand that this basically puts them in the position of issuing building permits. They need to require as a part of the LOMR-F

application a building permit from a, excuse me, a floodplain development from a local government. If there is no floodplain development permit associated with the LOMR-F application, the LOMR-F application must be rejected and returned to the applicant. Then FEMA will no longer be in the position of land use regulation as they claim.

SUPPORT TEAM: Thank you Mark.

MARK RYBEAU: You're welcome.

SUPPORT TEAM (5:40 p.m.): Would anyone else like to make a comment? [Brief pause] Again if you would like to make a comment, please let us know using the Chat feature or click on the "raise your hand" icon at the top of your screen. [Brief pause] I'm not seeing any raised hands. Again, if you would like to speak please let us know using the Chat feature or click on the "raise your hand" icon at the top of your screen. [Brief pause]

Well, thanks to everyone for participating on the webinar. It looks like we have no additional comments from the participants. We will be staying on the telecom line until 7 p.m. If you would like to make a comment, please let us know. We will be muting the line but will return every 20-30 minutes to see if

anyone has a comment. Before we mute the lines, is there any additional comments? [Brief pause] I'm not seeing any raised hands or request to comment. [Brief pause] Alright, thank you very much. We will be back on the line in about a half an hour to see if anyone is interested in making a comment. Probably at 6 p.m.

SUPPORT TEAM (6:00 p.m.): Reminder, FEMA is accepting comments on the NFIP draft NPEIS. If you would like to make a comment, please let us know using the Chat feature or click on the "raise your hand" icon at the top of your screen.

We are not seeing any requests to comment. We will be back to request comments at 6:30 p.m. Thank you.

SUPPORT TEAM (6:30 p.m.): This is the webinar for the NFIP draft NPEIS. If you would like to make a comment, please notify us using your phone. Are there any comments? [Brief pause] We will go back on mute if there are no comments and return at 7 p.m.

SUPPORT TEAM (6:59 p.m.): Since it is now almost 7:00 p.m., we will conclude this webinar. I would like to remind you that the comment period ends on June 6, 2017. Comments should be

received by that date in order to receive full consideration in the document.

Comments received after that date will be considered to the extent practicable. I am going to turn it over to Bret for closing remarks.

FEMA: I would like to thank everyone for participating tonight. The comments FEMA received today will be helpful in our final NPEIS development efforts. FEMA appreciates your continued participation in the NPEIS process. Thank you for participating.

MEETING CONCLUDED AT 7:01 p.m.

Appendix G
Handout



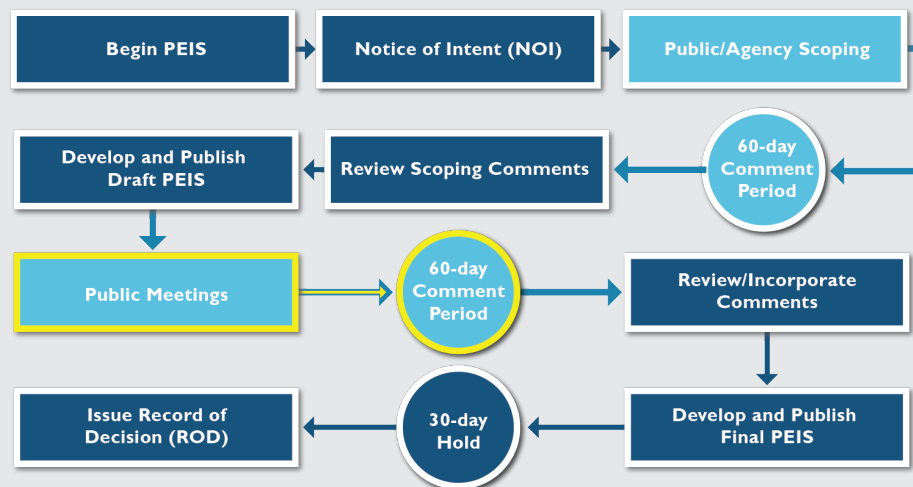
National Flood Insurance Program

Draft Nationwide Programmatic Environmental Impact Statement

Public Meetings – April/May 2017

Thank you for attending today's National Flood Insurance Program (NFIP) draft Nationwide Programmatic Environmental Impact Statement (NPEIS) public meeting.

PUBLIC INVOLVEMENT HISTORY: The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to determine the potential environmental impacts of any federal, or federally funded, action and make this information available to public officials and citizens before decisions are made. In accordance with NEPA, the NFIP NPEIS process started with the Federal Emergency Management Agency's (FEMA) publication of a Notice of Intent in the Federal Register on May 16, 2012. On March 25, 2014, FEMA published a subsequent notice to re-issue the Notice of Intent and to publicize three public scoping webinars. These webinars informed the public about the draft NPEIS and allowed interested parties to provide comments. Agency and public concerns provided during scoping were considered in preparing this NFIP draft NPEIS. The NFIP draft NPEIS was published on April 7, 2017 and started a 60-day public comment period that will end on June 6, 2017.



PROVIDING COMMENTS: Today's public meeting will include an overview presentation on the NFIP draft NPEIS and provide an opportunity for the public to present oral or written comments. Speakers will be asked to deliver brief comments to allow adequate time to hear all comments. FEMA is not answering questions at tonight's meeting but encourages commenters to submit their concerns during the comment period. Comments may be provided in the following methods:

- Federal eRulemaking Portal: <http://www.regulations.gov>, Docket ID FEMA-2012-0012
- Mail, Hand Delivery, or Courier
Regulatory Affairs Division
FEMA, Office of Chief Counsel
Room 8NE, 500 C St. SW
Washington, DC 20472
- Submit a written comment using the form provided at tonight's public meeting

All written comments on the NFIP draft NPEIS must be postmarked or received by June 6, 2017. Download the NFIP draft NPEIS at: <http://www.regulations.gov>, Docket ID FEMA-2012-0012

FEMA sincerely appreciates your interest and involvement in the NFIP NPEIS process. Your input helps us to identify community concerns and environmental issues to be addressed in the NFIP final NPEIS. As always, FEMA will consider all comments that are provided to us throughout the NEPA process.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

FEMA prepared this draft NPEIS to evaluate recent proposed modifications to the NFIP. This draft NPEIS includes an evaluation of the potential impacts to the natural and human environment associated with the NFIP at a programmatic level, as well as an evaluation of impacts of alternative proposals to modify the NFIP. Alternatives considered are:

- No Action Alternative, which refers to the current implementation of the NFIP and serves as a benchmark against which impacts of the alternatives can be evaluated
- Alternative 2 incorporates the legislatively required changes, floodplain management criteria guidance, and Letter of Map Change (LOMC) clarification

- Alternative 3 includes the legislatively required changes, proposed Endangered Species Act (ESA) regulatory changes, and the LOMC clarification
- Alternative 4 includes the legislatively required changes, ESA Guidance, and the LOMC clarification

FEMA's preferred alternative is Alternative 2 as this alternative would meet FEMA's purpose and need, and cause the least environmental impact overall. Alternative 2 is the only alternative within FEMA's discretion and meets the required timeframe.

All written comments on the NFIP draft NPEIS must be postmarked or received by June 6, 2017. Download the NFIP draft NPEIS at: <http://www.regulations.gov>, Docket ID FEMA-2012-0012.

The NFIP draft NPEIS identifies the following potential environmental consequences for each alternative:

Attribute	Alternative 1 No Action	Alternative 2 (Preferred Alternative)	Alternative 3	Alternative 4
Meets Purpose and Need	No	Yes	Yes	Yes
Air Quality	No impact	No impact	No impact	No impact
Noise	No impact	No impact	No impact	No impact
Geology and Soils	No impact	No impact	No impact	No impact
Aesthetics/Visual Resources	No impact	No impact	No impact	No impact
Hazardous Wastes & Materials	No impact	No impact	No impact	No impact
Climate Change	No impact	No impact	No impact	No impact
Historic & Cultural Resources	No impact	No impact	No impact	No impact
Infrastructure	No impact	No impact	No impact	No impact
Socioeconomic Resources	Less than significant	Less than significant	Less than significant	Less than significant
Land Use	Less than significant	No impact	Less than significant beneficial	Less than significant beneficial
Water Resources	Less than significant beneficial	No impact	Less than significant beneficial	Less than significant beneficial
Biological Resources	Less than significant beneficial	Less than significant beneficial	Less than significant beneficial	Less than significant beneficial

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APPENDIX C

National Flood Insurance Program

Biological Evaluation

Federal Emergency Management Agency
November 2016

Version History

Version	Date	Description
1.0	September 28, 2015	Draft Biological Evaluation provided to USFWS and NMFS.
2.0	December 28, 2015	Revised to identify Distinct Population Segment (DPS) species in Table 4-3, Table 4-4, Table 4-5, Table 4-6, and Table 4-7 and Evolutionary Significant Unit (ESU) species in Table 4-7.
3.0	July 1, 2016	Revised for changes in the Proposed Action.

National Flood Insurance Program (NFIP) Biological Evaluation (BE) November 2016

EXECUTIVE SUMMARY

ES-1 Introduction and Background

Established by Congress with the passage of the National Flood Insurance Act of 1968 and administered by the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) is a voluntary Federal program through which property owners in participating communities can purchase Federal flood insurance as a protection against flood losses. In exchange, communities must enact local floodplain management regulations to reduce flood risk and flood-related damages. However, the power to regulate floodplain development, including requiring and approving permits, inspecting property, and citing violations, requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances.

In addition to providing flood insurance and reducing flood damages through floodplain management, the NFIP identifies and maps the nation's floodplains. Maps depicting flood hazard information are used to promote broad-based awareness of flood hazards, provide data for rating flood insurance policies, and determine the appropriate minimum floodplain management criteria for flood hazard areas.

Since 2012, FEMA has coordinated with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS or National Oceanic and Atmospheric Administration [NOAA] Fisheries) on developing a nationwide approach to Section 7 compliance for the NFIP. In accordance with Section 7(a)(2) of the Endangered Species Act (ESA), all Federal agencies are required to consult with USFWS and NMFS—collectively referred to as "the Services"—to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of a threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat.

FEMA has prepared this Biological Evaluation (BE) pursuant to Section 7 of the ESA to evaluate the potential effects of the Proposed Action, which is the current implementation of the NFIP, as modified by recent legislation and other proposed program changes, on ESA-listed species and designated critical habitats within floodplains across the nation. This BE also evaluates the potential effects of the Proposed Action on designated Essential Fish Habitat (EFH) defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in a separate EFH Assessment (Chapter 5).

ES-2 Proposed Action

The Proposed Action, which is discussed in detail in Sections 2.1 to 2.3, is the current implementation of the NFIP, as modified by recent legislation and other proposed program changes. The three elements of the Proposed Action that FEMA is evaluating are Floodplain Management, Flood Hazard Mapping, and Flood Insurance.

Participation in the NFIP is based on a voluntary agreement between FEMA and the participating communities. If a community adopts and enforces a floodplain management ordinance that meets certain minimum requirements to reduce future flood risks within an area known as the Special Flood Hazard Area, or SFHA, FEMA will make flood insurance available to property owners in that community. In addition to providing flood insurance and reducing flood damages through floodplain management, FEMA identifies and maps the nation's floodplains. The three main components to the NFIP are Flood Insurance, Floodplain Management, and Flood Hazard Mapping.

ES-2.1 Flood Insurance

The NFIP makes Federal flood insurance available to property owners or lessees in communities that participate in the NFIP. Through the NFIP, property owners in participating communities are able to insure their property against future flood losses. The availability of flood insurance can build local self-sufficiency and promote sustainable, disaster resilient, and even disaster-resistant communities.

As originally established, the National Flood Insurance Act of 1968 (NFIA) authorized FEMA to provide subsidized flood insurance only for existing buildings or buildings built prior to the community's first Flood Insurance Rate Map (FIRM) (generally referred to as "pre-FIRM buildings." This means that flood insurance for new development has never been subsidized by the NFIP (subject to the very limited, short-term exceptions established in 42 United States Code (U.S.C.) § 4014(e)-(f)).

However, subject to the very limited, short term statutory exceptions referenced above, FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later (generally referred to as "post-FIRM buildings").(42 U.S.C. §§ 4014(a)(1), 4015(b)).

As discussed in the Program Changes (Section ES-2.4), with the passage of the Biggert Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014, FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25% premium rate increases per year, and the rest will be phased out at a rate of 5-15% premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to certain limited, short term statutory exceptions). As such, the premium rates on NFIP policies will be comparable to the premium rates offered on the private flood insurance market.

ES-2.2 Floodplain Management

A local community with land use authority elects to participate in the NFIP. In order to participate in the NFIP, a community must adopt and enforce floodplain management regulations that incorporate the NFIP minimum floodplain management criteria (44 C.F.R. §§ 59.2(b), 59.22(a)(3), 60.1(d)). The purpose of these standards is to reduce flood risk and prevent loss of life and property. Communities incorporate these requirements into their zoning codes, subdivision ordinances, and building codes, or they adopt special purpose floodplain management ordinances. These NFIP requirements apply to areas mapped as SFHAs in participating communities.

Under FEMA's regulations, participating NFIP communities are required to apply the minimum floodplain management criteria to all new development in the SFHA, including any buildings that

are substantially damaged or improved (44 C.F.R. § 60.3). However, FEMA has no role in reviewing permit applications or issuing permits at the community level. Because FEMA is not authorized by statute to act as a permitting authority, the NFIP floodplain management criteria are administered by States and communities through their floodplain management regulations. FEMA's role is limited to programmatic monitoring, oversight, and technical assistance to ensure that communities are implementing and enforcing the minimum floodplain management criteria (see 42 U.S.C. § 4102(c); 40 U.S.C. § 4022(a)(1)). A community that fails to adequately enforce its floodplain management ordinances may be put on probation or suspended from the NFIP (see 44 C.F.R. §§ 59.24(b) and (c)).

ES-2.3 Flood Hazard Mapping

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with States and communities to provide accurate flood hazard and risk data to guide them to mitigation actions. Congress requires FEMA to identify flood-prone areas and subdivide them into flood risk zones to provide the data that is used to administer community floodplain management regulations and rate flood insurance policies. Mapping of flood hazards also promotes public awareness of the degree of hazard within such areas and provides for the expeditious identification and dissemination of flood hazard information. FEMA maintains and updates data through FIRMs and Flood Insurance Studies (FISs).

ES-2.4 Program Changes

As stated above, the Proposed Action is the current implementation of the NFIP, as modified by recent legislation and proposed program changes. These program changes are as follows:

- (a) Changes to Floodplain Management:
 - (i) Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or state laws, including the ESA, as a condition of issuing floodplain development permits.
- (b) Changes to Flood Hazard Mapping:
 - (i) Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted documentation of compliance with the ESA.
- (c) Changes to Flood Insurance:
 - (i) Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium rate increases per year.
 - (ii) Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.
 - (iii) Development of a monthly installment plan payment option for non-escrowed flood insurance premiums.

ES-3 Outside the Scope of the Proposed Action

Floodplain development is not an action under the NFIP. As discussed in Section 2.3.2 below, Section 7 applies to actions that are authorized, funded, or carried out by a Federal agency. Floodplain development is not authorized, funded, or carried out by FEMA (except with respect to certain grant programs outside the scope of this evaluation). Furthermore, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain. As discussed above, the NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. The community regulates floodplain development through locally issued floodplain development permits. The community has the authority to issue or deny floodplain development permits. Likewise, the community monitors compliance and enforcement of individual permits. Therefore, the issuance, denial, and enforcement of individual permits are also outside the scope of FEMA's evaluation since these are not actions taken under the NFIP. This is consistent with interpretations taken with respect to other applicable Federal laws, such as Executive Orders 11988 and 13690. In sum, FEMA has no compliance responsibilities under the ESA with respect to private floodplain development. FEMA is only evaluating those actions identified as FEMA's actions in Section ES-2.

ES-4 Action Area

The extent of the Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as SFHAs on a FIRM under the NFIP.¹ The FEMA-mapped SFHA is the area where the NFIP's floodplain management regulations must be enforced (Federal Emergency Management Agency, 2014b). The SFHA is defined as "the land within the floodplain subject to a 1 percent or greater chance of flooding in any given year," often referred to as the 100-year floodplain (44 C.F.R. § 59.1).

ES-5 Discretion

Section 7 of the ESA applies where there is discretionary Federal involvement or control. As discussed in Section 2.1, the actions and program elements comprising the NFIP are a mix of direct mandates (providing little or no flexibility in implementation) and discretionary actions. Under Section 7(a)(2) of the ESA, Federal agencies are required to consult only if there is discretionary involvement or control: "...where the Federal agency lacks the discretion to influence the private action, consultation would be a meaningless exercise; the agency simply does not possess the ability to implement measures that inure to the benefit [of] the protected species" (50 C.F.R. § 402.03). Accordingly, per the requirements of the Services' ESA-implementing regulations, Section 7 consultations typically focus on the actions where a Federal agency has discretionary control over implementation of the action. In *National Wildlife Federation v. FEMA*, the court held that **the provision of flood insurance is a non-discretionary action for which "FEMA has no obligation to consult"** (National Wildlife Federation v. Federal Emergency Management Agency, 2004) (emphasis added).

However, in technical assistance meetings held prior to the initiation of this BE, the Services have advised FEMA that in practice, they look at the effects of both discretionary and non-discretionary actions when assessing the effects of a program on ESA-listed species and designated critical

¹ This does not include Federal lands or properties subject to Section 1316 of the NFIA.

habitat. The Services further advised FEMA that they would consider any BE that only analyzed discretionary NFIP actions to be deficient. As such, FEMA has consented to assess the effects of all aspects of the program. However, in order to ensure that any recommended program changes are limited to areas in which FEMA has discretion to make changes for the purposes of ESA compliance, FEMA has identified which actions are discretionary and which actions are non-discretionary. Table ES-1 identifies elements of the NFIP and describes the individual components under each element that FEMA will be evaluating under the ESA and indicates where FEMA has discretion (where FEMA has the authority to make a decision) or no discretion (actions that are mandated by statute).

ES-6 The NFIP and Floodplain Development

The NFIP is sometimes perceived, based on anecdotal evidence, as encouraging development in the floodplain. However, as discussed in Section 3.5, the studies and analysis in this BE demonstrate that development in the nation's floodplains is driven by numerous other factors. The primary factors influencing development are economic factors, including the availability of jobs; proximity to ports, and tourism and recreation; infrastructure; and proximity to natural resources and existing communities.

A history of the NFIP and the available data and studies demonstrate that the availability of flood insurance has proved a very poor incentive to develop in the floodplain. Prior to 1973, there were only 95,000 NFIP policies in force. Because of the lack of interest in purchasing flood insurance, Congress passed the Flood Disaster Protection Act of 1973, which required the purchase of flood insurance as a condition of receiving federally-backed loans and Federal assistance in SFHAs of participating communities. Even after 1973, flood insurance purchases were still low, so Congress passed the National Flood Insurance Reform Act of 1994, which required Federal agency lender regulators to develop regulations to direct their federally regulated lenders not to make, increase, extend, or renew any loan on applicable property unless flood insurance is purchased and maintained. However, the 1994 Reform Act has also not had a substantial impact in increasing flood insurance purchases.

A 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that factors other than flood insurance are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress." (Congressional Research Service, 2013)

The 2006 AIR report found that out of approximately 20,000 communities participating in the NFIP at the time of the report:

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;
- Five states – California, Florida, Louisiana, New Jersey, and Texas - accounted for nearly 70% of all NFIP policies; and
- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (American Institutes for Research - Monday et al., 2006)

Moreover, although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of individual behavior. A 2006 American Institutes for Research (AIR) report provides a number of data points –provided in the text box to the right – on the level and concentration of NFIP policies within the States, territories, and participating communities demonstrating this point (American Institutes for Research - Monday et al., 2006). The 2006 AIR report conducted a substantial literature review concerned with the public's perceptions about low frequency/high damage events, such as flooding, also indicates that the NFIP and flood insurance does little to influence floodplain development (American Institutes for Research - Monday et al., 2006).

Looking more broadly to the link between the implementation of the NFIP generally and floodplain development, studies have not shown that there is any demonstrable connection. For example, the Government Accountability Office (GAO) analyzed floodplain development data both before and after a community entered the NFIP. The GAO found that annual increases and decreases in new housing units generally paralleled the rise and decline of total housing units in the Nation and seemed to be more directly related to the state of the economy than the availability of flood insurance. (Comptroller of the United States, 1982)

The AIR took a different approach and looked at floodplain development in areas where flood insurance is available compared to areas in which it is not available (e.g., Coastal Barrier Resources System [CBRS] units). In this study, AIR found that available evidence suggests many CBRS units have been developed, often quite extensively, despite the absence of NFIP flood insurance. The report noted that development appeared to result from a combination of State and local government incentives and market forces. The report further found that "market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce." (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006); see also, (U.S. General Accounting Office, 1992).

As reported in the FEMA Floodplain Management Losses Avoided Study, more than half (57 percent) of residential properties located in SFHAs were built prior to the inception of the NFIP. As such, it is clear that development has occurred, and would continue to occur, in the SFHA even in the absence of flood insurance. Thus, the research and empirical evidence demonstrate that the availability of flood insurance has very little effect on the motivation to develop the floodplain, which was already well established prior to the inception of the NFIP (Federal Emergency Management Agency, 2014d).

ES-7 Effects Analysis

Section 7(a)(2) of the ESA requires all Federal agencies to consult with the Services to ensure that any action they fund, authorize, or carry out does not jeopardize the continued survival of any endangered or threatened species or adversely modify designated critical habitat. Section 7(a)(2) generally requires a Federal agency to conduct a biological assessment or evaluation to identify any endangered or threatened species that may be affected by the agency's action. There are three possible results of such an assessment: (a) a determination is that a project will have "no effect," positive or negative, on ESA-listed species and designated critical habitat; (b) a determination that the action "may affect, but is not likely to adversely affect" the species; and (c) a determination that the action "may affect, and is likely to adversely affect" the species. If the agency makes a determination that the Proposed Action has "no effect," then concurrence from the Services is not necessary and no further action is warranted. If the agency makes a determination that the Proposed Action "may affect, but is not likely to adversely affect" ESA-listed species and designated critical habitat, then coordination with the Services is required. If

the Services concur with an agency's finding that an action "may affect but is not likely to adversely affect" the species, then the consultation is complete. However, if the Services do not concur with such a finding, then consultation continues. The Services then use the agency's biological assessment as the basis for developing a Biological Opinion that further analyzes the action's impact on species to determine if the Proposed Action would jeopardize ESA-listed species or adversely modify designated critical habitat. If jeopardy or adverse modification of critical habitat is found by the Services, the Services will suggest a "reasonable and prudent alternative" (RPA) to the Proposed Action that will allow the Federal agency to proceed without jeopardizing the continued survival of ESA-listed species (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998). FEMA has determined that the Proposed Action, and all of the components therein, will have no effect (NE) on ESA species, critical habitat, or EFH.

Table ES-1 summarizes FEMA's formal effects determinations for the Proposed Action. The effects determinations take into account instances where a species assigned to a primary habitat outside the Action Area may rely on a habitat within the Action Area to meet an important physical or biological need. For example, the primary habitat for sea turtles is offshore marine waters, which are outside the Action Area. However, sea turtles nest on beaches, which are within the Action Area, and that is accounted for in the effects determination for the offshore marine reptiles sub-group.

Table ES-1: Effects Determination for the Proposed Action's Indirect Effects on ESA-Listed/Proposed Species, Designated/Proposed Critical Habitat, and Designated EFH within the Action Area

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
Floodplain Management	Implementing Minimum Floodplain Management Criteria	Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal and State laws, including the ESA, as a condition of issuing floodplain development permits.	Discretion	NE
	Enroll Communities in the NFIP	No change	No discretion	NE
	Monitor Communities' Compliance with NFIP via Community Assistance Visits (CAVs)/Community Assistance Contacts (CACs)	No change	Discretion	NE
	Enforcement (e.g., probation, suspension, Community Rating System (CRS) retrogrades)	No change	Discretion	NE
	Administer the Map Adoption Process	No change	No discretion	NE
	Administer CRS (includes awarding points for CRS Class ratings)	No change	Discretion	NE
	CRS Activity Changes / Updates	No change	Discretion	NE
	Training / General Technical Assistance on Minimum Floodplain Management Criteria	No change	Discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
	Removal of Insurance Eligibility (pursuant to Section 1316)	No change	No discretion	NE
Flood Hazard Mapping	Decision to publish Flood Insurance Rate Maps (FIRMs)– decision on level of study performed	No change	Discretion	NE
	Development of New or Revised Flood Insurance Studies (FIS) and SFHA Maps – making an FIS, engineering analysis	No change	No discretion	NE
	Non-regulatory Products and Features	No change	Discretion	NE
	Map Sequencing	No change	Discretion	NE
Flood Hazard Mapping	Letter of Map Amendment (LOMA) and Letter of Determination Review (LODR)	No change	No discretion	NE
	Letter of Map Revision (LOMR) and Letter of Map Revision Based on Fill (LOMR-F)	Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted documentation of compliance with the ESA.	No discretion	NE
	Conditional Letter of Map Revision (CLOMR)	No change	Discretion	NE
	Conditional Letter of Map Revision Based on Fill (CLOMR-F)	No change	Discretion	NE
	Conditional Letter of Map Amendment (CLOMA)	No change	Discretion	NE
	Data Development and Dissemination	No change	Discretion	NE
	Community Outreach, Training, and General Technical Assistance	No change	Discretion	NE
	Implementing Mapping Standards, Policies, and Regulations	No change	Discretion	NE
	Levee Accreditation Process	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE
	AR Zone-A99 Determinations	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE
Flood Insurance	Administering the Provision of Flood Insurance	No change	No discretion	NE
	Administer Write Your Own (WYO) Programs	No change	No discretion	NE
	Develop and Publish Insurance Rate Tables	<ul style="list-style-type: none"> Subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, 	No discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
Flood Insurance		substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) would be phased out at a rate of 25% premium rate increases per year. ¹ <ul style="list-style-type: none"> Subsidies on all other pre-FIRM properties would be phased out through annual premium rate increases of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.¹ 		
	Insurance Policy Management (Issue / Sell / Renew / Refund / Appeal)	A monthly installment plan payment option for non-escrowed flood insurance premiums would be developed. ¹	No discretion	NE
	Educate Insurance Agents	No change	Discretion	NE
	Educate and Certify Claims Adjusters	No change	Discretion	NE
	Adjust Loss Claims	No change	No discretion	NE
	Pay Valid Claims	No change	No discretion	NE
	Provide General Technical Assistance	No change	Discretion	NE
	Marketing	No change	Discretion	NE
NE No effect				
¹ Modifications required by statute				

ES-8 Cumulative Effects

According to the ESA, cumulative effects are effects of future State or private actions not involving Federal actions, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation (50 C.F.R. § 402.02). An assessment of cumulative effects occurs when the combined effects of an action are added to, or interact with, other effects in a particular place and within a particular timeframe.

For the purposes of this BE, reasonably foreseeable future actions are those State, Tribal, and local development projects in SFHAs nationwide likely to occur within the next 20 to 30 years.

Because there are more than 22,000 NFIP-participating communities within the nationwide Action Area, these future effects cannot be reasonably quantified. This BE addresses these effects by describing:

- The Effects Determination for the Proposed Action on ESA species, designated critical habitats, and EFH (Section 6.1);
- Interdependent and interrelated actions (Section 6.2); and
- Cumulative effects (Section 6.3).

Cumulative effects occurring in floodplains could include the indirect effects of the Proposed Action, combined with private floodplain development activities across the nation initiated by State agencies or local jurisdictions, Tribal entities, or private landowners. Activities could range from residential and business development to expansion and construction of new infrastructure, such as buildings, roads, utilities, or water-related projects (i.e., irrigation withdrawals, bank protection, and general land clearing). These factors may inevitably affect surface waters and terrestrial and aquatic habitats. Across the nation, there are a number of State, local, and Tribal efforts to reduce and minimize ongoing cumulative effects to ESA species, designated critical habitats, and EFH to restore habitats, provide greater protection, and apply increasingly stringent water-related regulations.

While it is reasonably foreseeable that there will be private floodplain development in the Action Area within the next 20 to 30 years, the extent and the impacts of such development is not reasonably foreseeable. There are a number of other factors affecting ESA-listed species within the timeframe of the Proposed Action – such as invasive species, disease, predation, hunting and fishing, overexploitation, and climate change (discussed in detail in Section 3.5) – that make it very difficult to determine what effects to ESA-listed species are properly attributable to private floodplain development, even if the extent of such development were somehow ascertainable. This complication is exacerbated by the fact that the factors themselves are also difficult to quantify.

ES-9 Conclusions

Based on a review of the current status of ESA-listed species and designated critical habitat, the environmental baseline for the Action Area, the effects of the Proposed Action, and cumulative effects, FEMA has determined that the Proposed Action will have no effect on species listed as threatened or endangered under the ESA or on the designated critical habitat of such species. FEMA has also determined that the Proposed Action will not reduce the quality or quantity of EFH, as defined under the MSA.

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Acronyms

ACRONYM	DEFINITION
AIR	American Institutes for Research
ASFPM	Association of State Floodplain Managers
BE	Biological Evaluation
BFE	Base Flood Elevation
CATEX	Categorical Exclusion
CACs	Community Assistance Contacts
CAVs	Community Assistance Visits
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CEC	Commission for Environmental Cooperation
C.F.R.	Code of Federal Regulations
C-HAPC	Coral Habitat Areas of Particular Concern
CLOMA	Conditional Letter of Map Amendment
CLOMC	Conditional Letter of Map Change
CLOMR	Conditional Letter of Map Revision
CLOMR-F	Conditional Letter of Map Revision Based On Fill
CNMS	Coordinated Needs Management System
CRS	Community Rating System
CWA	Clean Water Act
CZM	Coastal Zone Management
DPS	Distinct Population Segment
EA	Environmental Assessment
ECOS	Environmental Conservation Online System
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EHP	Environmental Planning and Historic Preservation
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency

ACRONYM	DEFINITION
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
GAO	Government Accountability Office
GAP	Gap Analysis Program
GDP	Gross Domestic Product
HAPC	Habitat Areas of Particular Concern
HCP	Habitat Conservation Plan
HFIAA	Homeowner's Flood Insurance Affordability Act of 2014
IPaC	Information, Planning, and Conservation System
LAA	Likely to Adversely Affect
LODR	Letter of Determination Review
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision Based On Fill
MOU	Memorandum of Understanding
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NE	No Effect
NEPA	National Environmental Policy Act of 1969
NFIA	National Flood Insurance Act of 1968
NFIP	National Flood Insurance Program
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic and Atmospheric Administration

ACRONYM	DEFINITION
OPA	Otherwise Protected Areas
ORV	Off-road Vehicles
RPA	Reasonable and Prudent Alternative
SFHA	Special Flood Hazard Area
TFIA	The Flood Insurance Agency
TMAC	Technical Mapping Advisory Council
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
WNS	White-Nose Syndrome
WYO	Write-Your-Own

1 INTRODUCTION AND BACKGROUND

The National Flood Insurance Program (NFIP) is a Federal program established by Congress with the passage of the National Flood Insurance Act of 1968 (NFIA) and administered by the Federal Emergency Management Agency (FEMA). Congress created the NFIP to "provid[e] appropriate protection against the perils of flood losses" and to "minimiz[e] exposure of property to flood losses" (42 United States Code [U.S.C.] § 4001(c)). The NFIP is a voluntary program through which property owners in participating communities can purchase Federal flood insurance as a protection against flood losses. In exchange, communities must enact floodplain management regulations to reduce flood risk and flood-related damages. Providing NFIP flood insurance indemnifies property owners from flood losses and reduces the costs of disaster assistance. NFIP floodplain management requirements are designed to reduce future flood damages and reduce disaster assistance costs. The losses avoided through implementation of these requirements is estimated at \$1.7 billion (B) (Federal Emergency Management Agency, 2014d). In addition to providing flood insurance and reducing flood damages through floodplain management, the NFIP identifies and maps the nation's floodplains. Maps depicting flood hazard information are utilized to promote broad-based awareness of flood hazards, provide data for rating flood insurance policies, and determine the appropriate minimum floodplain management criteria for flood-prone areas.

FEMA has no land use authority. The power to regulate floodplain development, including requiring and approving permits, inspecting property, and citing violations, requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens.

Today, more than 22,000 communities participate in the NFIP, with more than 5.6 million flood insurance policies in effect, providing over \$1.2 trillion (T) in insurance coverage (Federal Emergency Management Agency, 2013). In 2011, FEMA Administrator Craig Fugate reported to the Senate Committee on Banking, Housing, and Urban Affairs that implementation of the NFIP is estimated to save the nation about \$1.7B annually through avoided flood losses (Congressional Research Service, 2013).

1.1 Purpose

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA), all Federal agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS or National Oceanic and Atmospheric Administration [NOAA] Fisheries), referred to as "the Services," regarding potential effects of their actions to federally-listed threatened or endangered species and designated critical habitats. The Federal agency must ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of a federally listed species, or result in the destruction or adverse modification of designated critical habitat. For FEMA, the Proposed Action evaluated in this Biological Evaluation (BE) is the implementation of the NFIP in the United States as modified by recent legislation and proposed program changes. FEMA has prepared this BE pursuant to Section 7 of the ESA for the purpose of evaluating the potential effects of the Proposed Action on ESA-listed species, designated critical habitats, and designated Essential Fish Habitat (EFH).

The Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as Special Flood Hazard Areas (SFHAs) on FEMA's flood maps, and the nearshore marine waters² that may be affected by the Proposed Action. The SFHA is defined as "the land within the floodplain subject to a 1 percent or greater chance of flooding in any given year," often referred to as the 100-year floodplain (44 C.F.R. § 59.1). The 1 percent annual chance flood represents a magnitude and frequency with a statistical probability of being equaled or exceeded annually.

FEMA began discussions with the Services on January 23, 2012 for technical assistance on FEMA's ideas for a nationwide approach to Section 7 compliance for the NFIP. Since this initial meeting, FEMA and the Services have held numerous meetings on this topic, as well as on the proposed program changes.

² Nearshore marine waters are defined here as waters within a few hundred feet of the shoreline.

2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

The Proposed Action evaluated on this BE is the implementation of the NFIP in the United States, as modified by recent legislation and proposed program changes. This section will first cover (1) a discussion of the Proposed Action, including the current implementation of the NFIP, as well as the proposed program changes to the NFIP; (2) a discussion of what is outside the scope of the Proposed Action; and (3) a description of the Action Area

2.1 Proposed Action (Part 1): Current Implementation of the National Flood Insurance Program

As detailed above, Congress created the NFIP to provide appropriate protection against the perils of flood losses and to minimize exposure of property to flood losses. Participation in the NFIP is based on a voluntary agreement between participating (local, tribal, and States) communities and the Federal government. If a community adopts and enforces a floodplain management ordinance that meets certain minimum requirements to reduce future flood risks within an area known as the Special Flood Hazard Area, or SFHA, the Federal government will make flood insurance available to property owners and lessees in that community.

This section briefly describes the three main components of the NFIP—Floodplain Management, Flood Hazard Mapping, and Flood Insurance. Appendix A provides a detailed description of the NFIP and actions undertaken by FEMA in implementing the NFIP.

Case Summary: NFIP Does Not Regulate Property Owners Directly

In the case of City of Myrtle Beach v. Buchanan Motels, the City of Myrtle Beach sought a declaratory judgment that various Myrtle Beach businesses were out of compliance with NFIP floodplain management regulations: 2012 U.S. Dist. LEXIS 4913 (D. S.C., 2012). The court found that the minimum floodplain management regulations set out the standards that a community should enforce so that the community, as a whole, remains eligible for insurance under NFIP. The court held that Defendants, as individual businesses who own property in Myrtle Beach, cannot violate FEMA regulations to which only a "community" has voluntarily subjected itself.

The court further held that although the NFIP regulations allow FEMA, in certain circumstances, to deny flood insurance coverage to property owners, this denial is based on a violation of State or local laws, regulations, or ordinances. In so holding, the court clarified that the NFIP does not regulate property owners directly and that only the NFIP communities are subject to the NFIP regulations.

2.1.1 Floodplain Management

A community's participation in the NFIP is voluntary. Participation is based on an agreement between communities and the Federal government. A "community" is a governmental body with the authority to "adopt and enforce floodplain management regulations for the areas within its jurisdiction." Eligible communities can include cities, villages, towns, townships, counties, parishes, States, and Indian tribes (44 C.F.R. § 59.1).

FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends

on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

Enroll Communities in the NFIP

The NFIP provides flood insurance coverage only in States and communities that adopt and enforce floodplain management measures that meet the minimum floodplain management criteria established by regulation. Communities must apply to participate, submit compliant floodplain management requirements, and meet other program requirements. FEMA has established processes to enroll communities in the NFIP and to ensure that eligible communities continue to meet program requirements.

States also have a role in the NFIP and many have established State floodplain management programs. Each State has designated an NFIP State Coordinating Agency as a point of contact for the NFIP. Generally, the State Coordinating Agency is the State environmental or natural resources agency or the State emergency management agency.

Many States have adopted floodplain management statutes and regulations; in addition, they have established and funded their own floodplain management programs. States must also have floodplain management regulations or executive orders in place that meet the minimum requirements of the NFIP for State-owned properties in SFHAs. Where a State requires that communities adopt more restrictive requirements than the NFIP minimum requirements, such as a more restrictive floodway or additional freeboard (requiring new construction to be elevated to a level 1 or more feet higher than the Base Flood Elevation (BFE)), the State requirements take precedence over the NFIP minimum floodplain management standards, as long as the State enforces these higher standards.

Administer the Map Adoption Process

As discussed in more detail below, FEMA identifies and publishes flood hazards nationwide and periodically updates flood hazard data in support of the NFIP. This flood hazard data is provided to the communities in the form of a Flood Insurance Rate Map (FIRM) or Flood Insurance Study (FIS). The FIRM and FIS report provide States and communities with the information needed for land use planning so that the States and communities can take actions to reduce risk to floodplain development. Each time FEMA provides a community with additional flood hazard data, that community must adopt new floodplain management regulations, or amend existing regulations, to incorporate the new data. The community has six months to incorporate the new data or it will be immediately suspended from the NFIP. (44 C.F.R. §§ 59.24(a) and 60.13)

Implementing Minimum Floodplain Management Criteria

In order to participate in the NFIP, a community must adopt and enforce floodplain management regulation that meets the NFIP floodplain management criteria (44 C.F.R. § 59.2(b), 59.22(a)(3), 60.1(d), 60.3(a) through (f)).³ The intent of these standards is to reduce flood risk and loss of life and property. Additionally, communities are allowed, and encouraged, to adopt floodplain management regulations that are more restrictive than the minimum criteria. Higher standards are designed to reduce flood damage and encourage better long-range management and use of flood-prone areas. In the absence of the minimum floodplain management criteria, much

³ Appendix A, Section 1.3.2, provides a detailed description of the NFIP, including the minimum floodplain management criteria.

floodplain development would go largely unregulated except to the extent that the communities themselves voluntarily regulate it. Many communities had little or no floodplain management regulations in place prior to joining the NFIP.

Example: The minimum floodplain management criteria do not require communities to prohibit development in the floodway, but they do require the community to ensure that development is done in such a manner that it does not result in an increase in flood heights (subject to certain limited exceptions discussed later in this document). There are a number of ways to meet this performance standard, including, but not limited to: (a) reducing the size of the proposed development; (b) demolishing existing development; (c) not developing; or (d) providing compensatory storage. Because FEMA has no land use authority, FEMA does not dictate how the performance standard is met.

Through regulations, FEMA sets certain nationally applicable minimum floodplain management criteria related to reducing flood hazard risk in floodplain areas for all NFIP participating communities. These regulations are often implemented through guidance that clarifies and elaborates upon the minimum floodplain criteria requirements. The communities must incorporate these minimum floodplain management criteria into community ordinances and regulations as a condition of participation in the NFIP. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. As such, FEMA cannot require the communities to prohibit development,⁴ it can only place certain floodplain management-related conditions on how that development will be carried out.

Communities incorporate the floodplain management criteria into their zoning codes, subdivision ordinances, and building codes, or they adopt special purpose floodplain management ordinances. The floodplain management criteria apply to areas mapped as SFHAs. The community ordinances must also include effective enforcement provisions (44 C.F.R. § 59.2(b)). A community that fails to adequately enforce its floodplain management ordinance may be put on probation or suspended from the NFIP (44 C.F.R. § 59.24(b)-(c)).

FEMA is not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process. Before a property owner can undertake any development in the SFHA, they must obtain a permit from the community. The community is responsible for reviewing the proposed development to ensure compliance with their floodplain management ordinance and that all necessary permits have been received from Federal or State agencies from which approval is required. FEMA has no knowledge of any community-issued permits in the SFHA until subsequent community monitoring efforts occur.

Participating communities must apply the minimum floodplain management criteria to all new construction in the SFHA, as well as to existing buildings in the SFHA that have been substantially damaged or substantially improved. It is the community's responsibility to make substantial improvement or substantial damage determinations. If a community determines that the cost of any re-construction, rehabilitation, addition, or other improvements to a building equals or exceeds 50 percent of the market value of the building before the construction began, the building is considered a "substantial improvement." If a community determines that the cost of restoring

⁴ Notably, although some minimum floodplain management criteria do utilize the word "prohibit" (e.g., 60.3(d)(3)'s requirement to "prohibit all encroachments..."), this word was utilized for the purposes of clarity to the participating communities. A careful reading of the regulations reveals that these criteria are actually performance standards (e.g., "prohibit all encroachments...unless it has been demonstrated... that the proposed encroachment will not result in any increase in flood levels..."). As such, FEMA is not exceeding its legal authority by placing an outright prohibition on development.

a building equals or exceeds 50 of the market value of the building before the damage occurred, the building is considered "substantially damaged." (44 C.F.R. § 59.1)

Example: FEMA's compliance monitoring and enforcement efforts are limited to instances of systemic programmatic compliance, as opposed to non-compliance of individual permits. For example, in 2014, FEMA conducted a CAV with Union County, South Dakota, and cited several programmatic compliance issues that needed to be resolved. These issues included a non-compliant ordinance; permitting of residential structures with the lowest floor built below the base flood elevation; lack of documentation related to the elevation of lowest floors in residential or non-residential structures; lack of documentation related to development in the regulatory floodway; the use of data for permitting that was not included in the FEMA published FIRM; and lack of documentation related to whether or not structures were substantially improved or substantially damaged.

FEMA provided technical assistance to the county multiple times during 2014. When documentation was not forthcoming, FEMA notified the county via letter on January 16, 2015, that the county would be placed on probation on May 18, 2015, if the documented issues were not resolved. Subsequently, FEMA notified insurance policy holders within the county of the potential probation and the potential for increased insurance surcharges should the county be put on probation. FEMA continued to provide technical assistance to the county, and, on May 13, 2015, FEMA signed a Corrective Action Plan with the county to detail the steps that the county would take to resolve the remaining identified issues, thus avoiding probation.

FEMA's role under the NFIP is limited to enrolling communities in the NFIP, setting the minimum floodplain management criteria, providing programmatic monitoring and oversight, and provision of technical assistance to ensure that communities are complying with the NFIP program requirements, and enforcing the program requirements when there are issues of programmatic non-compliance by a participating community.

Administer Community Rating System (CRS) and Activity Changes/Updates

The NFIP Community Rating System (CRS) was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards, and was codified under the National Flood Insurance Reform Act of 1994 (42 U.S.C. § 4022(b)). Any community in full compliance with the minimum NFIP floodplain management requirements may apply to join the CRS.

Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

- Reduce and avoid flood damages to insurable property:
 - Protect public health and safety;
 - Reduce damage to property;
 - Prevent increases in flood damage from new construction;
 - Reduce the risk of erosion damage; and
 - Protect natural and beneficial floodplain functions.
- Strengthen and support the insurance aspects of the NFIP:
 - Improve flood insurance policy coverage; and
 - Improve actuarial rating.
- Foster comprehensive floodplain management:
 - Protect natural floodplain functions;
 - Address safety and health; and

- Protect other community assets such as infrastructure, critical facilities and open space.

The CRS uses a class rating system to determine flood insurance premium reductions for residents. CRS classes are rated from 10 to 1. As a community engages in additional mitigation activities, community residents become eligible for additional NFIP premium policy discounts. Each class improvement produces an additional 5 percent discount in flood insurance premiums, with a Class 1 community receiving the maximum 45 percent reduction in flood insurance premiums. The CRS recognizes 19 creditable activities, organized under 4 categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Some CRS activities for which communities may receive credit are environmentally protective activities, such as preserving open space, creating higher standards for stormwater management, and preserving the natural and beneficial functions of floodplains.⁵

As of June 20, 2014, there are 1,296 communities receiving flood insurance premium discounts based on their implementation of local mitigation, outreach, and educational activities that go well beyond minimum NFIP requirements. Although premium discounts are one of the benefits of participation in the CRS, these communities are carrying out important activities that save lives, reduce property damage, and protect the natural and beneficial functions of floodplains. These 1,200-plus communities represent a significant portion of the nation's flood risk as evidenced by the fact that they account for over 66 percent of the NFIP's policy base.

Training/General Technical Assistance on Minimum Floodplain Management Criteria
FEMA's compliance approach focuses on encouraging and promoting compliance, rather than threatening to penalize communities for non-compliance. FEMA provides training and technical assistance to help a community achieve compliant status. FEMA gives training both to the community floodplain managers who must administer the local floodplain ordinances and to FEMA floodplain management staff. Such training is offered through FEMA's national training center, the Emergency Management Institute, local training events, conferences, workshops, webinars, home study courses, and guidance. Additionally, the Community Rating System (discussed below) provides incentives to communities undertaking such training. FEMA also encourages its floodplain management staff and community partners to become certified floodplain managers through the Certified Floodplain Management program offered by the Association of State Floodplain Managers (ASFPM). This program, which was developed with input from FEMA staff, is a formalized procedure allowing individuals to demonstrate that they have a standardized level of knowledge and skills in floodplain management and a commitment to continual education in floodplain management.

FEMA also gives technical assistance to communities. Technical assistance takes many forms, including phone and other contacts with NFIP communities, visits to communities, workshops, webinars, the issuance of procedural guidance, development of technical publications, and responding to inquiries. Technical assistance may be provided on a more formal basis through Community Assistance Contacts (CACs) and Community Assistance Visits (CAVs), as discussed below, or in response to specific inquiries by the communities. In order to reach a broader audience in a quicker amount of time, FEMA also offers workshops and webinars. Additionally,

⁵ The Coordinator's Manual for the CRS includes the CRS Schedule, which sets the criteria for CRS classification, and the CRS Commentary on the Schedule. Section 100 gives general background information on the CRS. Section 200 explains the application and verification procedures. Sections 300 through 700 explain the credit points and calculations that will be used to verify CRS credit. The procedures in these sections are used by a community to submit a modification for a better CRS classification.

FEMA produces procedural guidance and technical publications, such as the "NFIP Guidance for Conducting CACs and CAVs" and the "NFIP Community Compliance Program Guidance."

Following major flood disasters, FEMA staff work closely with communities in providing technical assistance on the NFIP floodplain management requirements, such as the substantial damage requirement, and on developing a reconstruction strategy for property impacted by floods to determine appropriate mitigation measures, such as elevation, acquisition, demolition, or relocation of flood-damaged structures.

Case Summary: Technical Assistance for Violation

In May 2014, FEMA Region X became aware of a potential violation in a county in Washington on a blueberry farm. The blueberry farmers had encroached into a riparian area as they were preparing a field for planting. Region X contacted the county and made sure they were aware of the potential violation of the requirements of the Puget Sound Biological Opinion that establish a 250 ft riparian area in which there can be "no adverse effect" to species or habitat from any development. FEMA Region X and NMFS offered technical assistance to the county to help develop a mitigation plan to mitigate the adverse effects that were inadvertently caused by the development. The county has levied a \$10,000 fine and is working with the property owners to develop a mitigation plan. Currently, the mitigation plan is still in development. Site restoration is required, such as measures taken to restore an altered or damaged natural feature including active steps to restore damaged wetlands, streams, protected habitat, or their buffers to the functioning condition that existed prior to an unauthorized alteration.

Compliance Enforcement

When a potential programmatic compliance violation is reported to FEMA for further investigation, FEMA will notify the community. FEMA may also identify potential violations while conducting a CAC or a CAV. FEMA has an established process for pursuing compliance actions including technical assistance, probation, and finally suspension. Technical assistance provided to a community is often the best approach because it is a chance to provide education and find a programmatic solution that will prevent the violation from happening again. A physical violation must be mitigated to the maximum extent possible, and mitigation actions have to be approved by FEMA.

Most deficiencies in a community's floodplain management program or violations of local ordinances are generally due to lack of understanding of the NFIP requirements, lack of technical skills, failure to understand the rationales behind the NFIP requirements, or lack of an appreciation of the insurance implications and other consequences of a decision. Most problems that are identified can be solved through community assistance efforts.

Additionally, a community that participates in the Community Rating System (discussed below) must be fully compliant with the minimum standards of the NFIP. A CRS community that is not fully compliant will be provided an opportunity to remedy the violation to the maximum extent possible. If substantive program deficiencies or violations have not been remedied, the community will be retrograded to a lower class rating in the CRS program.

Compliance actions will be taken if any violations are identified and not remedied to the maximum extent possible (44 C.F.R. § 59.24 (b)-(c)). When a community has demonstrated a pattern of failure to enforce the NFIP floodplain management requirements and FEMA has identified substantive program deficiencies or violations, FEMA may initiate an enforcement action against the community in order to obtain compliance. A substantive violation or program deficiency is one that has resulted, or could result, in increased potential flood damages or flood stages in the community and surrounding communities. When community assistance has failed to resolve a community's compliance problems, the NFIP may place the community on probation. When a community is placed on probation, a \$50 surcharge will be added to the flood insurance policies

of all policyholders in that community (44 C.F.R. 59.24(b)-(c) and 61.16). Probation lasts for a minimum of one year and may be extended.

Communities that do not comply while on probation can be suspended from the NFIP. Flood insurance is not available from FEMA in communities that have been suspended (44 C.F.R. § 59.24(b)-(c)). Suspension also means that the community will be unable to obtain many forms of disaster assistance when a community suffers a disaster. Additionally, lenders will not be able to provide loans backed by the Federal government for property located in the mapped SFHA if a community is suspended from the program.

If an insured structure is identified as a violation of the community's floodplain management ordinance, FEMA can have the insurance company review the information and possibly rerate the structure to reflect the increased risk to the structure. This can result in significantly higher flood insurance rates on the structure, which may encourage the property owner to bring the building into compliance.

Removal of Insurance Eligibility

In addition, pursuant to Section 1316 of the NFIA, FEMA may deny flood insurance coverage for any property in the SFHA that has been declared by a duly constituted State or local zoning authority, or other authorized public body, to be in violation of State or local floodplain management regulations (42 U.S.C. § 4023). A Section 1316 action can only be taken upon request by the State; FEMA may not initiate such an action. This removal of insurance eligibility can act as a local enforcement action within the community to encourage a non-compliant property within the community to rectify the management issue(s).

Achieving Community Compliance

The NFIP compliance approach used by FEMA has three main components: (1) promotion of compliance; (2) monitoring of community programmatic compliance; and (3) enforcement. Within each of these components, FEMA has a number of tools to help the NFIP participating communities achieve compliance with the NFIP floodplain management regulations. These three components are essential to the process of achieving compliance, and FEMA often employs a number of the tools encompassed within these three components to achieve compliance (see Table 2-1).

Case Summary: Limitations on FEMA's Legal Authority under the NFIP

These limitations on FEMA's authorities under the NFIP were recognized by the federal court in National Wildlife Federation v. FEMA, 345 F.Supp.2d 1154 (W.D. Wa. 2004). In that case, Plaintiff challenged FEMA under Section 7 of the ESA, arguing that in failing to implement the Reasonable and Prudent Alternative (RPA) established by NMFS in its 2008 Biological Opinion, FEMA had failed to ensure that its implementation of the National Flood Insurance Program did not jeopardize threatened and endangered species in violation of the ESA. The court held that because FEMA is not a land use authority and it can only provide guidance, technical assistance, require reporting, and institute enforcement actions, FEMA's decision to implement the RPA to the greatest extent within its statutory authority was not arbitrary and capricious. The court further held that FEMA's implementation of the NFIP in the Puget Sound accords with the law, including the ESA.

Table 2-1: Achieving Community Compliance with the NFIP

Approaches/Components			
	Promoting Community Compliance	Monitoring Community Compliance	Enforcing Community Compliance
Tools	<p>Training</p> <p>Technical Assistance (community assistance contacts, community assistance visits, procedural guidance, technical publications, response to inquiries, other)</p> <p>Professional Certification</p> <p>Incentives (insurance availability, CRS premium discounts, etc.)</p> <p>Disincentives (loss of insurance availability, denial of insurance coverage (Section 1316), denial of disaster assistance, etc.)</p>	<p>Community Assistance Contacts (CACs) and Community Assistance Visits (CAVs), meetings</p> <p>Community Rating System procedures</p> <p>Community Information System (and data contained therein)</p> <p>Submit-for-Rate Procedure</p> <p>Complaints from citizens and others</p>	<p>Technical Assistance</p> <p>CRS Retrograde</p> <p>Require Correction of Program Deficiencies (performed by community)</p> <p>Require Remediation of Violations (performed by community)</p> <p>Section 1316 Declaration — for individual structure violations (declaration by community; insurance denied by FEMA)</p> <p>Legal action against owner of individual structure (only by community or State)</p> <p>Probation</p> <p>Suspension</p>

In sum, FEMA's role is limited to setting the minimum criteria and then providing monitoring, oversight, and provision of technical assistance to ensure that communities are complying with the NFIP program requirements.

Monitor Community Compliance with NFIP via Community Assistance Visits (CAVs) / Community Assistance Contacts (CACs)

Once FEMA provides a community with the flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain management ordinance that meets or exceeds the minimum NFIP requirements. FEMA monitors communities to ensure that they have adopted an ordinance that meets or exceeds the minimum NFIP floodplain management criteria and to ensure that they are effectively enforcing their ordinance. A basic compliance-monitoring tool for FEMA in the NFIP is conducting CACs and CAVs. FEMA conducts Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs) to monitor community floodplain management programs.

The CAC is a telephone call or brief visit to an NFIP community for the purpose of establishing or re-establishing contact to determine if any program-related problems exist and to offer assistance. A CAC includes an overview of the community's floodplain management ordinances, procedures, and enforcement provisions. A CAC can be used (1) to monitor low risk communities (i.e. communities with relatively low development pressure) to determine if technical assistance or additional follow-up is required; (2) as a screening tool for determining whether a community should receive the level of attention of a CAV; (3) as a follow-up to a CAV to ensure compliance issues have been resolved.

A CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program. A CAV typically involves a tour of the floodplain, a meeting with local floodplain management officials, a review of the community's floodplain management ordinances, an examination of the community's floodplain development permit and variance files, and a meeting with the community to discuss any identified deficiencies, offer technical assistance, help address any deficiencies, and identify good floodplain management practices. Following a CAV, the community is given a reasonable amount of time to correct any program deficiencies and remedy any violations identified during the visit. As long as a community is making adequate progress toward correcting program deficiencies and remediating violations, FEMA will not initiate formal probation.

2.1.2 Flood Hazard Mapping

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with States and communities to provide accurate flood hazard and risk data to guide them to mitigation actions. The NFIA requires that FEMA identify flood-prone areas and subdivide them into flood risk zones to provide the data necessary for FEMA to determine the appropriate minimum floodplain management criteria and to rate flood insurance policies. While a variety of flood zones are mapped on FIRMs, the 100-year flood (or 1-percent-annual-chance flood) is the standard used for implementation of the NFIP. Mapping of flood hazards promotes public awareness of the degree of hazard within such areas and provides for the expeditious identification and dissemination of flood hazard information.

Decision to Publish Flood Insurance Rate Maps⁶ and Development of New or Revised Flood Insurance Studies

FEMA is required by statute to revise and update flood hazard maps (a) upon a determination that such revision or updates are necessary or (b) upon request from any State or community if accompanied by technical data sufficient to justify the requested change (42 U.S.C. § 4101(f)). To assess flood hazards in a community, FEMA conducts Flood Insurance Studies (FISs) and publishes FIS reports that describe the flood hazards for the community. FEMA uses the information developed in the FIS to prepare Flood Insurance Rate Maps (FIRMs). FEMA publishes the FIRM for distribution to a wide range of users: private citizens, community officials, insurance agents and brokers, lending institutions, and other Federal agencies. The FIRM is the basis for the floodplain management, insurance, and mapping activities of the NFIP.

Non-Regulatory Products and Features

FEMA provides other data layers and information to facilitate improved flood risk management and communication at the local level. Unlike regulatory flood hazard products (e.g., FIRM, FIS Report, and FIRM Database), non-regulatory products are not intended to be used as the basis for official actions required under the NFIP, such as determining the insurance rate for a property or enforcing minimum building standards for construction in a floodplain. These products work alongside regulatory products to provide additional flood risk information and to support a community's overall floodplain management and hazard mitigation strategies and plans. There are also two key non-regulatory features, the Limit of Moderate Wave Action (LiMWA) and future conditions layers on existing FIRMs. Although these do not exist as separate products because they are placed on the actual FIRM, these are considered non-regulatory features because they

⁶ This covers the first two Flood Hazard Mapping components in Table 2-1.

are not associated with any regulatory requirements under the NFIP (although communities may, and do, choose to regulate based on these non-regulatory features).

LiMWA. Dangerous flood hazards can also exist in coastal areas affected by waves equal to or greater than 1.5 feet in height during the 1-percent-annual-chance flood. FEMA now delineates the LiMWA, which depicts the portion of the SFHA where base flood wave heights are between 1.5 feet and 3 feet, on all new coastal Risk MAP studies to assist communities interested in voluntarily applying V-zone requirements in those areas.

Future Conditions Maps. At the request of the community, FEMA may indicate zones to identify areas of future-conditions flood hazards. See 44 C.F.R. § 64.3. The future conditions flood hazard information is provided for informational purposes only, and it is up to the community to decide whether to use the information to regulate floodplain development.

Map Sequencing

The FEMA Flood Hazard Mapping Program (Risk MAP) is allocated a budget each year by Congress. With that budget, FEMA must meet regulatory requirements; respond to stakeholder correspondence; distribute flood hazard data products; establish and maintain cost and schedule controls; track and monitor performance; support the development of State and local capabilities through the Cooperating Technical Partners program and carry out other core program functions. These core functions utilize a significant portion of the budget.

The remaining funds are allocated to the overall program priorities established by the administration in the President's budget. Since 2009, one of the major budgetary commitments has been to update the maps for 100% of the populated coastline. In recent years, FEMA also has significant commitments to update analyses and maps affected by flood protection systems. The remaining budget is allocated to addressing other needs. Congress often establishes mapping priorities from year to year in appropriations legislation. FEMA must incorporate those priorities in determining how to allocate funding to specific mapping activities.

Risk MAP is addressing mapping needs by watershed. The overall guiding principle for Risk MAP project selection is that watersheds are prioritized for update based on both the level of flood risk and the need for flood hazard data updates. Risk MAP has developed an estimate of flood risk across the country and has tools that allow staff to rank watersheds based on this flood risk estimate. Risk MAP also has a system called the Coordinated Needs Management System (CNMS) for tracking flooding sources for which an updated flood hazard map is needed.

Letters of Map Change

FEMA can also revise or amend maps through a Letter of Map Change (LOMC). There are a number of LOMCs that FEMA issues including the Letter of Map Amendment (LOMA), the Letter of Map Revision (LOMR), and the Letter of Map Revision based on Fill (LOMR-F). A LOMR is FEMA's modification to an effective FIRM based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of an existing regulatory floodway,⁷ the effective BFEs, or the SFHA. A LOMR-F is a revision to the effective FIRM that establishes whether a specific property is located in an SFHA based on the placement of fill. In addition, there are limitations imposed by the scale at which the maps are prepared, which may result in individual properties being inadvertently included in SFHAs. FEMA has developed a process, referred to as a LOMA, to correct these inadvertent inclusions. A LOMA is issued pursuant to an administrative procedure that involves the review of

⁷ The regulatory floodway is the channel that must be kept clear of obstructions to allow passage of the 1-percent-annual-chance flood without causing the water surface elevation to rise beyond a designated height in the SFHA.

technical data submitted by the owner of property who believes the property has incorrectly been included in a designated SFHA. A LOMA establishes whether a specific property, or a specific structure on the property, is or is not located in an SFHA.

NFIP regulations require FEMA to revise and amend maps and FIS reports, as warranted or in response to requests from community officials and individual property owners. In making revisions and amendments, FEMA must adhere to the same engineering standards applied in the preparation of the original FIRMs and FIS reports. Therefore, when requesting changes to FIRMs and FIS reports, community officials and property owners are required to submit adequate supporting data. Those data enable FEMA to review and evaluate the requests and to carry out its responsibility of ensuring that the flood-risk information presented is scientifically and technically correct.

To help FEMA ensure that the maps and reports present information that accurately reflects existing flood risks, the NFIP regulations require that each NFIP community inform FEMA of any physical changes that affect BFEs in the community and, within six months of the date that such data are available, submit data that show the effects of the changes.

Letter of Determination Review

A Letter of Determination Review (LODR) is an option available to a property owner to appeal a lender's flood zone determination. The request can be made to FEMA, at a current cost of \$80, jointly by a lender and borrower within 45 days of the notice to the borrower that the building is located within the SFHA by the lender. The LODR review process enables FEMA to verify whether the building's location was correctly identified on the applicable FIRM. A successful LODR releases the lender from the statutory obligation to require the purchase of flood insurance and identifies the building in a low to moderate flood risk area. However, lenders retain the prerogative to require flood insurance absent the Federal requirement, but as a regulatory safety and soundness measure. This process does not consider the elevation of the structure above the flood level. It considers only the location of the structure relative to the SFHA shown on the effective FIRM.

Conditional Letters of Map Change

Because LOMAs, LOMR-Fs, and LOMRs officially amend or revise the flood maps, they must reflect existing conditions, such as an "as-built" project. However, communities, developers, and property owners may submit requests for proposed projects in floodplain areas to FEMA for review and comment. A Conditional Letter of Map Amendment (CLOMA), Conditional Letter of Map Revision Based on Fill (CLOMR-F), or Conditional Letter of Map Revision (CLOMR) are FEMA's comment on whether the proposed project, if built as proposed, would warrant a map revision. A CLOMA, CLOMR-F, or CLOMR does not constitute a building permit or approval; the authority to approve projects and issue building permits lies with the local community and, in some instances, State agencies.

Because CLOMR and CLOMR-F requests are submitted to FEMA prior to construction, there is an opportunity for the project proponent to identify whether threatened and endangered species may be affected by the potential project. If potential adverse impacts could occur, then the U.S. Fish & Wildlife Service or the National Marine Fisheries Service (collectively "the Services") may require the project proponent to make changes to the proposed activity and/or incorporate mitigation measures.

On October 19, 2015, FEMA released a memorandum providing clarifying guidance on the reviewing and processing of Conditional Letters of Map Revision (CLOMRs) and Conditional Letters of Map Revision based-on Fill (CLOMR-Fs). Specifically, this memorandum clarified a

requestor's responsibilities for documenting Endangered Species Act (ESA) compliance when requesting CLOMRs and CLOMR-Fs.

FEMA requires ESA compliance to be documented for all CLOMR and CLOMR-F applications prior to issuing a comment. The CLOMR/CLOMR-F request will not be processed by FEMA until FEMA receives this documentation. Unless FEMA is directly involved with the project's construction or funding, documentation of ESA compliance should be obtained without FEMA's involvement.

For projects with Federal construction, funding, or permitting, documentation of a "No Effect" determination from the Federal action agency, a "not likely to adversely affect" determination by the Federal action agency with concurrence from the Services, or other approval from the Services is required before FEMA will issue a CLOMR or CLOMR-F.

For non-Federal actions, the CLOMR/CLOMR-F request will be processed by FEMA only after FEMA receives documentation of compliance with the ESA from the requestor. For these projects, the requestor must document that a "take"—meaning to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct—will not occur to threatened and endangered species as a result of the project. If a project has the potential to "take" listed species, an Incidental Take Permit may be submitted with documentation showing that the proposed project is the subject, or is covered by the subject, of the permit.

Data Development and Dissemination

Under the NFIA, as amended, FEMA is required by Congress to identify flood-prone areas and to subdivide them into flood risk zones to promote public awareness of the degree of hazard within such areas and to provide for the expeditious identification and dissemination of flood hazard information (42 U.S.C. § 4101). Typically, data dissemination includes publication of flood hazard data on FEMA's website and distribution of flood hazard data to communities when new data becomes available.

Community Outreach, Training, and General Technical Assistance

FEMA encourages and promotes the NFIP by providing outreach, training, and technical assistance. FEMA provides training through webinars and in person trainings to a wide stakeholder audience. Technical assistance can include phone and other contacts with stakeholders, workshops, webinars, the issuance of procedural guidance, development of technical publications, and responding to inquiries.

Implementing Mapping Standards, Policies, and Regulations

To assure accuracy and consistency nationwide, FEMA has established standards for flood map studies, as well as the associated coordination and documentation activities. FEMA has also established product specifications for FIS reports, maps, and related NFIP products. These standards are provided in FEMA Policy FP 204-078-1: Standards for Flood Risk Analysis and Mapping. The product specifications are published as separate technical reference documents. These documents are available at <http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping>. In addition, FEMA provides supplemental guidance to support implementation of the standards. This guidance is a recommended method to meet the standard. However, acceptable approaches are not limited to this recommended method; mapping partners may use other methods to meet or exceed the standard. FEMA also has a number of regulations establishing its process for identification of flood hazards. See 44 C.F.R. Parts 64, 65, 67, 70, and 72.

Levees Accreditation Process

FEMA does not certify, design, construct, permit, or otherwise approve levees, levee systems, or floodwalls. However, FEMA has criteria that must be met before any levee, levee system, or floodwall can be depicted on a FIRM as providing risk reduction from the 1-percent-annual-chance flood, also referred to as the base flood. These criteria may be found in 44 C.F.R. § 65.10. To be depicted on a FIRM as providing risk reduction from the base flood, or accredited, the community or other party must provide FEMA with specific data certified by a registered engineer or a Federal agency with responsibility for levee design demonstrating the levee, levee system, or floodwall provides protection from the base flood. FEMA's review of this data is "for the sole purpose of establish[ing] appropriate risk-zone determinations for NFIP maps" and does not "constitute a determination or warranty by FEMA as to how a structure or system will perform in a flood event." FEMA only recognizes a levee, levee system, or floodwall that meets, and continues to meet, the minimum design, operation, and maintenance criteria established in 44 C.F.R. § 65.10. These requirements must be satisfied before such a structure may be accredited and then mapped as providing risk reduction from the 1-percent-annual-chance flood event, typically through the LOMR process (44 C.F.R. § 65.10; 44 C.F.R. § 65.2).

AR Zone Determinations

Participating communities, as well as Federal and State agencies, may restore the flood protection and risk reduction capability of existing levee systems to reduce flood risks in a particular community or particular area of a State. When such projects involve restoration of a levee system that meets the criteria in 44 C.F.R. § 65.14, a community may choose to submit the appropriate data and documentation to FEMA and request that FEMA make a "flood protection restoration" determination.

Zone AR is a flood insurance risk zone designation that may be used by FEMA to identify flood risk on a FIRM in areas where a flood protection system (i.e., levee system) previously credited with providing protection against the 1-percent-annual-chance or greater level of flood protection no longer provides that level of protection (42 U.S.C. § 4014(f)).

A community may be eligible for the Zone AR designation if the community is engaged in the process of restoring a flood protection system that was:

- Recognized as providing 1-percent-annual-chance flood protection on the effective FIRM; and
- Decertified by a Federal agency responsible for flood protection design or construction (44 C.F.R. § 65.14).

If the community meets these requirements and FEMA makes a "flood protection restoration" determination, FEMA is statutorily required to change the zone designation of the levee-impacted areas by updating the FIRM panels, typically by issuing a LOMR, to Zone AR and apply the flood insurance premium rates applicable to Zone AR. However, the mandatory flood insurance purchase requirement is still in effect for areas receiving the zone designation change, and the floodplain management criteria still apply to these areas. (44 C.F.R. § 60.3(f))

Zone A99 Determinations

Federal and State agencies, and communities, may design and build new levee systems, or they may restore the flood risk-reduction capability of existing levee systems, to reduce flood risks in a particular community or particular area of a State. When certain milestones are met, a community may choose to submit the appropriate data and documentation to FEMA and request an "adequate progress" determination. To establish eligibility for an "adequate progress" determination, the community must show that:

- 100 percent of the total financial project cost of the completed flood protection system has been authorized;
- At least 50 percent of the total financial project cost of the completed flood protection system has been expended;
- At least 60 percent of the total financial project cost of the completed flood protection system has been appropriated;
- All critical features of the flood protection system, as identified by FEMA, are under construction, and each critical feature is 50 percent completed as measured by the actual expenditure of the estimated construction budget funds; and
- The community has not been responsible for any delay in the completion of the system (42 U.S.C. § 4014(e); 44 C.F.R. § 61.12).

If the community meets the above criteria and FEMA makes an adequate progress determination, FEMA is statutorily required to change the zone designation to Zone A99 for the levee-impacted area by updating the FIRM panels, typically by issuing a LOMR, and apply the flood insurance premium rates that would be applicable when the project is completed (42 U.S.C. §4014(e)). However, the mandatory flood insurance purchase requirement is still in effect for areas receiving the designation change, and the floodplain management criteria still apply to these areas (44 C.F.R. § 60.3(f)).

2.1.3 Flood Insurance

Since its enactment in 1968, the NFIA has made flood insurance available to property owners or lessees in communities that participate in the NFIP. Through the NFIP, property owners in participating communities are able to insure their property against future flood losses. The risk zones shown on the FIRMs are the basis for the establishment of premium rates for flood coverage offered through the NFIP.

Congress recognized that insurance for "existing buildings" constructed before a community joined the NFIP could be expensive if the premiums were not subsidized by the Federal government. Congress also recognized that most of these older flood-prone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. Under the NFIP, "existing buildings" are generally referred to as Pre-FIRM flood insurance buildings. These buildings were built before the flood risk was known and identified on the community's FIRM.

As originally established, the NFIA authorized FEMA to provide subsidized flood insurance only for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings." This means that flood insurance for new development has never been subsidized by the NFIP (subject to the very limited, short-term exceptions established in 42 U.S.C. § 4014(e)-(f)).

However, subject to the very limited, short term statutory exceptions referenced above, FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later (generally referred to as post-FIRM buildings) (42 U.S.C. §§ 4014(a)(1), 4015(b)).

As discussed in the Program Changes section below, with the passage of the Biggert Waters Reform Act of 2012 (Biggert Waters) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA),

FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25 percent premium rate increases per year, and the rest will be phased out at a rate of 5-15 percent premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to certain limited, short term statutory exceptions). As such, the premium rates on NFIP policies will be comparable to the premium rates offered on the private flood insurance market.

The following are aspects of administering the provision of flood insurance.

Administer Write-Your-Own (WYO) Program

FEMA's Write-Your-Own (WYO) Program allows participating property and casualty insurance companies to write and service NFIP flood insurance policies in their own names. The WYO Program began in 1983 and is a cooperative undertaking of the insurance industry and FEMA. The WYO insurers retain an expense allowance (which includes agents' commissions) and remit the remaining premium to the Federal government. The WYO insurers pay flood losses and loss adjustment expenses based on a fee schedule. Both are paid through the regulated access of Federal funds; the WYO companies do not pay flood losses or loss adjustment expenses out of their own funds. In addition, under certain circumstances, reimbursement for litigation costs, including court costs, attorney fees, judgments, and settlements, are paid by FEMA based on documentation submitted by the WYO insurers.

Develop & Publish Flood Insurance Rate Tables

The development of insurance rate tables is based on insurance risk calculations and the predicted damage to a specific building type in a specific hazard area. The type and elevation of a building, along with the hazard zone that the building is located in, will determine the flood insurance premium rate. The publication of insurance premium rate tables is an administrative action that involves publishing updated premium rate tables.

Insurance Policy Management

FEMA, or the WYO companies on FEMA's behalf, issue, sell, renew, process refunds, and process appeals for NFIP flood insurance policies. Policies are rated based on the published insurance premium rate tables for specific building types and flood hazard areas. Flood insurance is available to all property owners and lessees in communities that participate in the NFIP. Flood insurance is typically provided once construction has been completed on an insurable structure.

Educate Insurance Agents/Educate and Certify Claims Adjusters

Property owners and lessees in NFIP participating communities typically acquire flood insurance through local insurance agents, who service the flood insurance policy. If there is a loss on the policy, a claims adjuster, typically an independent contractor will adjust the claim. FEMA provides education to insurance agents and claims adjusters on topics related to selling, issuing, renewing, processing premium refunds for, and adjusting the claims of NFIP flood insurance policies, as well as other flood insurance-related topics.

Adjust Loss / Pay Valid Claims

When a loss is reported, FEMA and the WYO companies, based on the recommendations of the claims adjusters, must determine the amount of damage to the buildings and/or contents, whether or not the damage was caused by flooding, and the appropriate payout under the insurance policy.

Provide General Technical Assistance

FEMA provides general technical assistance on insurance related topics as needed to agents, WYO companies, adjusters, policyholders and other stakeholders. This technical assistance can include bulletins, guidance, webinars and responding to inquiries.

Marketing

FEMA has a public marketing campaign through FloodSmart to educate the public on the risk of flooding and the availability of flood insurance through the NFIP. Information about the campaign can be found at <http://www.floodsmart.gov>.

2.2 Proposed Action (Part 2): Program Changes to the National Flood Insurance Program

The second component of the Proposed Action is the proposed program changes to the current implementation of the NFIP. Some of these proposed changes are the result of recent legislation amending the National Flood Insurance Act. FEMA developed other program changes to comply with the requirements of Section 7 of the ESA.

Notably, although all the changes related to the recent legislation are discussed together for the sake of consistency, some of these changes have already been implemented and, as such, would be considered part of the current program for the purposes of this evaluation, and not proposed changes to the current program. Such changes are indicated with an explanatory footnote.

2.2.1 Program Changes Resulting from Recent Legislation

On July 6, 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act of 2012 (Biggert Waters) (P. Law 112-141). This Act requires FEMA to make a number of changes to the administration of the NFIP. Key provisions of the legislation include the requirement to phase out subsidies for certain pre-FIRM properties, the establishment of a Reserve Fund, and the creation of the Technical Mapping Advisory Council (TMAC) to develop recommendations for FEMA's flood hazard mapping program.

Some of the required changes will result in premium rate increases for all policyholders. To assess the impacts of these rate increases, Biggert Waters also requires FEMA and the National Academy of Sciences to complete an affordability study (as stipulated within Biggert Waters). Additionally, Biggert Waters requires FEMA to establish an option for non-escrowed policyholders (i.e., for the most part, policyholders not subject to the mandatory purchase requirements) to pay flood insurance premiums through a monthly installment plan. This may help alleviate the affordability concerns of policyholders who voluntarily choose to purchase flood insurance.

Key provisions of the Biggert Waters legislation include the requirement to phase out subsidies for certain pre-FIRM properties. The pre-FIRM properties for which subsidies will be phased out include non-primary residences, business properties, severe repetitive loss properties, substantially damaged properties, substantially improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property. As of 2013, FEMA began phasing in full risk rates for pre-FIRM non-primary residences, severe repetitive loss properties (1-4 residences), and properties where the cumulative claims payments exceed the fair market value of the property. Biggert Waters mandates that the premium rates on these properties be increased by 25 percent each year until full risk rates are achieved. Biggert Waters also mandates the immediate removal of subsidies for pre-FIRM properties when a lapsed policy is renewed, but only if that policy lapsed as a result of the deliberate choice of the policyholder.

Biggert Waters also established a Reserve Fund, which is an account that would be established separate from other program funds and would be "available for meeting the expected future obligations of the flood insurance program..." FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment is primarily designed to build reserves to help meet expected future obligations in higher than average loss

years. However, the funds can also be used to pay interest or principal on the current large amount of Program borrowing. Introduced in October 2013 as a 5 percent assessment, the Reserve Fund Assessment is currently a 15 percent assessment on most policies (10 percent assessment on Preferred Risk Policies). That percentage is expected to increase until the annual collections from the Reserve Fund Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually.⁸

On March 21, 2014, President Obama signed into law the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA) (P. Law 113-89). HFIAA removed some of the provisions, not included in the above discussion on Biggert-Waters, requiring the phase out of subsidies on pre-FIRM properties. Additionally, HFIAA amended the Biggert Waters provision requiring application of full risk rates to policies renewed after a lapse to exclude policies that lapsed because the policyholder was no longer required to maintain flood insurance. However, HFIAA also required a phase out of subsidies on all pre-FIRM properties (not otherwise addressed by the Biggert Waters premium rate increase provisions) at a rate of no less than 5 percent, and no more than 15 percent, premium rate increases per year, with no individual policy exceeding an 18 percent premium rate increase. Accordingly, the subsidies on pre-FIRM properties will likely be phased out within the next 10 to 20 years.

Under HFIAA, other changes to the NFIP include a new surcharge for all new and renewed policies to offset the subsidized policies and achieve the financial sustainability goals of Biggert Waters (a \$25 surcharge on all primary residence policies and a \$250 surcharge on all other policies). Implementation of the new surcharge begins in 2015 on all policies. To provide policyholders with an option for reducing policy premiums, HFIAA raises the maximum 1-4 family residential deductible limits from \$5,000 to \$10,000. In addition, HFIAA requires FEMA to utilize the results of the Biggert Waters affordability study (the scope of which was expanded by HFIAA) to establish an affordability framework to address the affordability issues that have arisen since the passage of Biggert Waters and the associated premium rate increases.⁹

Additionally, HFIAA requires FEMA to set the premium rates for certain properties newly mapped into the SFHA at the same rate as Preferred Risk Policies, after which full risk rates will be phased in. This was also intended as a measure to alleviate affordability concerns by allowing for the phase-in of full risk rates for these policyholders.¹⁰

2.2.2 Program Changes to Comply with the Endangered Species Act

As explained in detail throughout this evaluation, private floodplain development is not an action under the NFIP. FEMA does not fund, authorize, or carry out private floodplain development through the NFIP. Similarly, the NFIP does not cause private floodplain development to occur, nor does it control the rate or quantity of development or the effects of those development activities may have on ESA-listed species or designated critical habitat. As discussed in Section 3.6, available research and studies suggest that the NFIP is not a significant factor in the determination of whether or not to develop in the floodplain. Nevertheless, some perceive that

⁸ Because this provision has already been fully implemented, FEMA considers this as part of the current program for the purposes of this evaluation, not as a proposed change.

⁹ Because this provision has already been fully implemented, FEMA considers this as part of the current program for the purposes of this evaluation, not as a proposed change.

¹⁰ Because this provision has already been fully implemented, FEMA considers this as part of the current program for the purposes of this evaluation, not as a proposed change.

certain actions taken under the NFIP –specifically the issuance of certain Letters of Map Change (LOMC), mapping a levee system as meeting the requirements for accreditation, or designating a levee system in an AR or A99 Zone –encourage some development in the floodplain.

LOMCs

The specific LOMCs of interest are Letters of Map Revision (LOMRs) and Letters of Map Revision Based on Fill (LOMR-Fs). A Letter of Map Revision (LOMR) is FEMA's modification to an effective Flood Insurance Rate Map (FIRM). LOMRs are generally issued to update hydrologic or hydraulic characteristics of a flooding source that result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). While many of these revisions are based on the completion of a physical project that would impact the hydrologic or hydraulic characteristics of a flooding source, not all LOMRs are based on physical projects. Updated technical data, such as topography or alternative models and analyses, may impact the Floodway, SFHA, or BFEs without the completion of a physical project.

A LOMR-F is when a property is located or will be located in an SFHA, property owners or project proponents choose to elevate the grade of the land on their properties through the placement of fill in order to elevate the grade of the land above the projected 1-percent-annual-chance flood elevation (also known as the BFE). This would elevate the land outside the SFHA and, thus, out of the area of flood hazard. This is an effective method of reducing the risk of flood damage to property and protecting against loss of life in the event of a flood. In fact, it is so effective that some States choose to prescribe this as the only method of elevating structures. Once a property is elevated above the SFHA, it is eligible to be identified as outside of the SFHA through the issuance of a LOMR-F.

Once a property is shown or determined to be out of the SFHA, whether through the issuance of a LOMR or LOMR-F, there are other perceived benefits to the property owner beyond flood risk reduction. The first benefit is that the property owner is no longer subject to the mandatory purchase requirement of 42 USC 4012a, which applies only to structures located in the SFHA. The second benefit is that the property is no longer subject to the minimum floodplain management regulations, which apply only to properties located in the SFHA. However, it is important to note that communities can, and do, regulate floodplain management outside the context of the NFIP, and they also frequently place floodplain management requirements on individuals within the community that go beyond the minimum floodplain management requirements of the NFIP.

Because these benefits extend beyond flood risk reduction, some perceive that the NFIP encourages the placement of fill for the purpose of having the property removed from the SFHA and the requirements attendant to properties in the SFHA. Such floodplain development might trigger ESA compliance requirements if it caused adverse impacts to ESA-listed species and designated critical habitat in violation of the ESA. Notably, there are no studies that support the causal relationship between FEMA's issuance of LOMR-Fs and increased incidence of the placement of fill—other than one study based on the perceptions of a very small study sample of certain NFIP stakeholders. (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006)

Mapping a Levee System as Accredited

As discussed above, FEMA does not certify, design, construct, permit, or otherwise approve levees, levee systems, or floodwalls. However, FEMA has regulatory requirements (44 C.F.R. § 65.10) that must be met before any levee, levee system, or floodwall can be depicted on a FIRM as reducing the risk of the 1-percent-annual-chance flood, also referred to as the base flood. While there are no immediate consequences to the determination that a levee system meets levee

accreditation requirements described in 44 C.F.R. § 65.10, generally the issuance of a LOMR will revise the flood hazards shown on the effective FIRM, as appropriate, to identify the area landward of the levee as outside the SFHA. In addition to the reduction of flood risk to these properties provided by the levee system, the property owners would incur the same perceived benefits associated with removal of the SFHA designation described above (e.g., removal from mandatory purchase requirement and applicability of FEMA's minimum floodplain management requirements).

AR/A99 Zone Determinations

As discussed above, participating communities, as well as Federal and State agencies, may restore the risk reduction capability of existing levee systems to reduce flood risks in a particular community or particular area of a State. Zone AR is a flood insurance risk zone designation given to previously accredited levee systems that have been decertified, but are determined to be in the process of being restored to provide risk reduction to the 1-percent-annual-chance or greater flood (42 U.S.C. § 4014(f)). If the community meets the requirements of 44 C.F.R. § 65.14 and FEMA makes a "flood protection restoration" determination, FEMA is statutorily required to change the zone designation of the levee-impacted areas to Zone AR by updating the FIRM panels, typically by issuing a LOMR, and apply the flood insurance premium rates applicable to Zone AR.

Likewise, Federal and State agencies, and communities, may design and build new levee systems, or they may restore the flood risk-reduction capability of existing levee systems, to reduce flood risks in a particular community or particular area of a State. Zone A99 is a flood insurance risk zone designation that may be used by FEMA in areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately have this risk reduced upon completion of an under-construction levee system. If the community meets the criteria established in 44 C.F.R. § 60.3(f) and FEMA makes an adequate progress determination, FEMA is statutorily required to change the zone designation to Zone A99 for the levee-impacted area by updating the FIRM panels, typically by issuing a LOMR, and apply the flood insurance premium rates that would be applicable when the project is completed (42 U.S.C. §4014(e)).

However, although an AR or A99 zone determination could result in lower flood insurance rates, the mandatory flood insurance purchase requirement is still in effect for areas receiving these zone designation changes, and the floodplain management criteria still apply to these areas.

Description of Proposed Changes

The issuance of LOMRs and LOMR-Fs is a non-discretionary action for which FEMA has no obligation to consult. Nevertheless, to the extent that the issuance of certain letters of map change are perceived to offer some encouragement to develop in the floodplain, FEMA proposes to take measures within its discretion to demonstrate that its actions in issuing LOMRs and LOMR-Fs are ESA-compliant. FEMA is not responsible for private floodplain development, or for ensuring that such development is compliant with the ESA. FEMA does require written assurance of compliance with appropriate sections of 44 C.F.R. § 60.3 be provided by the participating community prior to processing a LOMR or a LOMR-F request.

Currently, FEMA's minimum floodplain management criteria at 44 C.F.R. § 60.3(a)(2) requires communities to, for all floodplain development permits, "review [the] proposed development to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law..." FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, the community must obtain and maintain documentation of compliance with the ESA for the proposed floodplain development. Furthermore, FEMA will require the community, or the project proponent on the

community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought is ESA-compliant, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). As discussed above, FEMA has always required compliance with the ESA as a condition of the community's issuance of a floodplain development permit. This proposed clarification would simply add a documentation requirement that would assist FEMA and the NFIP-participating communities in documenting this compliance. Notably, the LOMC documentation requirement would also cover LOMCs associated with the mapping of levee accreditations, as well as AR zone and A99 zone determinations.

2.2.3 Summary of Proposed Program Changes

Modifications to the NFIP include:

- 1) Changes to Floodplain Management:
 - a) Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal and state laws, including the ESA, as a condition of issuing floodplain development permits.
- 2) Changes to Flood Hazard Mapping:
 - a) Clarify that certain letter of map change requests will not be processed until the community or project proponent has submitted documentation of compliance with the ESA.
- 3) Changes to Flood Insurance:
 - a) Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium rate increases per year.*¹¹
 - b) Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.*
 - c) Development of a monthly installment plan payment option for non-escrowed flood insurance premiums.*

2.2.4 Discretion

The actions and program elements comprising the NFIP are a mix of direct mandates (providing little or no flexibility in implementation) and discretionary actions. Federal agencies are only required to consult under Section 7(a)(2) if there is discretionary involvement or control. "[W]here the Federal agency lacks the discretion to influence the private action, consultation would be a meaningless exercise; the agency simply does not possess the ability to implement measures that inure to the benefit [of] the protected species" (50 C.F.R. § 402.03). Accordingly, per the requirements of the Services' ESA-implementing regulations, Section 7 consultations typically focus on the actions where a Federal agency has discretionary control over implementation of the action. In *National Wildlife Federation v. FEMA*, the court held that the provision of flood insurance

¹¹ An asterisk (*) indicates that the proposed action is legislatively required.

is a non-discretionary action for which "FEMA has no obligation to consult" (National Wildlife Federation v. Federal Emergency Management Agency, 2004) (emphasis added).

However, in technical assistance meetings held prior to the initiation of this evaluation, the Services have advised FEMA that in practice, it looks at the effects of both discretionary and non-discretionary actions when assessing the effects of a program on ESA-listed species and designated critical habitat. The Services further advised FEMA that they would consider any BE that only analyzed discretionary NFIP actions to be deficient. As such, FEMA has consented to assess the effects of all aspects of the program. However, in order to ensure that any recommended program changes are limited to areas in which FEMA has discretion to make changes for the purposes of ESA compliance, FEMA has identified which actions are discretionary and which actions are non-discretionary. Table 2-2 indicates where FEMA has discretion (where FEMA has the authority to make a decision) or no discretion (actions that are mandated by statute). The NFIP Program Description, which is included at Appendix A, provides a more detailed description of the Program and the elements and components of the NFIP.

Nevertheless, even where a component action has been identified as discretionary, this is not an indication that the action is completely discretionary. For example, the establishment of the floodplain management criteria is identified as discretionary, but the general authority to develop these criteria is not unfettered. Rather, it is limited by the language of the statute in several significant ways. Among other limitations, the minimum floodplain management criteria must be (a) necessary to achieve the purposes laid out in 42 U.S.C. § 4102, (b) feasible, and (c) practicable. They must also be developed based on studies and investigations carried out by FEMA (42 U.S.C. § 4102; 42 U.S.C. § 4001(e)(2)). Similarly, Congress's direction to FEMA to map flood hazards is also not unrestricted. Because FEMA flood maps may be challenged on the basis of scientific or technical correctness, FEMA must use the best available science and data in support of its maps regardless of the impacts of doing so (e.g., a reduction in the size of the SFHA). While this distinction does not affect FEMA's analysis of the effects of the Proposed Action in this document, it did inform FEMA's decision-making process in identifying the proposed program changes discussed in this section.

2.2.5 Summary of Proposed Action

The Proposed Action evaluated in this BE is the implementation of the NFIP in the United States as modified by recent legislation and proposed program changes to comply with ESA requirements. The three elements of the Proposed Action on which FEMA is conducting an assessment of effects are Floodplain Management, Flood Hazard Mapping, and Flood Insurance. Table 2-2 identifies the NFIP elements and the individual components under each element for which FEMA will be making effects determinations. Table 2-2 also indicates the proposed changes to the component actions of the NFIP that are included as part of the Proposed Action. FEMA is only assessing the effects of the FEMA actions identified in this table.

Table 2-2: Proposed Action

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
	Implementing Minimum Floodplain Management Criteria	Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal and State laws, including the	Discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
Floodplain Management		ESA, as a condition of issuing floodplain development permits.		
	Enroll Communities in the NFIP	No change	No discretion	NE
	Monitor Communities' Compliance with NFIP via Community Assistance Visits (CAVs)/Community Assistance Contacts (CACs)	No change	Discretion	NE
	Enforcement (e.g., probation, suspension, Community Rating System (CRS) retrogrades)	No change	Discretion	NE
	Administer the Map Adoption Process	No change	No discretion	NE
	Administer CRS (includes awarding points for CRS Class ratings)	No change	Discretion	NE
	CRS Activity Changes / Updates	No change	Discretion	NE
Floodplain Management	Training / General Technical Assistance on Minimum Floodplain Management Criteria	No change	Discretion	NE
	Removal of Insurance Eligibility (pursuant to Section 1316)	No change	No discretion	NE
Flood Hazard Mapping	Decision to publish Flood Insurance Rate Maps (FIRMs)— decision on level of study performed	No change	Discretion	NE
	Development of New or Revised Flood Insurance Studies (FIS) and SFHA Maps – making an FIS, engineering analysis	No change	No discretion	NE
	Non-regulatory Products and Features	No change	Discretion	NE
	Map Sequencing	No change	Discretion	NE
	Letter of Map Amendment (LOMA) and Letter of Determination Review (LODR)	No change	No discretion	NE
	Letter of Map Revision (LOMR) and Letter of Map Revision Based on Fill (LOMR-F)	Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted documentation of compliance with the ESA.	No discretion	NE
	Conditional Letter of Map Revision (CLOMR)	No change	Discretion	NE
	Conditional Letter of Map Revision Based on Fill (CLOMR-F)	No change	Discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
	Conditional Letter of Map Amendment (CLOMA)	No change	Discretion	NE
	Data Development and Dissemination	No change	Discretion	NE
	Community Outreach, Training, and General Technical Assistance	No change	Discretion	NE
	Implementing Mapping Standards, Policies, and Regulations	No change	Discretion	NE
	Levee Accreditation Process	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE
	AR Zone-A99 Determinations	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE
Flood Insurance	Administering the Provision of Flood Insurance	No change	No discretion	NE
	Administer Write Your Own (WYO) Programs	No change	No discretion	NE
Flood Insurance	Develop and Publish Insurance Rate Tables	<ul style="list-style-type: none"> Subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) would be phased out at a rate of 25% premium rate increases per year.¹ Subsidies on all other pre-FIRM properties would be phased out through annual premium rate increases of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.¹ 	No discretion	NE
	Insurance Policy Management (Issue / Sell / Renew / Refund / Appeal)	A monthly installment plan payment option for non-escrowed flood insurance premiums would be developed. ¹	No discretion	NE
	Educate Insurance Agents	No change	Discretion	NE
	Educate and Certify Claims Adjusters	No change	Discretion	NE
	Adjust Loss Claims	No change	No discretion	NE
	Pay Valid Claims	No change	No discretion	NE
	Provide General Technical Assistance	No change	Discretion	NE
	Marketing	No change	Discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
NE	No effect			
1	Modifications required by statute			

Case Example: National Association of Home Builders v USACE

In the case of *National Association of Home Builders v. United States Army Corp of Engineers*, a Federal court held that FEMA has no role in the approval or denial of floodplain development permits (453 F.Supp.2d 116). In that case, Plaintiffs challenged a rule published by USACE and known as General Condition (GC) 26. Among other legal challenges to GC 26, Plaintiffs argued that because GC 26 required compliance with the NFIP floodplain management regulations, it gave FEMA an improper veto authority over permits issued by USACE. The court found that FEMA has no authority to halt local floodplain development conducted pursuant to a Clean Water Act permit because of the permittee's alleged non-compliance with FEMA's minimum floodplain management regulations. The court further held that GC 26 did not change this by providing FEMA with a "veto power" over projects.

2.2.6 Actions Outside the Scope of the Proposed Action

Floodplain development is not an action under the NFIP. Section 7 applies to actions that are authorized, funded, or carried out by a Federal agency. Floodplain development is not authorized, funded, or carried out by FEMA (except with respect to certain grant programs outside the scope of this evaluation). FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain or to control the rate or quantity of development. As discussed above, the NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. The community regulates floodplain development through locally issued floodplain development permits. The community has the authority to issue or deny floodplain development permits. Likewise, the community monitors compliance and enforcement of individual permits. Therefore, the issuance, denial, and enforcement of individual permits are also outside the scope of FEMA's evaluation as these are not actions taken under the NFIP.

FEMA has no compliance responsibilities under the ESA with respect to private floodplain development. Figure 2.1 above shows FEMA's actions, as distinguished from the actions of the participating communities, and the role each plays in the process. FEMA is only consulting on those actions identified as FEMA's actions in Table 2-2 above.

This is consistent with interpretations taken with respect to other applicable Federal laws. For example, Executive Order 11988, Floodplain Management, states that "[e]ach agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities." However, Executive Order 11988, the language of which is very similar to that utilized in the ESA with respect to applicability, has never been held to apply to private floodplain development merely because it was permitted by a community participating in the NFIP. Nor has Executive Order 11988 ever been held to apply to FEMA's establishment of the minimum floodplain management criteria. For the Executive Order to apply, the Federal government must

be the entity taking the action, such as when a Federal agency funds floodplain development through a grant.

Executive Order 13690 amended Executive Order 11988 and established a Federal Flood Risk Management Standard (FFRMS). As with the Executive Order it amends, Executive Order 13690 has been determined not to apply to FEMA's establishment of the minimum criteria or private floodplain development. FEMA recently issued guidance advising the public that the FFRMS does not apply to the "the minimum floodplain management criteria in 44 C.F.R. Part 60 that communities must adopt in order to participate in the NFIP...." (Federal Emergency Management Agency, 2015).

Case Example: Northern California River Watch v Wilcox

In *Northern California River Watch v. Wilcox*, 633 F.3d 766 (9th Cir. 2009), the court considered the meaning of the term "areas under Federal jurisdiction" as used in Section 9 of the ESA. Plaintiff River Watch argued that the term encompasses privately owned wetlands adjacent to navigable waters that have been designated as "waters of the United States" by the U.S. Army Corps of Engineers (USACE), and are, as such, subject to USACE's regulatory jurisdiction. USFWS, as amicus curiae, argued that Section 9 is ambiguous, and that the court must apply the deference principles set forth in *Chevron*, 467 U.S. 83, and that under *Chevron*, the privately-owned land at issue in this case is not an "area[] under Federal jurisdiction." *Id.* The court held:

While we recognize that "areas under Federal jurisdiction" or "federal lands" surely includes areas under the control of the federal government, i.e. through ownership, leasehold-estates, or conservation easements, **we do not interpret "areas under Federal jurisdiction" to encompass wetlands that are adjacent to navigable waters and therefore subject to only the regulatory jurisdiction of the Corps.**

Id. at 782 (emphasis added). Accordingly, the court held that the requirements of the ESA applicable to USACE do not extend to private land and private parties based on the fact that they are subject to USACE's regulatory jurisdiction.

FEMA's assertions regarding the scope and limits of its Proposed Action are also consistent with judicial interpretations of other provisions of the ESA with similar language to that found in Section 7 of the ESA.

Federal courts have been unwilling to extend the requirements of the ESA applicable to Federal agencies to private land and private parties based on the fact that they are subject to the regulatory jurisdiction of a Federal agency.

Additionally, private floodplain development is not an interrelated or interdependent action. The ESA implementing regulations define interdependent actions as those actions having no independent utility apart from the action under consideration (50 C.F.R. § 402.02). Floodplain development clearly has an independent utility apart from the NFIP, as it existed hundreds of years prior to the implementation of the NFIP, and it would continue to exist even if the NFIP no longer did.

The ESA implementing regulations define interrelated actions as actions that are part of a larger action and depend on the larger action for their justification (50 C.F.R. § 402.02). Private floodplain development is not part of the larger action of implementing the NFIP, and it does not depend on the implementation of the NFIP for its justification. As stated above, floodplain development pre-dated the NFIP, and it continues unabated even in those communities that do not participate in the NFIP. Accordingly, FEMA has no responsibility to consult on private floodplain development as an interrelated and interdependent action.

2.2.7 Action Area

The ESA defines the Action Area as "all areas to be affected directly and indirectly by the Federal action and not merely the immediate area involved in the action" (50 C.F.R. § 402.02). The extent of the Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, but only including those areas in the United States and its territories designated as SFHAs on a FIRM under the NFIP and nearshore marine waters¹² that may be affected by the Proposed Action.¹³

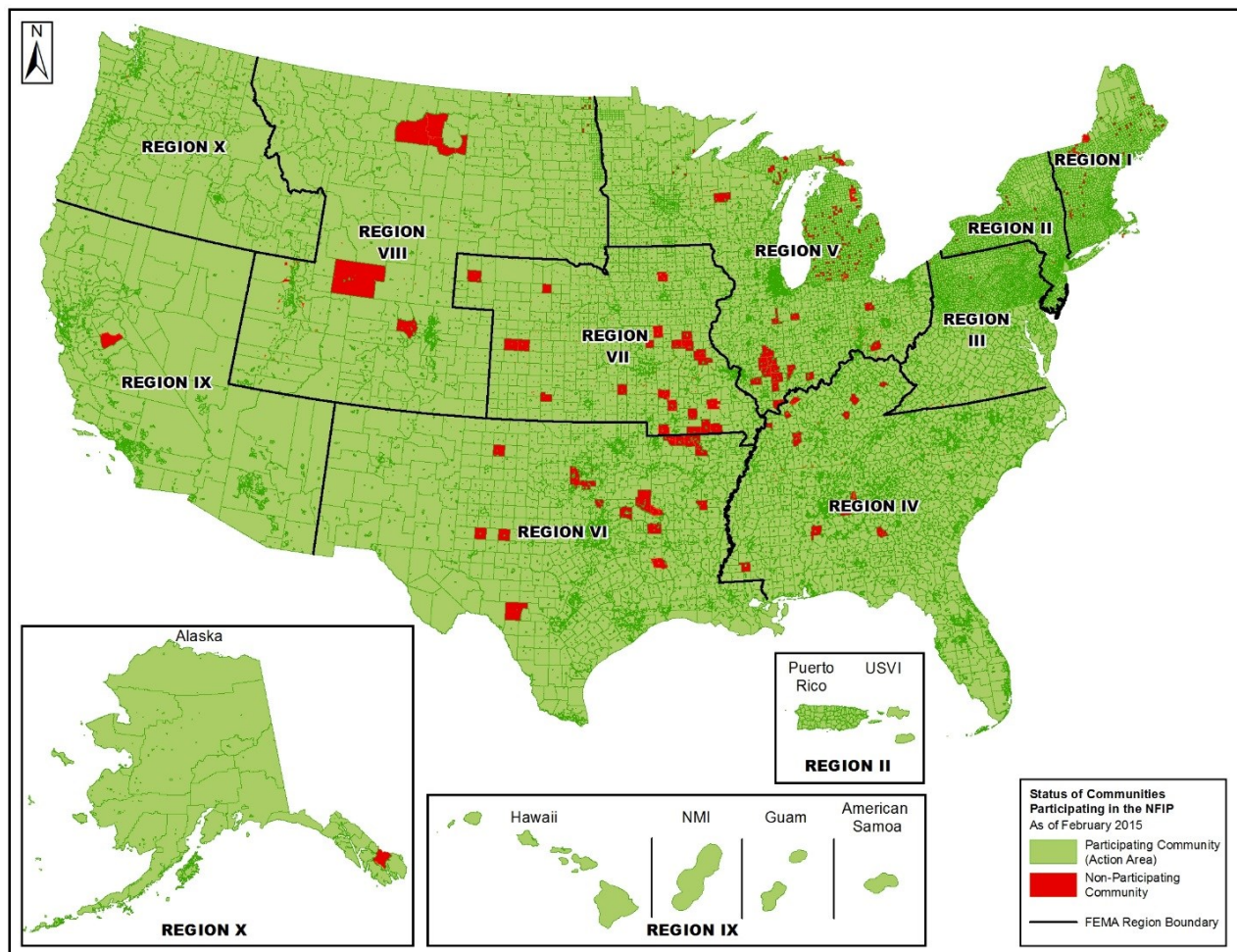
However, it should be noted that while some elements of the Proposed Action may take place anywhere within a participating community, such as the provision of flood insurance, some actions only take place within the FEMA-mapped SFHA, such as the implementation of the minimum floodplain management criteria. The SFHA is defined as "the land within the floodplain subject to a 1 percent or greater chance of flooding in any given year," often referred to as the 100-year floodplain (44 C.F.R. § 59.1). Participating communities are only required to enforce the minimum floodplain management criteria within the FEMA mapped SFHA (Federal Emergency Management Agency, 2014b). Even for actions that occur both inside and outside the SFHA, the potential effects can be quite different.

Over 22,000 communities in the United States participate in the NFIP; the Action Area of the BE is depicted in Figure 2-1. The land area covered by the floodwaters of the base flood is the SFHA on NFIP FIRMs. The SFHA is the area where the NFIP's floodplain management regulations must be enforced (Federal Emergency Management Agency, 2014b).

¹² Nearshore marine waters are defined here as waters within a few hundred feet of the shoreline.

¹³ This does not include Federal lands or properties subject to Section 1316 of the NFIA.

Figure 2-1. NFIP Participating Communities (Action Area) in the United States



3 OVERVIEW OF FLOODPLAIN BASELINE CONDITIONS

This section describes existing conditions relevant to this BE and provides: (1) an overview of floodplain functions, types, and benefits; (2) a discussion of floodplain baseline conditions and how development in the floodplain affects natural and biological resources; (3) a description of habitats that are typically associated with SFHAs; (4) Federal, State, and local regulatory programs that interact with the NFIP; (5) major factors that influence floodplain development; and (6) a discussion of whether, and how, the NFIP influences floodplain development.

3.1 Overview of Floodplains

3.1.1 Floodplain Functions

A floodplain is any land area susceptible to being inundated by water from any source. Floodplains are hydrologically important, environmentally sensitive, and ecologically productive areas within a watershed that perform many functions. FEMA describes flooding as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from: (1) overflow of inland or tidal waters; (2) unusual and rapid accumulation or runoff of surface waters from any source; (3) mudflow; or (4) collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above (Federal Emergency Management Agency, 2014a).

Flooding is a natural phenomenon of rivers and coastal environments, and is extremely important to the maintenance of floodplain ecosystems and channel stability. Floodplain environments are dynamic in nature and, given their proximity to water and the presence of fertile soils and nutrients, are highly productive biological communities. Floodwaters carry nutrient-rich sediments and trigger chemical processes that cause beneficial changes in the soil, contributing to a fertile environment for vegetation. Floodwaters enhance biodiversity by creating a variety of habitats, including breeding areas for fish and wildlife. In addition, floodplains provide flood storage and conveyance, protection of water quality, and recharge of groundwater functions (Federal Emergency Management Agency, 2002).

3.1.2 Floodplain Types

Floodplains contain a wealth of cultural and natural resources that are of enormous value to society (Federal Emergency Management Agency, 2002). Floodplains are described as riverine or coastal depending on their location. Riverine floodplains include palustrine forested, scrub-shrub, and emergent wetlands. Coastal floodplains include palustrine and estuarine wetlands, barrier islands, rocky intertidal shores, and marshes.

Riverine. Riverine systems vary in steepness, width, flow, sediment deposition, and erosion capacity. This becomes readily apparent in the transitions from narrow headwater streams to lower gradient streams with wider floodplains. The frequency, duration, and extent of flood events will vary among different types of floodplains, dependent on their hydrology, geomorphology, and amount of floodplain development. Floodplains are formed and modified by periodic flooding and the dynamics of stream and river migration and periodic flooding. Riverine floodplains can experience multiple flood events within the same year with durations varying from hours to days. Periodic flooding of riverine systems and the related processes of erosion and deposition determine the shape of the floodplain; depth and composition of soils (e.g., often alluvial organic

soils); type and density of vegetation; presence and extent of wetlands; richness and diversity of wildlife habitats; and depth to groundwater. (Federal Emergency Management Agency, 2002)

The major flood conveyance component of riverine floodplains is the floodway. The NFIP defines the floodway as that area of the watercourse and adjacent floodplain necessary to carry the base flood without increasing the water surface elevation more than a designated amount. The base flood is the flood that has a 1 percent chance of being equaled or exceeded in a given year. Subject to certain exceptions, communities participating in the NFIP may only allow development within the floodway that would not cause an increase in flood heights. This requirement has the effect of limiting development in floodways that in turn helps to maintain some of the floodplain's most important natural resources and functions (Federal Emergency Management Agency, 2002). The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. As described in Section 1.1, the land area covered by the floodwaters of the base flood is the SFHA on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies (Federal Emergency Management Agency, 2014b).

Coastal. Coastal floodplains provide habitat for marine and estuarine organisms, many of which are of significant ecological and economic value. Coastal beaches, dunes, banks, and tidal flats all play roles in protecting the land from destructive coastal storms, such as hurricanes. In coastal systems, aside from major storm events where waves may overrun large areas, inundation follows a largely predictable tidal cycle. The specific characteristics of a coastal floodplain such as geographic location, contributing sediments, and whether the floodplain has been modified or remains relatively pristine, can alter the way storms and resulting floodwaters will impact the area. (Federal Emergency Management Agency, 2002)

The configuration of a coastal floodplain is largely determined by underlying geology, sediment supply, and wind and wave energies. Sedimentary coastal floodplains, such as cobble, sand, and silt beaches, adjust to storm energies during an extreme event and then rapidly readjust to normal patterns. Long term more permanent shoreline changes can result from changes in sediment supply, sea level rise, or changes in predominant wind and wave direction. The classic example of this long term change is the "rolling over" of a barrier island which migrates towards or away from the mainland over geologic time as sea level and sediment supply change. (Federal Emergency Management Agency, 2002)

Coastal floodplains protect and maintain the resources that exist along both the shores and inland, including beaches, barrier islands, rocky intertidal shores, salt marshes, and wetlands. Also included are humans and human elements such as housing and roads. The coast's primary defense against wave energy is shallow near shore ocean bottoms. Energy-intensive storm waves cause beach sediment to move offshore to subtidal areas, resulting in a reduced coastal beach volume and a gentler slope. Coastal dunes on barrier islands constitute the major portion of the total volume of a barrier island that is visible above high water. On retreating shorelines, the coastal dunes bordering the beach migrate landward, either over a gradual period from tidal and wave influences, or very rapidly, as in the event of a major storm. The erosion of coastal dunes by waves, usually during storms, supplies sand to the adjacent coastal beaches or shallow waters. Without this supply of sediment, beaches will gradually be depleted, either migrating or disappearing from the onshore sediment system. The volume and form of coastal dunes provides a buffer that resists wave run-up during storms and retards shoreline retreat. Vegetation contributes to the growth and stability of coastal dunes by providing conditions favorable to sand deposition and stability. (Federal Emergency Management Agency, 2002)

Estuarine wetlands provide important for breeding, nursery, and feeding grounds for marine fisheries and coastal floodplains are important habitat for waterfowl and other wildlife. Shallow coastal areas such as estuaries, tidal flats and rivers, and beaches support significant for shellfish, reptiles, and other finfish. Rivers, creeks, and lakes that have an unimpeded connection to the sea provide breeding and feeding grounds for a variety of coastal marine life. The water quality in these areas is affected by changes in sediments, salinity, nutrients, oxygen, temperature, and the addition of various pollutants. (Federal Emergency Management Agency, 2002)

Barrier islands and coastal banks play an important role in storm damage prevention and flood control. Barrier islands provide one of the strongest coastal defenses against shoreline erosion through their natural processes of roll and migration. Barrier islands hinder wave action and storm overwashes. Coastal banks have the ability to adjust in response to wave action, which allows them to supply sediment to coastal beaches, coastal dunes, barrier beaches, and land under the ocean. They provide a natural resistance to erosion caused by wind and rain runoff, acting as a vertical buffer to stormwaters and waves. (Federal Emergency Management Agency, 2002)

Rocky intertidal shores act in much the same manner as coastal beaches. The sloping shorelines and/or boulders dissipate wave energy and serve as natural buffers from the sea for the land behind the rocky intertidal shore. Rocky intertidal shores also play an important role in the protection of fish and shellfish. (Federal Emergency Management Agency, 2002)

Marshes provide important habitat for marine fish and shellfish. Salt marshes are extremely productive natural systems and a source of large volumes of organic material for the ocean and estuaries that support extensive marine food chains. The chemical characteristics of estuarine waters, particularly the levels of nutrients, dissolved oxygen and biological oxygen demand, are modified each time estuarine waters flush a salt marsh area. Salt marshes act to reduce pollution of the coastal zone by removing excess nutrients and heavy metals delivered by surface runoff from upland areas. Marshes also play an important role in storm damage prevention and groundwater supply. Marsh vegetation and underlying peat are resistant to erosion and dissipate wave energy, thus providing another coastal zone defense against wave damage. Marshes help to slow water flow and spread it out during periods of inundation until it gradually returns to the sea or estuary. (Federal Emergency Management Agency, 2002)

3.1.3 Floodplain Benefits

Floodplains perform a variety of essential functions including floodwater conveyance and storage, groundwater recharge, wave attenuation, stream bank erosion control, reduction in sedimentation rates, water quality maintenance, and support of highly productive ecosystems. Flooding from hurricanes and storms is the key process in providing such tangible benefits as increased soil fertility, wetland creation, rejuvenation of spawning gravel, creation of barrier islands, promotion of aquatic habitat, transportation of large woody material that provides fish habitat and bank stability, promotion of plant establishment, and the evolution of channels and shoreline features such as dunes (Association of State Floodplain Managers, 2008a). Benefits to humans are also provided in the form of sites for various types of water dependent development and recreational opportunities as well as cultural and scientific values. Some benefits provided by floodplains are static in nature (e.g., providing aesthetic pleasure) and some are dynamic processes (e.g., filtering nutrients). A summary of the natural and societal benefits of floodplains is included in Table 3-1.

Water Resources. Flood conveyance and floodwater storage are among the primary natural functions of floodplains. Hydrology is the dominant characteristic of floodplains that drives the dynamics of the entire system. Floodplains receive and store water from (1) excess stream flow that exceeds the capacity of the channel; (2) surface runoff from the surrounding watershed; and

(3) direct precipitation. The generally flat nature of natural floodplains is favorable for local ponding and flood detention, and the permeable nature of alluvial soils promotes infiltration into the subsurface for storage in soils and aquifers. (Federal Emergency Management Agency, 2002)

Floodwater that exceeds the conveyance capacity of the waterway is stored in floodplains for varying periods of time after a precipitation event and flows to the watercourse gradually, either as surface or subsurface (groundwater discharge) flow. The floodplain's natural capacity for flood storage and conveyance serves to reduce flood velocities and peak flows in stream channels. Floodplain vegetation also plays an important role in determining the flow patterns and the velocity at which water flows across the land. Floodplains generally provide an expansive area where floodwaters can slow and disperse over a broader area. Decreased velocities can increase the lag time of a flood (i.e., the time between the middle of the rainfall event and the flood peak), and minimize the magnitude of flooding and the potential for flood-related damage. Additionally, decreasing floodwater velocities will reduce erosion and subsequent sedimentation in other areas such as the stream channel (Federal Emergency Management Agency, 2002).

Table 3-1: Benefits of Floodplains

Water Resources	Biological Resources	Societal Resources
Natural Flood and Erosion Control <ul style="list-style-type: none"> Provides flood storage and conveyance Reduces flood velocities Reduces peak floods Reduces sedimentation Water Quality Maintenance <ul style="list-style-type: none"> Filters nutrients and impurities from runoff Processes organic wastes Moderates temperature fluctuations Groundwater Recharge <ul style="list-style-type: none"> Promotes infiltration and aquifer recharge Reduces frequency and duration of low flows 	Biological Productivity <ul style="list-style-type: none"> Supports high rate of plant growth Maintains biodiversity Maintains integrity of ecosystem Fish and Wildlife Habitats <ul style="list-style-type: none"> Provides breeding and feeding grounds Provides and enhances waterfowl habitat Protects habitats for ESA species 	Harvest of Wild and Cultivated Product <ul style="list-style-type: none"> Enhancement of agricultural lands Provides sites for aquaculture Restores and enhances forest lands Recreational Opportunities <ul style="list-style-type: none"> Provides areas of active and passive use Provides open spaces Provides aesthetic pleasure Areas for Scientific Study / Education <ul style="list-style-type: none"> Cultural Resources (historical / archaeological) Opportunities for environmental, biological, or other studies

Source: (Federal Emergency Management Agency, 2002)

The groundwater-surface water interaction helps to naturally regulate flow regimes of rivers, streams, and lakes. During periods of abundant flow, water enters the groundwater system rather than contributing to seasonal floods. Diminishing extreme variations in flow levels improves the capacity of the water body to support a diversity of wildlife and provide recreational benefits. (Federal Emergency Management Agency, 2002)

Vegetated floodplains control erosion and sedimentation of streams and other water bodies by stabilizing riverbanks and filtering runoff. Water is naturally cleansed through the processes of filtration, ion exchange, adsorption, absorption, and aerobic biological actions that take place in the floodplain. These natural processes reduce the levels of pathogens and toxic substances that

enter the water body, while at the same time retaining the nutrients within the floodplain soils. Vegetative floodplains also protect waterways, wetland areas, and riparian zones from excessive erosion and sedimentation by slowing the velocity of stormwater, allowing for the deposition of sediments on land and by binding the soil. (Federal Emergency Management Agency, 2002)

Biological Resources. The nation's coastal and riverine floodplains support and promote biological productivity and often contain large and diverse populations of plants and animals contributing to the diversity and integrity of adjacent downstream ecosystems. Nutrients and energy that enter rivers and streams are carried downstream into larger water bodies. Many plant species indigenous to floodplains are adapted to thrive in the specific conditions created by the soil types and water regimes that characterize river corridors. Floodplains may contain the only suitable environment for growth of some species of vegetation, which foster breeding/spawning of species of fish and wildlife. (Federal Emergency Management Agency, 2002)

The diverse vegetation in floodplains provides habitat for wildlife, controls erosion, and sedimentation, and improves water quality by filtering pollutants. Floodplains often contain different zones of vegetation, with shallow aquatic vegetation changing gradually to trees and shrubs in upland areas. The diverse vegetation of floodplains can support a wide variety of wildlife and smaller organisms feeding on plants. Trees and shrubs in more upland areas provide food, protection, nesting, and roosting areas for many species. In addition, fallen branches and root masses create macro- and micro-habitats among the pools, breaks, and riffles in the stream. The shading effect of riparian vegetation is beneficial for avoiding temperature extremes that stress natural biota. The warming of surface water due to the removal of streamside vegetation also lowers dissolved oxygen levels in the water, making it more difficult for aquatic species to migrate, reproduce, or fulfill their expected life cycles. (Federal Emergency Management Agency, 2002)

Wetlands also serve as an important component of the floodplain environment; wetlands act as a natural buffer against flooding by storing and slowly releasing floodwaters. Wetlands also protect water quality by filtering pollutants and sediments from surface runoff. Wetlands provide habitats for fish, shellfish, waterfowl, and a wide variety of other aquatic and semi-aquatic species. USFWS estimates that up to 60-70 percent of threatened and endangered animal species rely on wetlands for habitat. (Federal Emergency Management Agency, 2002)

Biological resources are floodplain resources and functions that benefit large and diverse populations of plants and animals. Historically, biological productivity (including high rates of plant growth, maintaining biodiversity, and maintaining integrity of the ecosystem), and fish and wildlife habitats (including breeding and feeding grounds, enhanced waterfowl habitats, and habitats for rare and endangered species), have been two of the primary biological benefits of maintaining natural floodplains. (Federal Emergency Management Agency, Undated)

Societal Benefits. In addition to the natural functions, floodplains provide values to humans that enable society to enjoy and interact with their natural surroundings. Floodplains provide cultural, educational, recreational, and scenic values that extend beyond a specific floodplain to enrich communities along entire rivers and coasts. In some areas, floodplain lands constitute the only public land base available to nearby residents for passive and active recreation. (Federal Emergency Management Agency, 2002)

Floodplains contain cultural resources important to the nation and to individual localities. Native American settlements and early cities located along the coasts and rivers for access to water supply, waste disposal, water transportation, and trade. Due to their flat topography, floodplains were travel corridors for human movement. Consequently, floodplains include many of the nation's earliest archaeological and historical sites. In addition to their historical richness, floodplains contain invaluable resources for scientific research. Floodplains can serve as nature

study centers and laboratories for outdoor learning experiences. (Federal Emergency Management Agency, 2002)

Due to their scenic value and recreation opportunities, floodplains are ideal locations for parks and numerous outdoor activities, such as water-oriented sports, boating, swimming, hiking, and camping. Floodplain wildlife resources can be managed for observation as well as for recreational hunting and fishing. Finally, natural floodplains can be valuable as constituents of the "wilderness experience," an important aspect of American culture. (Federal Emergency Management Agency, 2002).

3.2 Floodplain Conditions

3.2.1 Existing Floodplain Conditions

As defined in 44 C.F.R. § 59.1, a floodplain is "any land area susceptible to being inundated by water from any source" and as "a general and temporary condition of partial or complete inundation of normally dry land areas from 1) the overflow of inland or tidal waters...2) the unusual and rapid accumulation or runoff of surface water from any source." The NFIP provides communities with maps that show areas that are likely to flood, or FIRMs. For purposes of the NFIP, the mapped flood height is the base flood elevation, or "the flood having a one percent chance of being equaled or exceeded in any given year" (44 C.F.R. § 59.1).

Floodplains are not uniform and vary in size and conditions by State. For U.S. streams, the average floodplain width can range from 3 meters for small rivers to about 1 kilometer for larger rivers.

Over the NFIP's history, flood claim losses due to riverine floods and hurricane events have been concentrated in Texas, Florida, and Louisiana, with concentrations of non-hurricane flood claim losses in Texas and Louisiana. Repetitive flood claim losses are also concentrated in a few other States (such as New York, New Jersey, and Mississippi) (Galloway, et al., 2006). Physical floodplain conditions differ from one location to another across the nation. Some floodplains are subject to flash floods or fast rising floodwaters, and others face floods that arrive slowly and can be forecast days (or even weeks) beforehand. In some areas, the difference between the 1-percent and the 0.2-percent flood is a matter of inches and the extent of the 0.2-percent floodplain is only slightly larger than the 1-percent floodplain. In other cases, the vertical difference may be a matter of feet and the areal difference very large (Galloway, et al., 2006).

In an attempt to transport floodwaters more efficiently through a watershed, modifications to naturally existing floodplains through structural interventions such as concrete lining, revetments, floodwalls, jetties, diversions, dams, and reservoirs, and through reshaping the landscape for agriculture and development, have altered the natural floodplain landscape with very few unaltered floodplains remaining in the United States. As a result, the physical attributes, such as vegetation and ground surface that shape the floodplain, are disturbed leading to changes in the natural movement of water (e.g., changes in speed and sediment load). (Association of State Floodplain Managers, 2008b)

Floodplain degradation is caused by altering the landscape of the floodplain. In comparing the amount of degradation between different floodplains, the geology type is a substantial factor. Areas with fine particles of silt and clay are more likely to erode, and the sedimentation aggrandizes downstream. Erosion is caused by many factors, including development, mining, agriculture, and other activities (Federal Emergency Management Agency, 2002). Additionally, the presence of water storage and debris basins changes the landscape downstream: dams

reduce the upstream supply of recharging sediment and result in a higher rate of erosion even though the water flows slower (RBF Consulting, 2014).

3.2.2 Threats to Species and Habitats in Floodplains

Many factors influence threatened and endangered species populations and their habitats. Common threats that occur among the different identified species groups and habitats include floodplain development, invasive species, diseases, parasites, predation, hunting/fishing/overexploitation, and climate change.

3.2.2.1 Floodplain Development

Floodplain development is not an action under the NFIP, and, FEMA does not have any appreciable influence on the rate or quantity of development in floodplains. However, floodplain development can have significant effects on ESA species, designated critical habitats, or EFH, and the NFIP is a potential tool that FEMA can utilize, as required by Section 7(a)(1) of the ESA, to address these adverse impacts to ESA species. General effects of development in floodplains are analyzed in this section by assessing the following four types of effects: (1) habitat loss, fragmentation, degradation, and disturbance; (2) degradation of water quality; (3) changes to hydrology, erosion, and sediment transport; and, (4) degradation or removal of movement and migration corridors (Environmental Protection Agency, 1993) (McGarigal, Cushman, & Regan, 2005).

Habitat loss, fragmentation, degradation, and disturbance are the result of incremental conversion of natural lands to agricultural, residential, commercial, or industrial uses, including mineral extraction. In addition to direct habitat loss within the construction footprint, degradation to surrounding natural lands may occur from erosion or through the introduction of non-native plants and animals, including domestic animals. Habitat fragmentation increases the amount of edge habitat and decreases the amount of core or interior habitats. The edge habitats produced by fragmentation from development often lack the transition zones found in natural habitat edges, reducing overall habitat functionality (Environmental Protection Agency, 1993) (McGarigal, Cushman, & Regan, 2005) and can increase predation and the risk of parasitism by other species (U.S. Fish and Wildlife Service, 1999f).

Changes to water quality in nearby bodies of water often occur as a result of development. These changes include increases in turbidity from erosion; increases in water temperature from removal of overhanging vegetation; and pollution in the form of non-point source runoff of contaminants from roadways, parking lots, and lawns and point-source contaminants from wastewater treatment plants and industrial activities (North Carolina State University, 1995). Contaminants include pesticides, metals, petroleum products, pharmaceuticals, and household soap/detergent products. In terms of ESA-listed species and designated critical habitats, water quality degradation provides the greatest threat resulting from pollution. Pollution sources may be point (end-of-pipe) or non-point (runoff), and may be current or historical. Pollutants resulting in water quality degradation result from a variety of causes, including agriculture, mining, petroleum exploration, and the manufacturing of chemicals. USFWS estimates that approximately one third of all native freshwater mussels are either extinct or listed as endangered or threatened, many a result of impaired water quality (U.S. Fish and Wildlife Service, 2015a).

Development may also cause changes to hydrology, erosion, and sediment transport. For instance, channelization of waterways and installation of hardened banks can alter flows, direct flood energy to other areas, and affect sediment transport; the resulting changes in substrates, flow rates, and depths may alter aquatic habitats (North Carolina State University, 1995). As an example, straightening a bend in a waterway increases flow velocities, which increases the scour

of finer substrates, leading to an overall coarsening of substrate and channel incision. Alternatively, deepening and widening of a waterway decreases flow velocities and allows for the settling of finer substrates, leading to siltation.

The degradation or removal of migration corridors occurs as a synergy of the habitat changes described above. As habitat and vegetative cover are fragmented by development, movement becomes more difficult and exposes species to greater risks, such as collisions with vehicles and predation by both natural and domestic predators (McGarigal, Cushman, & Regan, 2005). Fencing, retaining walls, and curbs may constitute barriers to some terrestrial animals. For aquatic animals, the installation of dams for flood control or water diversions may prevent the upstream movement of fish and other aquatic organisms. Plant populations may also be affected because intervening areas of unsuitable habitat may prevent populations from spreading or re-colonizing areas from which they have been extirpated (Environmental Protection Agency, 1993).

3.2.2.2 Invasive Species

An invasive species is a species introduced to an ecosystem to which it is not native and which is likely to cause environmental or economic harm or harm to human health (Executive Order 13112, 1999). Invasive species often cause harm to existing native species. Invasive species may be native or nonnative (exotic) and introduced intentionally, such as for pets or biocontrol, or unintentionally, such as in ballast water, hidden within vegetation, or other pathways. Invasive species can disturb natural communities and ecosystems by changing the composition and quality of habitat; reducing stream flows; degrading water quality and changing water temperatures; displacing and/or causing major alterations of native plant communities including composition of the understory; competing for habitat resources including food, water, cover, or breeding/nest sites; disrupting the food chain; increasing soil erosion; and increasing wildfire potential. Invasive species can harm and prey on native species, leading to declines in native populations (U.S. Fish and Wildlife Service, 2012b). Crossbreeding between native and invasive species can lead to genetic concerns; for example, recent evidence suggests the endangered Hawaiian duck breeding with the feral Mallard ducks (U.S. Geological Survey - University of California Davis, 2007). Invasive species are often part of the reason native species are listed as threatened (U.S. Fish and Wildlife Service, 2012b). According to the EPA, invasive species represent the second leading cause of species extinction and loss of biodiversity in aquatic environments worldwide (Environmental Protection Agency, 2015a) (Environmental Protection Agency, 2015a).

Native species are most likely to be adversely affected by introduced species (referred to as exotic invasives) that grow and reproduce quickly and spread aggressively. Exotic invasives can rapidly colonize an area and become serious pests, often because they are no longer controlled by predators or diseases that limit their numbers in their native habitat (University of California Integrated Pest Management Program, 2015). An example is feral (wild) pigs in California that overturn native vegetation as they dig for food; this rooting also damages the habitat of animals that live on or under the ground such as amphibians, reptiles, mammals, and ground-nesting birds. One researcher found that almost 100 species identified as threatened, endangered, or rare are exposed to rooting and other feral pig activities (University of California Integrated Pest Management Program, 2007).

Competition with exotic invasives can be especially damaging to native wildlife if diet or cover requirements are similar and the habitat is at carrying capacity. In this situation, native populations may decline if they are unable to adapt to the stress of habitat depletion caused by the introduced species. For example, in response to a reduced food supply, exotic invasives may be able to shift to foods that are less preferred but more available. If native species cannot do the same, the native species will not compete well for available resources (Trawick & Welch, 1992).

Example: Non-native Eucalyptus

In Oakland, California, the introduction of non-native eucalyptus as ornamental vegetation has significantly increased the risk of wildfire and the potential to destroy habitat for the endangered Alameda whipsnake. (Federal Emergency Management Agency, 2014e)

Invasive species may also cause environmental harm by causing changes in ecological processes, sometimes across entire regions, resulting in conditions that native species and even entire plant and animal communities cannot tolerate. For example, some non-native plants can change the frequency and intensity of wildfires, or alter the hydrology of rivers, streams, lakes and wetlands. See Invasive Species Definition Clarification and Guidance White Paper, Invasive Species Advisory Committee (April 27, 2006).

Parasite-caused diseases have become increasingly common and can pose significant risks to natural populations. Most wild mammal species threatened by parasites are either carnivores or artiodactyls (cloven-hooved mammals); these groups also include the majority of domesticated and companion animals. Mammals that are closely related to domesticated animals are at the greatest risk. In addition, parasites can infect a wide range of domestic host species and close contact between domestic animals and endangered wildlife species is a major route of transmission for these harmful parasites. For example, domestic dogs can infect wolves or foxes with the canine distemper virus. Diseases, especially in small or already fragmented populations, may compromise a threatened or endangered animal population by suppressing population growth rates or by killing individuals more rapidly than they can reproduce (Pedersen et al., 2007).

Introduced exotics (invasive species) of plants and animals may carry harmful diseases or parasites from which native species may not have immunity (Trawick & Welch, 1992). Native wildlife can carry parasites that adversely affect threatened or endangered species. For example, white-tailed deer are the main host for a parasite that causes "brain worm," a severe debilitating neurological disease. Deer carry the parasite but have few, if any, signs of illness; however, the disease is fatal to the endangered woodland caribou (Woodbury, Undated) (Washington Department of Fish and Wildlife, 2012). Diseases caused by or carried by invasive species are particularly threatening, as native wildlife may have no natural immunity to them.

Although plant diseases are not typically the sole or primary cause of species extinctions, over the past 100 years forest disease has caused significant declines in North American canopy trees and restructured forest ecosystems on a large scale, which may adversely affect threatened or endangered species (Cobb, Filipe, Meentemeyer, Gilligan, & Rizzo, 2012).

Example: Diseases Threatening U.S. Wildlife

The following are a few of the many diseases threatening U.S. wildlife:

- **Chytrid Fungus:** *Batrachochytrium dendrobatidis* (Bd) is a fungus that grows on the skin of amphibians, interfering with their ability to breathe or take up water through their skin. In most places, almost as soon as Bd is detected at a new site, the frogs begin dying off. In a period of a few months, frog populations can go from abundant to nearly nonexistent. Most mass die-offs occur soon after frogs transform from tadpoles into frogs, leaving pond or stream shorelines littered with dead frogs. In some places, frogs may be infected even though die-offs are not observed. (National Park Service, 2015)
- **Fibropapillomatosis:** Sea turtles worldwide are becoming infected with this disease, which causes tumors to appear on the skin or internally. These tumors can make it difficult for a turtle to swim, eat, or see, and can weaken their immune systems. (Klein, 1995)
- **White-nose Syndrome:** Since 2007-2008, millions of insect-eating bats in 25 States and 5 Canadian provinces have died from the white-nose fungus, *Pseudogymnoascus destructans*, which infects the skin of muzzles, ears, and wings of hibernating bats. The disease affects hibernating bats, making them appear to have a white substance on their faces and wings. Infected bats often display abnormal behaviors in their hibernation sites, such as movement toward the mouth of caves and daytime flights during winter. These abnormal behaviors may contribute to the untimely consumption of stored fat reserves causing emaciation, a characteristic documented in a portion of the bats that die from white-nose syndrome. (U.S. Geological Survey - National Wildlife Health Center, 2015)
- **Chronic Wasting Disease (CWD):** This disease is a highly contagious, fatal neurological disease (spongiform encephalopathy) that infects primarily deer and elk. The disease is believed to be caused by a modified protein called a prion, which infects the host animal by converting a normal protein to the abnormal one. CWD causes a spongy degeneration in the brains of infected animals, resulting in emaciation, abnormal behavior, loss of bodily functions, and ultimately death. (Virginia Department of Game and Inland Fisheries, 2015)
- **Whirling Disease:** Trout, salmon, and whitefish in 25 States have been infected by the parasite *Myxobolus cerebralis* that causes whirling disease. This parasite damages nerves and cartilage, causing young fish to die and older fish to swim in an uncontrolled whirling motion, making it difficult for them to find food and increasing their vulnerability to predators. (Montana Water Center, 2012)
- **Sylvatic Plague:** Prairie dogs are highly susceptible to this bacterial disease, which is transmitted by fleas. The endangered black-footed ferret is at even greater risk from the effects of the disease, because not only can the disease infect it, but prairie dogs are also its primary food source. (U.S. Geological Service - National Wildlife Health Center, 2013)

3.2.2.3 Predation

Predation affects many threatened and endangered species, for which the loss of a very few individuals may have a greater impact due to smaller populations. Predators of endangered species may be exotic or native species. In Florida, for example, native but over-abundant raccoons and nonnative armadillos both prey on sea turtle eggs in beach nest areas. Other significant predators of rare species include domesticated or feral cats and dogs (Engeman, Constantin, Gruver, & Ross, 2009).

Predation by large, native carnivores (such as black and grizzly bears, wolves, cougars, and wolverines) is the major natural cause of mortality for all ungulates (hooved mammals), including threatened and endangered species. Predator populations naturally increase in response to a corresponding increase in prey species. Increased predation can have a more significant effect on species with lower population numbers. For example, when moose populations expanded into areas historically occupied by woodland caribou, wolf populations increased in response to a larger prey base, which in turn led to increased predation on caribou (Mountain Caribou Science Team, 2005).

3.2.2.4 Hunting/Fishing/Overexploitation

Hunting, fishing, and overexploitation of species have occurred for centuries. Humans depend on plants and wildlife for a variety of necessities, such as food, shelter, clothing, medicine, and

other needs. Illegal hunting (or historical legal overhunting) for sport or to protect livestock continue to threaten large carnivores (NatureServe, 2009c) (Northern Continental Divide Ecosystem, 2013). Commercial and recreational fishing can result in entrapment or entanglement of threatened or endangered marine mammals and sea turtles in fish or shrimp nets, monofilament line, and other fishing gear (U.S. Fish and Wildlife Service, 2001c). Overexploitation occurs when humans hunt or fish to the extent that species population levels become unsustainable. Humans hunted the passenger pigeon to extinction by the early 1900s; overhunting nearly caused the extinction of several whale species and the American bison until the enactment of the ESA and protective measures (U.S. Fish and Wildlife Service Pacific Southwest Region, 2013) (Braham, 1984) (U.S. Fish and Wildlife Service Wichita Mountains Wildlife Refuge, 2014).

Large mammal species are frequently hunted for their fur, food, sport, and for their antlers, horns, or tusks. Illegal hunting of large mammals for their body parts threatens species, such as tigers, bears, and rhinoceros. Birds are collected or hunted for sport, food, and as pets (particularly parrots and songbirds) with many species threatened to extinction. Reptiles are collected or harvested for their skins or shells, eggs, food, and as pets (such as the box turtle). Reptile skins (e.g., python and crocodile) are prized and highly valued for trade. Marine invertebrates seem particularly resistant to overfishing, primarily because their relative immobility and scattered concentrations creates refuge populations. Overfishing concerns for invertebrates arise primarily for those species where price is sufficiently high to encourage illegal fishing or where harvest by the fishing industry is not easily monitored or controlled (Jamieson, 1993).

Woodland caribou historically ranged throughout much of Canada and the northeastern, north-central, and northwestern U.S., but the southern limit of their range has receded considerably due, in part, to overhunting; the species is now endangered (Washington Department of Fish and Wildlife, 2012).

Example: Hunting, Fishing, and Overexploitation Activities Threatening U.S. Wildlife

- **Fish and Other Aquatic Species:** Overfishing is the primary driver in the decline of worldwide populations of fish and other aquatic species. Overexploitation is a persistent problem due to the typical slow response of fish populations to fishing restrictions and the general tendency to overfish immediately following apparent increases in fish populations (Rosenberg, 2003).
- **Birds:** Several bird species are threatened or have gone extinct due to hunting and habitat destruction (BirdLife International, 2012). While hunting for birds often occurs as a sport, the Passenger Pigeon was hunted to extinction during the 19th century for food as it was a good source of protein (Yeoman, 2014).
- **Mammals:** Human activities, including hunting, are currently contributing to the decline of nearly 25% of mammals, such as threatened mammals (rhinoceroses, elephants, tapirs, jaguars, and various primates). For example, between 1970 and 1992, black rhinoceros numbers dropped 96% due to hunting. International agreements to protect species are largely ineffective given that few countries have resources to pursue poachers or the illegal trade in wildlife (Worldwatch Institute, 2015).
- **Amphibians:** Amphibians can be exploited for a variety of uses, including food, pets, medicine, educational purposes, research, and fish bait. Overharvesting has had devastating effects on amphibians in the United States, such as the California red-legged frog, which was exploited heavily between the late 1840s and early 1900s. By the mid-1870s, their numbers had been significantly depleted in parts of California. Although this species is no longer harvested, it is listed as federally threatened due to overharvesting more than a century ago (Amphibiaweb, 2003).
- **Reptiles:** Researchers blame unsustainable hunting and harvesting as one of the greatest threats to reptile species in the U.S. Commercial harvesting is considered the second greatest threat to reptiles. For example, in one year, Louisiana shipped 40,000 box turtles overseas as pets. In 1980, an estimated 115,000 leatherback turtles were in existence worldwide, but that number dropped to 30,000 by 1995 due to exploitation in the Atlantic Ocean. Interpol estimates that the annual illegal wildlife trade approaches \$6 billion, with reptiles such as the Komodo dragon selling for nearly \$20,000 (Gianaro, 2000).
- **Invertebrates:** Marine invertebrates seem particularly resistant to overfishing, primarily because their relative immobility and scattered concentrations creates refuge populations. Overfishing concerns for invertebrates arise primarily for those species where price is sufficiently high to encourage illegal fishing or where harvest by the fishing industry is not easily monitored or controlled (Jamieson, 1993).
- **Plants:** Plants are harvested for food, medicinal purposes, building materials, and in their natural form. Harvesting plant species is sustainable when plant populations can grow sufficiently to replenish the stock taken; when harvested in excess, however, the plant resource is unable to regenerate fast enough for the population to recover. Sometimes whole individuals are taken (as when logging for timber), but in other cases just parts of plants are used. In the case of mahogany tree harvesting, exploitation can affect a species' genetic composition. Mahogany trees take over 100 years to mature, and sustainable harvesting would only take a small percentage of the standing trees. However, general practice has been to extensively log the straight trees for timber, leaving non-straight trees as the only ones to reach maturity and reproduce (Botanic Gardens Conservation International, 2015).

3.2.2.5 Extreme Weather Events and Climate Change

Extreme weather events include tropical storms, heavy precipitation, flooding, tsunamis, volcanic eruptions, landslides, earthquakes, wildland fires, heat waves, and droughts, all of which may adversely affect threatened and endangered species by direct mortality or by intensifying existing stresses on threatened and endangered species (U.S. Climate Change Science Program, 2008). Hurricanes and severe flooding can scour areas removing plants and topsoil, and may introduce stored or stockpiled contaminants into waterways when developed areas are flooded (North Carolina State University, 1995). Although sudden extreme events such as flash floods capture the public's attention and can have serious consequences on species, the slower, more long-term extreme weather related to climate change, such as drought, are equally threatening to endangered species and their habitats (U.S. Geological Survey, 2007).

Climate change can potentially cause abrupt changes to habitat and ecosystems, and may be a threat to many threatened or endangered species. Notably, climate change is affecting the migration of songbirds; breeding birds' arrival dates are changing, often occurring before the necessary food supply is available. Climate change has exacerbated wildfires, insect outbreaks,

pathogens, coral bleaching, disease outbreaks, and tree mortality. Higher water temperatures resulting from climate change may impact cold and cool water fish, and rising sea levels affect many fish and wildlife habitats (U.S. Fish and Wildlife Service, 2012a).

Example: Climate Change affects Species in some U.S. Regions more Severely than Others

Arctic species are especially at risk because the Arctic is warming at about twice the global average. By the year 2050, the average Arctic temperatures are expected to rise by approximately 2° C from 2015 levels. The rapid rates of warming in the Arctic dramatically reduce the snow and ice covers that provide denning and foraging habitat for polar bears and other Arctic species (Arctic Monitoring and Assessment Programme, 2015).

The length of the growing season has increased more rapidly in the west than in the east. The western U.S. has seen an increase of about 2.2 days per decade since 1895, compared with a rate of almost one day per decade in the east (Environmental Protection Agency, 2015b).

Increased runoff in eastern regions may cause little change in the Missouri and lower Mississippi Rivers, but may lead to substantial decreases in annual runoff in the interior of the west (Colorado and Great Basin). The west and southwest have experienced increased drought conditions throughout the 20th century. In arid lands, changes in temperature and precipitation will very likely decrease the vegetation cover that protects the ground surface from wind and erosion, threatening species that occur there (U.S. Climate Change Science Program, 2008).

Along the eastern coast of the U.S., climate change is linked to increased shoreline erosion, saltwater intrusion, and a rising water table, all of which may adversely affect threatened and endangered species (Rowland, Cross, & Hartmann, 2014).

Corals in many tropical regions are affected by increasing water temperatures that cause mass bleaching and infectious disease outbreaks. Carbon dioxide absorbed into the ocean from the atmosphere reduces calcification rates in reef-building and reef-associated organisms by decreasing the pH in seawater (ocean acidification) (National Oceanic and Atmospheric Administration, 2015b).

Forest fires, insect outbreaks, and tree mortality caused by climate change are a serious problem in forests of the interior west, the southwest, and Alaska (U.S. Climate Change Science Program, 2008).

Climate change effects include warmer air and ocean temperatures, more high-intensity rainfall events, and more frequent heat waves. Warming temperatures also cause increases in ozone levels that can damage vegetation, adversely affecting the growth of plants and trees by reducing their ability to take up carbon dioxide from the atmosphere (Environmental Protection Agency, 2012).

The average length of the growing season in the contiguous 48 States has increased by nearly 2 weeks since the beginning of the 20th century. A particularly large and steady increase occurred over the last 30 years (Environmental Protection Agency, 2015b). The warmer and drier conditions caused by rising global temperatures and longer growing seasons favor species adapted to those conditions, threatening the success of species requiring cooler and wetter conditions (Washington Department of Fish and Wildlife, 2012).

3.3 Habitat Descriptions

A brief discussion of the potential for habitats typically associated with SFHAs that may be affected by floodplain development is provided below.

3.3.1 Wetland Habitats

Forested and nonforested wetlands may be affected by all four of the general effects of development. Habitat loss, degradation, and disturbance often occur when wetlands are filled to create developable land, dredged to create navigable waters, or diked off of supporting waterways for the purposes of flood control. The removal of trees from forested wetlands may alter habitat quality. Floodplain development may result in the degradation of movement corridors within forested and nonforested wetlands. Development in or near wetlands may also degrade water

quality. Wetlands may be affected by changes in hydrology, erosion, and sedimentation. These changes resulting from development, such as channelization and bank armoring, may scour away or deposit sediment, altering the extent and characteristics of wetland habitats. Irrigation associated with nearby development could affect groundwater, lowering the water table and reducing water available to wetland plants and trees (Environmental Protection Agency, 1993) (North Carolina State University, 1995).

Mammals, birds, reptiles, amphibians, fish, and invertebrates rely on forested and nonforested wetland habitats for foraging, breeding, and nesting; these animals would be affected by habitat loss or degradation from changes in hydrology or rises in the water table. Habitat fragmentation could also result in low genetic diversity due to isolation from restricted population sizes and changes in migration corridors (North Carolina State University, 1995).

When roads are constructed in wetland areas, vehicles are often a cause of mortality for small, slow-moving reptiles and amphibians, as well as some mammals. Changes to water quality may reduce the availability of suitable aquatic prey for mammals, birds, reptiles, amphibians, and fish and changes to hydrology and sediment transport could result in scour or sediment deposition, altering habitat characteristics for these sub-groups.

Amphibians of forested and nonforested wetlands typically rely on the presence of both aquatic and adjacent terrestrial habitats. Shallow pools and ponds are of particular importance to wetland amphibians as breeding grounds, and most of these amphibians spend their early life stages in these aquatic habitats. Therefore, habitat loss, water quality degradation, and changes in hydrology from development activities could prevent species from breeding and reduce population sizes. Habitat fragmentation could also degrade necessary corridors connecting ponds to wetland habitats (U.S. Fish and Wildlife Service, 2014f).

Vernal pool habitat supports endemic crustaceans, including fairy shrimp and tadpole shrimp. Approximately 95 percent of vernal pools have been filled due to urbanization and agricultural expansion, which continues to be the largest threat to this habitat. Urbanization affects vernal pools by altering the soil, water regime, water quality, and vegetation (U.S. Fish and Wildlife Service, 2005a), (U.S. Fish and Wildlife Service, 1998e).

3.3.2 Freshwater Habitats

Freshwaters (streams and canals, lakes, reservoirs, and estuaries) may be affected by all four of the general effects of development. Habitat loss, degradation, and disturbance often occur when fresh waters are filled to create developable land, dredged to create navigable waters, or impounded to create reservoirs. Development in or near fresh waters may also degrade water quality through the changes in hydrology, erosion, and sedimentation described above, including the alteration of water temperatures by removing shade from waterways. Changes to the processes of hydrology resulting from development may scour away or deposit sediment, altering the extent and characteristics of freshwater habitats. Such changes may include the channelization of waterways, bank armoring, or reductions in floodplain area (North Carolina State University, 1995). The removal of groundwater, which may occur as a result of irrigation associated with nearby development, may lower the water table and reduce water availability to these freshwater habitats.

All of the above effects may result in the degradation of movement corridors. In particular, impoundments of streams may prevent fish, amphibians, and aquatic invertebrates from reaching breeding grounds or other key habitat areas. The above effects may also reduce the availability and quality of freshwater foraging habitats for fish, birds, and mammals. Increased recreational activities in the vicinity of development, including off-road vehicles (ORV) and boat use, may

disturb or degrade important freshwater habitat areas for mammals, birds, amphibians, fish, invertebrates, and plants.

Freshwater resident fish, anadromous fish, and manatees could all be affected by loss of movement corridors caused by habitat fragmentation. A change in water quality may reduce the availability of suitable prey, and a change in sediment loads may result in decreased underwater visibility and increased turbidity, altering preferred habitat characteristics for these species. Commercial and recreational freshwater activities could lead to an increase in habitat disturbance, entanglement with fishing gear or human trash, and collisions with vessels (U.S. Fish and Wildlife Service, 1994c), (U.S. Fish and Wildlife Service, 2001c).

Habitat degradation and fragmentation could affect freshwater amphibians due to decreased availability of suitable habitat and a loss of spring and stream flow. Changes in water quality may reduce the availability of suitable prey and nesting areas and a change in sediment loads may increase turbidity and decrease water oxygenation, altering preferred habitat characteristics for these species (U.S. Fish and Wildlife Service, 1996a).

Sessile and slow-moving freshwater invertebrates, such as mussels and snails, are especially sensitive to sedimentation and stream channel changes. For example, sedimentation may bury viable mussel beds. Fragmentation of mussel and snail populations due to channelization may result in reduced reproductive viability for the species (U.S. Fish and Wildlife Service, 1984g), (U.S. Fish and Wildlife Service, 1993d).

3.3.3 Nearshore Marine Waters

Development within floodplains does not generally result in fragmentation, degradation, or loss of marine habitat or movement corridors for nearshore marine mammals, birds, fish, invertebrates, and plants. However, nearshore marine waters and the species dependent upon the habitat they provide may be indirectly affected by changes to water quality associated with development in floodplains. These effects may include habitat degradation resulting from the movement of debris into nearshore marine waters associated with rainfall events or following floods or other natural disasters. Similarly, the construction of breakwaters, dikes, and other structures installed to protect beaches and other nearshore areas may alter the processes of hydrology, erosion, and sedimentation in nearshore marine waters, which could alter habitat characteristics (Environmental Protection Agency, 1993).

Effects to nearshore marine waters could affect mammals, birds, fish, invertebrates, and plants due to changes in sediment transport, water quality, and hydrology. Increased boat traffic associated with development may disturb habitats for these species sub-groups and boat strikes could cause injury or mortality. Movement corridors within offshore marine waters would not be affected by development in SFHAs.

Habitat degradation in the nearshore marine environment may reduce the availability of suitable prey and forage, impair water quality, and alter the preferred habitat composition for mammals, birds, fish, invertebrates, and plants. Commercial and recreational marine activities could lead to an increase in open ocean habitat disturbance and collisions with marine vessels, and cause entanglement with fishing gear or human trash (National Marine Fisheries Service, 2007a), (U.S. Fish and Wildlife Service, 2013e).

3.3.4 Beaches

Development along coastal beaches, such as the construction of roads and commercial or residential areas, could cause loss and fragmentation of beach habitat, impairing migration, or the ability to reach other necessary habitats or breed with other populations. Development on or

near beaches could also cause changes to water quality, hydrology, and sediment transport. An increase in runoff or erosion could carry sand away from beaches, causing additional habitat loss.

Beach mammals typically rely on sandy coastal areas for nesting and foraging. These mammals generally reside in burrows dug in the sand. Development along beaches could lead to the degradation or destruction of these burrows as well as the loss of important food sources, including seeds, grasses, and small animals. The construction of roads and commercial or residential developments near beaches often cause mortalities from vehicle collisions and increased occurrence of predation and disease from domestic and feral cats, dogs, and pigs (U.S. Fish and Wildlife Service, 1987a).

Nearshore marine mammals and birds rely on beaches for mating, nesting, and resting, and sometimes for foraging (when in bays or estuaries). On-shore habitat degradation and fragmentation could result in the loss of preferred nesting habitats.

Although sea turtles are associated most closely with offshore marine waters, they rely on coastal beaches for nesting. Habitat loss and fragmentation could result in the loss of preferred nesting habitats and the disorientation of migrating or nesting sea turtles. A decrease in water quality may reduce the availability of suitable prey and forage and alter the preferred habitat composition for these species.

Development along beaches may disturb or alter nesting sites for mammals, birds, reptiles, and invertebrates, possibly reducing reproductive success for these species. Disturbances associated with beach development include the installation of lights, recreational use of beaches by people, the presence of domestic animals, and ORV use.

The installation of sea walls, dikes, or other erosion control structures may also alter beach habitats for mammals, birds, reptiles, invertebrates, and plants (National Marine Fisheries Service, Office of Protected Resources, and U.S. Fish and Wildlife Service, Southeast Region, 2013).

3.3.5 Barren Lands

In barren lands, development such as road construction or construction in commercial or residential areas could cause loss and fragmentation of habitats or removal of migration corridors. Development activity could disturb or damage existing habitat and vegetation, which may reduce availability of suitable prey or food sources. As defined in this document, barren lands typically lack water bodies; therefore, development in barren lands is not likely to affect hydrology or water quality.

Barren land mammals require open terrain for good visibility to avoid predators. Some of these mammals, particularly bighorn sheep, also require flat migration corridors for access to other mountain ranges, and therefore other sources of food and breeding gene pools (U.S. Fish and Wildlife Service, Region 1, 2000). Development could result in a degradation of habitat quality by adding structures and vegetation that fragment the open terrain and reduce visibility and interrupt or remove migration corridors.

Barren land reptiles tend to burrow in uncompacted and undisturbed sandy areas or hide under vegetation for protection (U.S. Fish and Wildlife Service, 1984a). Ground disturbance from development in these sandy barren land areas could compact the soil and damage vegetation, degrading habitat quality for these species.

Barren land invertebrates often spend most of their time in rock cracks and fissures or in the shaded areas between boulders (U.S. Fish and Wildlife Service, 1984h). Some require vegetation as a food source, with some species relying on one specific plant for food (Lockwood & Lockwood,

2008). Development could damage or remove vegetation and rock habitats, reducing overall habitat quality for these species.

3.3.6 Caves

Because construction of roads and development of commercial or residential areas does not occur within caves, effects on habitats from development are not expected. However, development that occurs in areas nearby or adjacent to caves could result in adverse impacts to the water quality in caves. Caves may contain standing or flowing water depending on local aquifers and the hydrologic processes of the area. Construction activities could lead to soil erosion and sedimentation that can degrade the water quality of nearby groundwater sources. Non-point source runoff of contaminants from roadways, parking lots, and lawns, and point-source contaminants from nearby industrial activities could also degrade the water quality of groundwater sources that feed into caves.

Cave-dwelling amphibian, fish, and invertebrate species require good water quality, particularly cave amphibians that require groundwater with constant conditions (i.e., temperature, pH, and flow). Nearby construction activities could lead to erosion, sedimentation, or polluted runoff that could degrade the habitat, water quality, and quality/availability of food sources for these species (U.S. Fish and Wildlife Service, 2008c) (U.S. Fish and Wildlife Service, 2013i) (U.S. Fish and Wildlife Service, 2015d).

3.3.7 Rangelands

Ground disturbance from construction may lead to the destruction of the low-growing vegetation characteristic of rangelands, resulting in a reduced suitable prey or food base for many species.

Rangeland mammals, birds, reptiles, invertebrates, and plants may be affected by the habitat quality degradation of these development effects. Small rangeland mammals and some reptiles typically spend a large amount of their time in burrows, some of which have complex underground structures. Development in rangelands could lead to the degradation or destruction of these burrows and a reduction in important food sources, including seeds and grasses (U.S. Fish and Wildlife Service, 1990b) (U.S. Fish and Wildlife Service, 2014n).

Several rangeland mammals, such as bison and pocket gophers, rely on large contiguous areas of habitat. Development could fragment habitat and degrade or remove important movement corridors for these species, isolating populations and increasing their risk of extinction (U.S. Fish and Wildlife Service, 2011e) (U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 2014).

Many rangeland birds and reptiles rely on low-growing vegetation for protection from predators. The ground disturbance related to development could reduce this vegetation cover, degrading habitat quality for these species (U.S. Fish and Wildlife Service, 1990b) (U.S. Fish and Wildlife Service, 2014h). Snakes, tortoises, and geckos require plenty of sunlight to maintain body temperatures (U.S. Fish and Wildlife Service, 1986a). Some rangeland invertebrates rely on host plants that may only grow in open environments with plenty of sunshine (U.S. Fish and Wildlife Service, 2003a). Development could alter the rangeland landscape, adding structures and vegetation, particularly trees that could provide too much shade for these species.

3.3.8 Forest Lands

Habitat loss, fragmentation, degradation, and disturbance may occur when forested land is converted to developed areas. Deforestation destroys important elements of this habitat type, including mature trees, and degrades movement corridors. The ground disturbance of

construction also impacts the forest undergrowth. The alteration of the existing habitat could also result in a loss of suitable prey or food sources for many species.

Small mammals and birds rely on the mature trees, dead standing or downed snags, and tree cavities in forests for cover, foraging, and nesting. The removal or disturbance of trees from development could remove habitat for these species, and negatively affect important food sources from the removal of other forest land plants. Some mammals, including large predators, require large areas of contiguous forest habitat. Development could fragment habitat and degrade or remove important movement corridors for these species, thereby increasing their risk of extinction from the isolation of populations and gene pools (U.S. Fish and Wildlife Service, 2005c) (U.S. Fish and Wildlife Service, 2011d).

Forest reptiles, amphibians, and invertebrates rely on the significant amounts of canopy cover, damp leaf litter, and undergrowth of forest lands for foraging and nesting. Amphibians, in particular, rely on the canopy cover of forests to promote a shaded, moist ground, which is vital for maintaining a moist skin surface for hydration and respiration. Development could degrade the habitat by reducing the amount of canopy cover available for these species and removing necessary host plants in the forest undergrowth (U.S. Fish and Wildlife Service, 1984f) (U.S. Fish and Wildlife Service, 1994b) (U.S. Fish and Wildlife Service, Southeast Region, 2014).

The conversion of forest land to roads and commercial or residential developments often causes mortalities from vehicle collisions and increased occurrence of predation and disease from domestic and feral cats, dogs, and pigs (U.S. Fish and Wildlife Service, 1992a) (U.S. Fish and Wildlife Service, Pacific Island, 2009).

3.3.9 Perennial Snow or Ice

It is not likely that development and associated adverse impacts would occur in areas that are covered by snow or ice year-round.

3.4 Regulatory Programs that Interact with the NFIP

Several Federal regulatory programs interact with the NFIP. Each of these programs regulates activities in and near floodplains in important but different ways. Due to their potential impact on water quality, projects that have to address NFIP floodplain management requirements typically also require Section 404, Section 401, and National Pollutant Discharge Elimination System (NPDES) permits to ensure adequate protection of the physical and biological integrity of the nation's waterways. The vast quantity of regulation at the Federal, State, and local level, as defined within this section, combine to influence the regulatory environment for floodplain development and present a challenge in attributing specific responsibility for floodplain development, and its associated effects, to any one party.

3.4.1 Endangered Species Act

Signed into law in 1973, the Endangered Species Act (ESA) protects imperiled species and the ecosystems upon which they depend. USFWS administers the ESA for terrestrial and freshwater organisms, while NMFS administers the Act primarily for marine wildlife and anadromous fish. Under the Act, an endangered species is defined as a species currently in danger of becoming extinct, while a threatened species is likely to become endangered in the foreseeable future.

Section 7(a)(2) of the ESA requires all Federal agencies to consult with the Services to ensure that any action they fund, authorize, or carry out does not jeopardize the continued survival of any endangered or threatened species or adversely modify designated critical habitat. Section 7(a)(2) generally requires a Federal agency to conduct a biological assessment to identify any endangered or threatened species that may be affected by the agency's action. There are three

possible results of such an assessment: (a) a determination is that a project will have "no effect", positive or negative, on ESA-listed species and designated critical habitat; (b) a determination that the action "may affect, but is not likely to adversely affect" the species; and (c) a determination that the action "may affect, and is likely to adversely affect" the species. If the agency makes a determination that the Proposed Action has "no effect," then concurrence from the Services is not necessary and no further action is warranted. If the agency makes a determination that the Proposed Action "may affect, but is not likely to adversely affect" ESA-listed species and designated critical habitat, then coordination with the Services is required. If the Services concur with an agency's finding that an action "may affect but is not likely to adversely affect" the species, then the consultation is complete. However, if the Services do not concur with such a finding, then consultation continues. The Services then use the agency's biological assessment as the basis for developing a Biological Opinion that further analyzes the action's impact on species to determine if the Proposed Action would jeopardize ESA-listed species or adversely modify designated critical habitat. If jeopardy or adverse modification of designated critical habitat is found by the Services, the Services will suggest a "reasonable and prudent alternative" (RPA) to the Proposed Action that will allow the Federal agency to proceed without jeopardizing the continued survival of ESA-listed species (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998).

However, even if an RPA may be implemented to avoid jeopardy or adverse modification, it may still result in the take of ESA-listed species. Section 9 of the ESA prohibits the taking of ESA species. Take is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capture, or collection of ESA species, or attempting to engage in any such conduct. Harm includes significant habitat modification or degradation that results in death or injury to ESA species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to ESA species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 C.F.R. §17.3). If take will occur from the implementation of an RPA, the Services will develop an incidental take statement to exempt such take from the prohibitions of Section 9 of the ESA.

Section 10 of the ESA provides exceptions to the Section 9 prohibitions. The exceptions most relevant to Section 7 consultations are takings allowed by two kinds of permits issued by the Services: (1) scientific take permits and (2) incidental take permits. The Services can issue permits to take listed species for scientific purposes or to enhance the propagation or survival of listed species. The Services can also issue permits to take listed species incidental to otherwise legal activity.

The take prohibitions of Section 9 of the ESA also apply to non-Federal parties. Section 10(a)(1)(B) of the Act allows non-Federal parties to apply for an incidental take permit for activities that could result in the incidental taking of ESA-listed species. The application must include a habitat conservation plan (HCP) that lays out the Proposed Actions, determines the effects of those actions on ESA species and their habitats, and defines measures to minimize and mitigate adverse effects (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998).

As stated above, private floodplain development is not FEMA's action, in that FEMA does not authorize, fund, or carry out private floodplain development (except pursuant to the grants programs, which are not within the scope of this evaluation). Because private floodplain development is not FEMA's action, and because FEMA has no authority to prohibit such development or control the rate or quantity of such development, Section 7 would be inapplicable to these actions. As such, FEMA utilizes Sections 9 and 10 of the ESA as the authority for requiring participating communities to ensure that project proponents have assessed, and

appropriately addressed, any adverse effects of development in the SFHA on ESA-listed species and designated critical habitat, thereby ensuring there is no "take" in violation of Section 9 of the ESA.

3.4.2 Executive Order 11988/13690, Floodplain Management

Issued in 1977, Executive Order 11988, Floodplain Management, requires all Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

The Executive Order affects actions including the acquisition, management, and disposal of Federal facilities and land; federally undertaken, financed, or assisted construction and improvements; and Federal programs and activities affecting land use (42 F.R. 26951). Prior to any Federal action, the agency must determine whether the Proposed Action will occur in the floodplain; identify and evaluate practicable alternatives "to avoid adverse effects and incompatible development in the floodplains;" identify the impacts of the Proposed Action; develop measures to minimize potential harm to people, property, and floodplains; and provide an opportunity for public review and comment. EO11988 reviews are generally conducted as part of environmental review under the National Environmental Policy Act (NEPA). However, they still must be undertaken in situations where no NEPA review is required.

Issued in 2015, EO 13690 amends EO 11988 and establishes the new Federal flood risk management standard, which is a flexible framework to increase resilience against flooding and help preserve the natural values of floodplains. Incorporating this standard will ensure that agencies expand management from the current base flood to a higher vertical elevation and corresponding horizontal floodplain to reduce the impacts of flooding and ensure that projects funded with taxpayer dollars last as long as intended. Neither executive order is intended to prohibit development in the floodplain, but instead requires executive departments and agencies to address current and future flood risks when funding projects. Additionally, neither executive order impacts the development in the floodplain by local communities where no Federal funding, authorization, management, or construction is involved.

3.4.3 Executive Order 11990, Protection of Wetlands

Executive Order (EO) 11990 "Protection of Wetlands" requires Federal agencies to minimize the destruction, loss, or degradation of wetlands, including waters of the United States, and to preserve and enhance the natural and beneficial values of wetlands. Before implementing an action that is located in, or may affect, a wetland, this EO requires Federal agencies to demonstrate that there is no practical alternative and the Proposed Action includes all practical measures to minimize harm to the wetlands. The Federal agency must also provide opportunity for early public review by those who may be affected and include its findings in its environmental or other appropriate decision documents. Projects requiring compliance with this EO are likely to require a permit under Section 404 of the Clean Water Act. The USACE has permitting authority over activities affecting waters of the United States. Waters of the United States include surface waters such as navigable waters and their tributaries, all interstate waters and their tributaries, natural lakes, all wetlands adjacent to other waters, and all impoundments of these waters. Accordingly, Federal regulation of wetlands is under the jurisdiction of the USACE (although the USACE has delegated permitting authority to some States). See <http://www.spk.usace.army.mil/Missions/Regulatory/Jurisdiction.aspx>.

3.4.4 Section 404 and 401 of the Clean Water Act

The Clean Water Act (CWA), passed in 1972, establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for

surface waters. Through a variety of regulatory and non-regulatory initiatives, the CWA is designed to restore and maintain the chemical, physical, and biological integrity of the nation's waters, including wetlands. Sections 404 and 401 most directly influence development and related activities within floodplains.

Section 404 of CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. "Fill material" includes not only soil or dredge material, but also bridge footings, pier pilings, and other man-made materials. A Section 404 permit must be obtained from the USACE for any activity that includes the discharge of dredged or fill material into waters of the United States, including wetlands. Section 404 permits are either individual or general. Individual permits are required for specific activities that may potentially create significant impacts, such as the construction of dams, levees, and highways along a waterway. General permits may be granted by the USACE on a nationwide, statewide, or regional basis for activities that produce minimally adverse effects, such as minor culvert or road crossings over streams. Thus, the USACE has a direct authority to regulate waters of the United States, including wetlands, and Section 404 permitting is one regulatory mechanism that affects development within riverine and coastal floodplains.

The U.S. Environmental Protection Agency (EPA) plays a key oversight role in the implementation of Section 404 through the Section 401 water quality certification process, which is required for issuance of a Section 404 permit. In some States, Section 401 authority is delegated to a State regulatory agency. The main function of Section 401 is to allow State and Tribal jurisdictions to review and approve, condition, or deny all Federal permits or licenses that may produce discharge within the jurisdiction's waterway. Applicants for a Federal license or permit must demonstrate that either the State in which the proposed discharge will originate or the interstate water pollution control agency with jurisdiction over the navigable waters in question has approved the proposed development. As a result, all Federal permits, including those issued by USACE, must also meet all applicable State (or interstate) water management provisions. Throughout the Section 404/401 process, the USFWS, NOAA Fisheries, and State resource agencies all play an advisory role for USACE and EPA.

In most cases, the jurisdictional limit of Section 404 and Section 401 permitting is the highest tide line in tidal areas and the ordinary high water mark along freshwater waterways. Wetlands and relatively permanent tributaries with connection to navigable waters are also generally under Section 404 and Section 401 jurisdiction. While floodways typically fall entirely within the jurisdictional limit of Section 404 and 401 permitting, the full extent of the SFHA may not.

In addition to these aspects of the CWA, the National Pollutant Discharge Elimination System (NPDES) Stormwater Program is a comprehensive, two-phased national program for addressing the non-agricultural sources of stormwater discharges that adversely affect the quality of the nation's waters. The program uses the NPDES permitting mechanism to require the implementation of controls designed to prevent harmful pollutants from being washed into local water bodies by stormwater runoff. The NPDES permit requirements include mandatory permits for any earth moving or ground clearing for areas larger than 1 acre. Implementation of this phase of the program will provide a higher degree of agency review and corresponding measures to protect aquatic resources.

3.4.5 Sections 9 and 10 of the Rivers and Harbors Act

Sections 9 and 10 of the Rivers and Harbors Act represent additional Federal legislation that influences the type and intensity of development around navigable waters. Originally passed in 1899, Section 9 of the Act prohibits bridges, dams, dikes, or causeways to be constructed over or within U.S. navigable waters without Congressional approval (33 U.S.C. § 403, Chapter 425).

Both the U.S. Coast Guard and the USACE have jurisdictional authority in the administration of Section 9. State legislatures may authorize the construction of such structures if the affected navigable waters are contained wholly within the State. Section 10 requires approval from the USACE for the construction of wharfs, piers, jetties, or other structures. Projects occurring in the floodplain that have to address NFIP floodplain management requirements must also take the provisions of this Act into account for development near navigable waters.

3.4.6 Coastal Barrier Resources Act and Coastal Barrier Improvement Act

The Coastal Barrier Resources Act (CBRA) (Public Law [P. Law] 97-348, 16 U.S.C. §§3501–3510, 42 U.S.C. §4028), administered by the USFWS, was enacted to protect sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines. The CBRA established the Coastal Barrier Resources System (CBRS), which is composed of undeveloped coastal barrier islands, including those in the Great Lakes. The areas protected under CBRA include CBRS protected system units and Otherwise Protected Areas. Areas contained within the system are ineligible for direct or indirect Federal funds that might support or promote coastal development. The CBRS areas are located in nearly 400 communities on the Atlantic and Gulf coasts and along the Great Lakes shores, and cover an estimated 3 million acres. These areas are delineated on the communities' flood maps.

The CBRS currently includes 585 System units, encompassing approximately 1.3 million acres of land and associated aquatic habitat. CBRS system units are usually relatively undeveloped private lands at the time of designation within the CBRS. Most new Federal expenditures and financial assistance, including Federal flood insurance, are prohibited within System units.

Otherwise Protected Areas (OPA) are generally comprised of lands held by a qualified organization primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purpose. The CBRS currently includes 272 OPAs, encompassing approximately 1.9 million acres of land and associated aquatic habitat. The only Federal spending prohibition within OPAs is the prohibition on Federal flood insurance. (U.S. Fish and Wildlife Service, 2015)

3.4.7 Coastal Zone Management Act

The Federal Coastal Zone Management Act of 1972 calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active State involvement in achieving these goals. The Act requires participating coastal States to develop coastal zone management programs to effectively manage coastal zones within State boundaries. These programs are intended to protect wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and fish and wildlife habitat and often involve coordinating permit processes, landowner assistance, and grants to communities. Upon Federal approval of a State's coastal zone management program, the State becomes eligible for Federal coastal zone grants. Grant allocation is based on the total number of shoreline miles and shoreline population density within the State. Development projects within the coastal zone must demonstrate compatibility with the State's coastal zone program and apply for a coastal zone permit; review by other regulatory agencies such as USFWS and NOAA Fisheries is typically part of a coastal zone permit review. For projects in the coastal zone that are funded, authorized, or carried out by a Federal agency, a Federal consistency determination is submitted to the State as confirmation the project is consistent with the State coastal zone program.

3.4.8 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 requires Federal agencies to assess the environmental impacts of their Proposed Actions and reasonable alternatives to those actions. Potential project impacts to physical, air and noise, socioeconomic, biological (including ESA

species), transportation, land use, aesthetics, environmental justice, and cultural resources are analyzed.

Projects in the floodplain that are federally funded, such as hazard mitigation grants, are required to document compliance with NEPA. The NEPA document would also include an assessment of a project's potential to affect ESA-listed species and designated critical habitats. The level of NEPA analysis depends on the anticipated impacts of the project. For projects with minimal to no impacts, a Categorical Exclusion (CATEX) may be prepared. A CATEX is a list of actions an agency has determined do not individually or cumulatively affect the quality of the human environment (40 C.F.R. §1508.4).

If the Proposed Action is not included in the list of categorically excluded actions, an Environmental Assessment (EA) must be prepared. EAs are concise public documents that include the need for a proposal, a list of alternatives, and a list of agencies and persons consulted in the proposal's drafting. The purpose of an EA is to determine the significance of the proposal's environmental outcomes and to look at alternatives of achieving the agency's objectives. An EA is supposed to provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS), aid an agency's compliance with NEPA when an EIS is not required, and facilitates preparation of an EIS when one is necessary. If no substantial effects on the environment are found after investigation and the drafting of an EA, the agency must produce a Finding of No Significant Impact (FONSI). This document explains why an action will not have a significant effect on the human environment and includes the EA or a summary of the EA that supports the FONSI determination.

If it is determined that a proposed Federal action does not fall within a designated CATEX or does not qualify for a FONSI, then the responsible agency must prepare an EIS. The purpose of an EIS is to help public officials make informed decisions based on the relevant environmental consequences and the alternatives available. The drafting of an EIS includes public party, outside party, and other Federal agency input concerning its preparation.

An EIS is required to describe the environmental impacts of the Proposed Action, any adverse environmental impacts that cannot be avoided should the action be implemented, the reasonable alternatives to the Proposed Action, the relationship between local short term uses of man's environment along with the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action.

3.4.9 Magnuson-Stevens Fishery and Conservation Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA; P. Law 94-265) (National Marine Fisheries Service, 2007b), as amended by the Sustainable Fisheries Act of 1996 (P. Law 104-267), Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance these habitats. Essential Fish Habitat (EFH) is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity... 'Waters' includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle" (National Marine Fisheries Service, 2004). The MSA requires cooperation among NOAA Fisheries, the eight regional Fishery Management Councils (FMCs), and Federal and State agencies to protect, conserve, and enhance EFH.

Pursuant to Section 303(a)(7) of the MSA (National Marine Fisheries Service, 2007b), regional FMCs must prepare Fishery Management Plans (FMPs) which include the identification of EFH used by all life history stages of each managed species. NOAA Fisheries and the FMCs, under the authority of the Secretary of Commerce, are mandated to describe and identify EFH in each FMP; minimize to the extent practicable the adverse effects of commercial fishing on EFH; and identify other actions to encourage the conservation and enhancement of EFH (50 C.F.R. § 600.805-930). NOAA Fisheries and the regional FMCs also identify Habitat Areas of Particular Concern (HAPC) (National Marine Fisheries Service, 2015b).

Section 305(b)(2) of the MSA requires a Federal agency to consult with NOAA Fisheries on all activities, or proposed activities, authorized, funded, or undertaken that might adversely affect EFH. As part of the EFH consultation process, Federal agencies must prepare a written EFH Assessment describing the effects of that action on EFH. NOAA Fisheries recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA, Section 7 of the ESA, or the Fish and Wildlife Coordination Act. NOAA Fisheries must provide the Federal agency with EFH consultation recommendations for any action that may adversely affect EFH (50 C.F.R. § 600.805-930).

3.4.10 State and Local Floodplain Management Regulations

State and local agencies often establish floodplain regulations to address floodplain issues and flooding concerns. Because these regulations are specific to each State or community, they may vary widely. State floodplain programs are usually administered by a State's environmental protection or natural resources department or through the emergency management department, which may institute supplemental or independent reviews, permitting, or floodplain management requirements for projects that occur in floodplains. Local floodplain regulatory programs are generally implemented by county or community hazard prevention departments, zoning departments, environmental departments, or conservation districts. These local agencies may institute supplemental or independent environmental review, permitting, or floodplain management requirements for projects that occur in floodplains.

3.5 Major Factors Influencing Floodplain Development

The NFIP is sometimes perceived, based on anecdotal evidence, as encouraging development in the floodplain. However, the studies and analysis in this section demonstrate that development in the nation's floodplains is driven by other factors. This section provides an overview of the primary factors influencing development, such as economic factors, including the availability of jobs, proximity to ports, and tourism and recreation; infrastructure; and proximity to natural resources and existing communities.

Historically, people have been attracted to water as places for living, industry, commerce, and recreation. During the early settlement of the United States, locations near water provided necessary access to transportation and a water supply. Many of the oldest and largest cities in the United States are located near the Atlantic or Pacific Oceans, or on harbors that join the ocean (New York, New Orleans, Boston, Baltimore, San Francisco, etc.). As populations grew and cities began to expand, these locations were very important for trading and shipping, with communities growing in the surrounding areas (job creation). Settlements near water also have fertile soils, making them prime agricultural lands.

This pattern of development continued as communities grew; even after natural disasters destroyed communities, damaged crops, and caused deaths, communities continually chose to rebuild in the floodplain. In April and May 1927, the most destructive historical flood in the United States occurred along the Mississippi River resulting in 500 deaths and leaving 600,000 people

without homes. Across Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana, some 16 million acres of land (26,000 square miles) were inundated with water (Webley, 2011). After the floods of 1927, the USACE used Federal funds from the Flood Control Act of 1928 to develop a flood-control system for the Mississippi River, allowing for the areas impacted to be rebuilt (Ashley County Ledger, Undated). In 1861-1862, a "megaflood" occurred in Central Valley, California causing the State to go bankrupt (Ingram, 2012). Today, the same regions that were so greatly damaged in this flooding event, such as the Sacramento area (which also experienced floods in 1849, 1850, 1851, and twice in 1852 and 1853), are some of California's most prosperous and growing cities (Ingram, 2012) (New York Times, 1862). In recent decades, development along waterways and shorelines — areas within floodplains — has been spurred by the aesthetic and recreational value of these locations (American Institutes for Research - Blais et al., 2006) (Comptroller of the United States, 1982).

Numerous factors influence individuals and communities to develop in the floodplain. The key factors identified in the studies reviewed by the Government Accountability Office (GAO) as driving development in the floodplain were the diverse natural resources, abundant wild life, agricultural lands, commercial and sport fishing resources, and diverse recreational potential. Additional factors identified by GAO include bridge access to barrier islands; community infrastructure such as roads, water, sewers, and utilities; the availability of mortgage and investment capital; construction costs; the state of the economy; and regional and local economic conditions (Comptroller of the United States, 1982).

Table 3-2. New Privately Owned Housing Units Authorized

Year	Total Number of Authorizations for One Unit Structures	In SFHA
2012	518,695	38,208
2013	620,802	45,591
2014	640,318	46,858
2015	695,998	50,750

Notes: A housing unit, as defined for purposes of these data, is a house, an apartment, a group of rooms, or a single room intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have a direct access from the outside of the building or through a common hall.

Source: (U.S. Census Bureau, 2016)

3.5.1 Economic Factors

Jobs. Jobs are one of the strongest development drivers in U.S. coastal areas (National Ocean Economics Program, 2014). The United States has 673 coastal watershed counties: 285 along the Atlantic Ocean (21.4 percent of all U.S. counties as of July 2013) (U.S. Census Bureau, 2013); 142 in the Gulf of Mexico region; 87 bordering the Pacific Ocean; and 159 fronting the Great Lakes (U.S. Commission on Ocean Policy, 2004). Coastal watershed counties¹⁴ account for less than 25 percent of U.S. land area, yet they are home to more than 52 percent of the U.S. population a disproportionate number of people are driven to coastal areas due to jobs and other economic factors (U.S. Commission on Ocean Policy, 2004).

The U.S. ocean economy includes six sectors of economic activity that derives all or part of their inputs from the Atlantic Ocean, Pacific Ocean, or Great Lakes. These economic activities are significant drivers of coastal development and include: (1) construction, (2) living resources (e.g., fishing), (3) offshore minerals, (4) ship and boat building, (5) tourism and recreation, and (6) transportation. Of the 6 ocean economy sectors, tourism and recreation alone provided nearly 70 percent of jobs in 2012 (Table 3-3). In terms of economic GDP contribution, tourism and recreation contributed \$89.25B, offshore minerals contributed \$87.37B and transportation contributed \$58.73B (Table 3-3). The concept of the ocean economy derives from the fact that the oceans and Great Lakes generate a large amount of economic activity (National Ocean Economics Program, 2014).

In 2000, coastal watershed counties were home to nearly half of the nation's jobs and generated a similar proportion of the nation's gross domestic product (GDP); more than \$4.5T of the nation's annual GDP (as of 2000) is generated within coastal watershed counties (U.S. Commission on Ocean Policy, 2004). The contribution to employment is equally impressive with 60 million jobs in coastal watershed counties, more than 13 million of these jobs support trade transported by the network of inland waterways and ports that support our nation's waterborne commerce (National Oceanic and Atmospheric Administration, Undated). In addition, the cruise industry provided over 340,000 jobs paying over \$16.5B in total wages and salaries in 2011 (American Association of Port Authorities, 2012).

Shore-adjacent counties are immediately adjacent to the shoreline of an ocean, the Gulf of Mexico, or a Great Lake. Watershed counties encompass coastal watersheds as defined by the U.S. Geological Survey, whereas inland counties are located outside of the defined coastal watershed areas. Within coastal States, the shore-adjacent counties comprise 37 percent of overall employment on only 17.5 percent of U.S. land area, indicating that the concentration of the nation's economy is found near the oceans and Great Lakes. The coastal economy sector consists of all economic activities in the coastal region (e.g., restaurants, hotels, surf shops, etc.) (National Ocean Economics Program, 2014).

In a study of all 30 coastal States in terms of employment and percentage of coastal land, 12 States in particular were found to be the most valuable in terms of their overall contribution to coastal employment (Table 3-3). Leading the top coastal States is California where shore-adjacent counties comprise 77.6 percent of land yet were responsible for providing 90 percent of overall employment in 2012 (National Ocean Economics Program, 2014).

¹⁴ Coastal watershed counties are those counties with at least 15% of their land area in a coastal watershed.

Table 3-3: Coastal State and Shore-adjacent County Employment, 2012

State	Total Private State Employment*	Coastal Employment	% of Shore-adjacent counties within State	% of State Jobs in Coastal Lands
California	12,952,818	11,607,875	77.6%	90.0%
Connecticut	1,463,732	951,307	58.4%	64.9%
Florida	6,932,382	5,368,259	73.1%	77.4%
Illinois	5,119,826	2,727,015	48.4%	53.3%
Louisiana	1,644,282	685,462	36.6%	41.7%
Maine	486,838	322,929	55.4%	66.3%
Maryland	2,152,458	1,277,015	50.8%	59.3%
Massachusetts	3,035,897	1,712,214	52.8%	56.4%
Michigan	3,468,089	1,731,046	44.0%	49.9%
New Jersey	3,440,470	2,519,037	66.8%	73.2%
New York	7,556,521	6,506,129	76.0%	86.1%
Washington	2,361,697	2,078,302	71.8%	88.0%

Source: (National Ocean Economics Program, 2014)

*Private non-farm employment (U.S. Census Bureau, 2014)

Ports. Throughout the early years of the United States' history, commerce drove development to both riverine and coastal ports. Development adjacent to many of the nation's largest riverine waterways — such as the Mississippi, Ohio, Missouri, and Illinois Rivers — and development within our largest coastal ports — such as New York, San Francisco, and Houston — pre-dates the existence of the NFIP by more than a century. The "boomtowns" of the 19th century, including New Orleans, St. Louis, and Cincinnati, grew substantially on waterborne commerce. Waterborne commerce was so important during the 19th century "boomtown" period that the nation began to build new waterways, such as the Erie Canal (Smithsonian National Museum of American History, Undated). The sustained importance of ports to the nation's economy is likely to continue to drive development in those coastal and riverine areas.

In 2007, 13M employees worked in port-related jobs generating nearly \$650B in annual personal income and \$212.4B in Federal, State, and local taxes (Martin Associates, 2007). Jobs that directly depend on ports are terminal workers, longshoremen, pilots, forwarders, brokers, steamship agents and lines, ship crews, warehousing and transloading employees, container repair and leasing companies, chandlers, surveyors, ship repair and marine construction businesses, barge operators, and local government (American Association of Port Authorities, 2013).

Today, as coastal and riverine ports continue to provide access to ocean-related commerce, they continue to drive floodplain development. Users of the waterway system each year include 70,000 port calls for commercial vessels, 110,000 fishing vessels, and 20 million recreational vessels (National Oceanic and Atmospheric Administration, Undated). Additionally, international trade through U.S. coastal and riverine ports supports 25-30 percent of GDP and 13M jobs, supporting the growth of U.S. manufacturing, agriculture, forestry, and nationwide export initiatives (American Road & Transportation Builders Association, 2015).

Annually, the nation's ports handle more than \$700B in goods to include the cruise industry (\$12B), commercial fishing industry (\$28B), recreational saltwater fishing (\$20B), and recreational boating (\$30B). Over the next two decades, overseas trade via U.S. ports, including the Great Lakes, is expected to double in volume. The expanding ferry and cruise line industries continue to provide economically valuable means of transportation for work and leisure (U.S. Commission on Ocean Policy, 2004). For every \$1B in manufactured goods exported through U.S. seaports, 15,000 American jobs are created (American Association of Port Authorities, 2012). Marine transportation and ports also play a central role in national security as U.S. harbors and ports are major points of entry to our country. Local, State, and Federal government agencies all maintain a significant presence in coastal areas related to fields of port management and law enforcement (U.S. Commission on Ocean Policy, 2004).

In 2012, the top U.S. coastal ports contributed over \$1T in total imports and exports (Table 3-2). Los Angeles, one of the nation's largest ports, contributed \$283.5B in total revenue, consistent with previous coastal land and employment findings for the State (U.S. Commission on Ocean Policy, 2004) (National Ocean Economics Program, 2014). Los Angeles is responsible for contributing approximately \$336B annually to the U.S. GDP (Conway, 2013).

Since 2001, the Gulf Coast has expanded its job base by 7 percent and is projected to grow another 18 percent in the coming decade. Gulf Coast cities, such as New Orleans and Corpus Christi, are expanding due to a growing concentration of energy jobs, which are five times the national average for that sector (Kotkin, 2013).

Coastal ports along the East Coast are also expanding in terms of job, population, and development growth. One of the largest coastal ports on the East Coast is the New York port, which includes New York City and New Jersey. New York is responsible for contributing approximately \$218.3B annually to the U.S. GDP (National Ocean Economics Program, 2015). Charleston, another East Coast port, contributes approximately \$63.6B annually to the U.S. GDP (National Ocean Economics Program, 2015). In 2013, the Port of Chicago supported an estimated 6,900 jobs and America's Central Port, located on the Illinois side of the Mississippi River, handled 80M tons of product (McMeekin, 2013). Growth in employment and the economic gain from coastal ports supports development opportunities for this industry.

Tourism and Recreation. Tourism and recreation constitute the fastest growing sector of the ocean economy extending virtually everywhere along the coasts of the continental United States, southeast Alaska, Hawaii, and island territories and commonwealths. People are attracted to coastal properties as full-time or vacation homes. This was the finding of a 1982 GAO Report, which found that a multitude of factors influence a builder to construct, an individual to occupy a structure, or an executive to locate in a coastal or barrier island community. The report concluded that the primary reason for this development is desirability of the location for retirement and recreation purposes. GAO further concluded that other factors promoting development include the availability of a community infrastructure, the availability of capital, and the viability of the local economy (Comptroller of the United States, 1982). These conclusions were supported by a more recent study issued by the American Institutes for Research (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006).

Across the country, more than 89 million people a year participate in marine-related recreation, such as swimming, scuba diving, surfing, motor boating, sailing, kayaking, and wildlife viewing (U.S. Commission on Ocean Policy, 2004). In 2006, U.S. households made nearly 110 million trips to the beach, each spending an average of \$850 per trip (National Oceanic and Atmospheric Administration, Undated).

Burgeoning industries associated with tourism and recreation require development in coastal areas, such as hotels, resorts, restaurants, fishing and dive stores, marinas, and other retail businesses these industries are leading tourism to be one of the nation's largest and fastest-growing economic forces. In four South Florida coastal counties, recreational diving, fishing, and ocean-watching activities generate \$4.4B in local sales and almost \$2B in local income annually. Visitors to the Florida Keys total more than 2.9 million people each year. During the summer of 2000, beach activities in Los Angeles and Orange counties in California stimulated an estimated \$1B in spending. The Hawaiian Islands and many U.S. island territories are particularly dependent on tourism for their economic health. Hawaii attracts close to 7 million tourists each year (U.S. Commission on Ocean Policy, 2004). In 2011, over 10 million passengers boarded cruise ships (U.S. Department of Transportation, 2012). More Americans participate in recreational fishing than in both of golf and tennis combined (U.S. Commission on Ocean Policy, 2004). Taken together, these industries collectively serve as a strong driver of coastal floodplain development throughout the country.

Agriculture. The EPA reports that more than \$450B in foods, fiber, and manufactured goods depend on clean, healthy watersheds (Environmental Protection Agency, 2013a). The main source of food for the population is agriculture, which encompasses livestock, fisheries, and forestry. As the population continues to increase, more food and livestock feed are needed. The closer farmers are to water sources, the cheaper the production of food and feed would be. As the population increases, so would the consumer demand for food to feed the growing population, and this, in turn, would drive more agricultural development in areas near or surrounding water (LENNTECH, 2014).

3.5.2 Infrastructure

Many factors can influence development within the floodplain, including the attractiveness and location of the site for developers and consumers. More intense demands for development in the floodplain comes with population growth and development. An increase in population growth can lead to an increase in residential units and commercial businesses within a community. Property located near favorable amenities, such as central business districts, shopping, schools, recreational areas, open space, and areas of employment, add value to the property and increase the demand to develop these parcels (Burby, et al., 1988). The placement of streets and utility lines also affects the property value, and therefore, influences where developers are willing to invest. In a 1982 report, GAO identified the availability of community infrastructure as a key factor promoting development (Comptroller of the United States, 1982).

Transportation. Highway interchanges are often prime locations for fast food restaurants and hotels, as well as other types of businesses. Easy access to main thoroughfares and highway interchanges increase the land value and can intensify development pressures in areas where it might not otherwise occur. For instance, the Lake Pontchartrain Causeway enabled rapid growth in St. Tammany Parish, which is situated near New Orleans, Louisiana (Bagstad, Stapleton, & D'Agostino, 2007). Maryland State officials claim that the Chesapeake Bay Bridge (completed in 1952) and the Chesapeake Bay Bridge-Tunnel (completed in 1964) allowed for improved access to Ocean City, Maryland for residents of the Washington, DC and Baltimore, Maryland metropolitan areas (both of which are 50+ miles away from Ocean City), as well as southern Virginia. These infrastructure projects increased demand for development in their respective communities (Ocean City Maryland Chamber of Commerce, 2015). Multiple interviews indicated that improved transportation options were a primary driver for development on this barrier island (Comptroller of the United States, 1982).

Case Example: Mullin v Skinner

In *Mullin v. Skinner*, 756 F. Supp. 904 (E.D. N.C. 1990), the court acknowledged the substantial effect that construction of highways has on development. This suit involved a challenge brought against the Federal Highway Administration and other defendants for violations of NEPA related to its decision to allow the construction of a high-rise, fixed-span bridge at the island of Sunset Beach, NC. Although the Environmental Assessment concluded that the bridge project would not cause a significant alteration in development patterns, the court found that "it is obvious that constructing a large interchange on a major interstate highway in an agricultural area where no connecting road currently exists will have a substantial impact on a number of environmental factors." The court further found that its conclusion is supported by a Department of Transportation's document—PPM 90-1, August 24, 1971, 2 ELR 46106, which governs preparation of impact statements for federal-aid highway projects. That document states: "The improved access and transportation afforded by a highway may generate other related actions that could reach major proportion and which would be difficult to rescind. An example would be a highway improvement which provides access to a nonaccessible area, acting as a catalyst for industrial, commercial, or residential development of the area." *Id.*, Appendix E, Par. 2f, 2 ELR at 46110. The court held that the "growth-inducing effects of the [proposed bridge project] are its reason d'être, and with growth will come growth's problems: increased population, increased traffic, increased pollution" See *Mullin*, 756 F.Supp. at 920.

Utilities. The presence/absence of municipal services such as gas, electricity, water supply, communications, sanitary sewer connectivity, and other utilities has a significant influence on the land values, and therefore, can be considered an influential driver of development. Areas that maintain existing utilities tend to experience additional development, more than areas where utilities have yet to be installed (Asabere & Harvey, 1985) (Burby, et al., 1988) (Scott, 1989). When vacant land lacks access to adequate utilities, the associated costs for development increase and the likelihood of development decreases (Asabere & Harvey, 1985) (Burby, et al., 1988). Acquiring access to adequate utilities can significantly increase investment costs associated with development, especially if the nearest utility service is far from the site (Burby, et al., 1988) (Scott, 1989). When a site lacks access to utilities, developers often consider the costs associated with the actual development versus the final value of the finished development (U.S. Department of Treasury, 2010). As long as the costs to bring utilities to the site do not exceed final profit potential, a developer may opt to pay for installation of utilities in order to develop a desirable piece of land.

3.5.3 Proximity to Natural Resources / Existing Communities

The 1982 GAO report noted that people desire to locate in coastal and barrier island communities because of the beaches and the recreational and retirement opportunities they provide. The study indicates that people are driven to coastal areas because they are "richly endowed with natural resources, abundant wildlife, agricultural lands, commercial and sport fishing resources, and diverse recreation potential." In addition, the report also cited the convenience of "shorefront hotels, condominiums, restaurants, and shops..." (Comptroller of the United States, 1982). None of the research studies GAO reviewed attributed development in coastal and barrier island communities to the existence of flood insurance, but some reported on the increased growth in these types of communities and the reasons for that growth. Likewise, the American Institutes for Research found that "available evidence suggests that many CBRS units have developed, often quite extensively, despite the absence of NFIP insurance" (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006).

The desire for beach living is further evidenced by the fact that communities often rebuild after devastating storms. For example, both Ocean City, Maryland and Bethany Beach, Delaware were rebuilt after a major storm hit the area in 1962—six years before the creation of the NFIP (Comptroller of the United States, 1982). More recently, communities along the New York and New Jersey coasts elected to rebuild after Superstorm Sandy (hit landfall in 2012) (Joyce, 2013). Erwann Michel-Kerjan, managing director of the Risk Management and Decision Processes Center at Wharton, emphasizes that in the absence of an immediate and lethal threat, such as

nuclear contamination, it is hard to deter people from wanting to rebuild their homes" (University of Pennsylvania (Wharton), 2013).

In short as the American Institutes for Research noted in its 2006 report:

"[A]lthough the availability of flood insurance may affect a decision to build in a floodplain that is also the habitat of an endangered species, the insurance alone is unlikely to be the sole or primary factor that leads to a decision to build. Indeed, it may not be a factor at all."

This report further found that the linkage between flood insurance and floodplain development, to the extent it exists, is not easily separated from other competing explanations of such development (such as those primary drivers of development discussed above) (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006).

3.6 The NFIP and Floodplain Development

Some have claimed, based on anecdotal evidence, that the NFIP reduces the financial risk to property owners and communities from potential flood disasters through relatively low-cost property insurance. However, the research and empirical evidence on the issue demonstrates that the asserted linkage between the availability of flood insurance and resulting impacts on development or the environment is tenuous. As defined by the ESA, indirect effects are those effects that are caused by a Proposed Action and are later in time, but are still reasonably certain to occur (50 C.F.R. § 402.02) whereas direct effects are caused by a Proposed Action and occur at the same time. The NFIP does not cause development to occur, nor does it play a significant role in facilitating or encouraging floodplain development. As such, floodplain development is neither a direct, nor an indirect, effect of the implementation of the NFIP.

3.6.1 Availability of NFIP Flood Insurance

A history of the NFIP and the available data demonstrate that the availability of flood insurance has proved a very poor incentive to develop in the floodplain. Prior to 1973, there were only 95,000 policies. Because of the lack of interest in purchasing flood insurance, Congress passed the Flood Disaster Protection Act of 1973, which required the purchase of flood insurance as a condition of receiving federally-backed loans and Federal assistance in special flood hazard areas of participating communities. Even after 1973, flood insurance purchases were still low, so Congress passed the National Flood Insurance Reform Act of 1994, which required Federal agency lender regulators to develop regulations to direct their federally regulated lenders not to make, increase, extend, or renew any loan on applicable property unless flood insurance is purchased and maintained. The law also addressed the responsibility of regulated lending institutions and Government-Sponsored Enterprises (GSEs) (i.e., Fannie Mae and Freddie Mac) in providing a notice of, and requiring, flood insurance coverage for the term of the loan on buildings located in any SFHA in participating NFIP communities. However, the 1994 Reform Act has not had a substantial impact in increasing flood insurance purchases.

A 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that other factors, aside from flood insurance, are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress." (Congressional Research Service, 2013).

The literature on risk perception indicates that public perceptions about low frequency/high damage events, such as flooding, imply that the availability of flood insurance may do little to encourage floodplain development because property owners frequently have an "optimistic bias" — a tendency to view themselves as invulnerable, or less likely than others, to experience negative life events such as flood damage (American Institutes for Research - Rosenbaum, W., 2005). There is evidence that many homeowners are either not fully aware of the risk of a flood occurring or that they discount the cost of a flood if it occurs. In some cases, owners simply underestimate the risk of flooding. Rosenbaum (2005) notes that many studies find homeowners underestimate the risk of floods and even when informed, few owners react to offset the risk (American Institutes for Research - Rosenbaum, W., 2005). For example, Chivers and Flores (2002) surveyed homebuyers in Boulder, Colorado and found a market failure of information in which homeowners did not fully understand the flood risks or cost of insuring against the risk when purchasing their homes (Chivers and Flores, 2002). Michel-Kerjan (2010) also noted that, despite the occurrence of floods or natural disasters, homeowners take no action to fortify their homes, likely due to "a lack of accurate knowledge about risk; budget constraints; and myopia" (Michel-Kerjan, 2010). This effect is evident through the actions of homeowners. Michel-Kerjan, Lemoyne de Forges, and Kunreuther (2012) found that homeowners allowed their flood policies to lapse typically after two to four years, even for federally-backed mortgages that require flood insurance.¹⁵ This occurs despite the rule prohibiting individuals from applying for disaster assistance a second time unless flood insurance has been maintained (Michel-Kerjan, Lemoyne de Forges, & Kunreuther, Policy Tenure Under the U.S. National Flood Insurance Program, 2012).

The 2006 AIR report found that out of approximately 20,000 communities participating in the NFIP at the time of the report,

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;
- Five states – California, Florida, Louisiana, New Jersey, and Texas -- accounted for nearly 70% of all NFIP policies; and
- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (American Institutes for Research - Monday et al., 2006)

Although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of individual behavior. A 2006 American Institutes for Research (AIR) report provides a number of data points on the level and concentration of policies within the States, territories, and participating communities that demonstrates this point (American Institutes for Research - Monday et al., 2006). A substantial literature review concerned with the public's perceptions about low frequency/high damage events, such as flooding, also implies that the NFIP and flood insurance may do little to influence floodplain development. In 1982, a GAO study concluded that although much development is occurring in the floodplain, flood insurance is not the principal reason for that development. In an interview of 115 people, including 12 Federal officials, 46 State and local government officials, and 57 business people and private citizens, not one person cited flood insurance as the principal factor encouraging their respective decisions to develop in the floodplain (Comptroller of the United States, 1982).

¹⁵ For loans made by federally regulated lenders, lenders are responsible for enforcing the flood insurance requirement. However, as explained by Michel-Kerjan, Lemoyne de Forges and Kunreuther (2012), some banks do not ensure the policies remain in force.

Looking more broadly to the link between the implementation of the NFIP generally and floodplain development, the studies have not shown that there is any demonstrable connection. For example, GAO analyzed floodplain development data both before and after a community entered the NFIP. GAO used (1) available Bureau of the Census data on population, per capita income, and new housing units authorized by building permits and public contracts in the United States and (2) building permits that the six selected communities reportedly issued. GAO's analysis concentrated on population growth and increases in housing units authorized for construction. GAO compared the rate of population growth in a 20-year period with the dates the communities entered the program. Generally, the communities were growing before their entrance into the program from 1960 to 1970, and this rate of growth continued from 1970 to 1980. (Comptroller of the United States, 1982)

GAO obtained data on new housing units authorized for a 10-year period for the Nation and the three larger communities, but GAO was only able to obtain this data from 1977 to 1980 for the three smaller communities. New housing units authorized were increasing in all three larger communities prior to their entrance into the flood insurance program and continued to increase thereafter. GAO was unable to attribute the rate of increase in new housing units authorized to the availability of flood insurance because of the many other factors that promote community development. The GAO found that annual increases and decreases in new housing units authorized generally paralleled the rise and decline of total housing units authorized in the Nation and seemed to be more directly related to the state of the economy than the availability of flood insurance.

AIR took a different approach and looked at floodplain development in areas where flood insurance is available compared to areas in which it is not available (e.g., CBRS units). In this study, AIR found that available evidence suggests many CBRS units have been developed, often quite extensively, despite the absence of NFIP flood insurance. The report noted that development appeared to result from a combination of State and local government incentives and market forces. For example, units in Bethany Beach, Delaware, North Topsail Beach, North Carolina, and Cape San Blas, Florida, studied in 1997 developed very much like nearby non-System areas. The report further found that market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce (American Institutes for Research - Rosenbaum, W., 2005); see also, (U.S. General Accounting Office, 1992).

As reported in the FEMA Floodplain Management Losses Avoided Study, more than half (57 percent) residential properties located in SFHAs were built prior to the inception of the NFIP. As such, it is clear that development has occurred, and would continue to occur, in the SFHA even in the absence of flood insurance. Thus, the research and empirical evidence demonstrate that the availability of flood insurance has very little effect on the on the motivation to develop the floodplain, which was already well established prior to the inception of the program. (Federal Emergency Management Agency, 2014d)

3.6.2 NFIP Flood Insurance Premium Rates and Phase Out of Subsidies

Environmental advocacy organizations have frequently asserted that inexpensive NFIP premiums encourage development in high-risk flood zones, particularly in coastal areas, that might not otherwise occur. Commonly suggested remedies include increasing NFIP premiums to reflect the true flood risk to the property (Pew Oceans Commission 2003, 58). Additionally, according to initial research, one major obstacle for private market insurers entering the flood insurance market has been the inability of private carriers to compete with subsidized premiums that are offered by the NFIP for certain properties (i.e., pre-FIRM buildings) (Insurance Journal, 2014). While private insurers have the capacity to provide coverage for flooding risk and can price more accurately

using better modeling tools, the lower premium rates offered by the NFIP have hindered their entrance into the market.

However, industry experts and reports have found that private insurers may be willing to write significant amounts of flood business if they are allowed to charge actuarially sound rates (Insurance Journal, 2014). According to the Fitch Ratings Report, if and when Federal subsidies for flood insurance are reduced and the cost of government provided flood insurance goes up, the demand for private flood coverage is projected to rise (Insurance Journal, 2014).

Following Biggert Waters, HFIAA, and initiation of the phase out of flood insurance subsidies for pre-FIRM properties, a number of private insurance companies are beginning to offer private flood insurance at competitive rates. With the introduction of private flood insurance into the Government dominated market, flood insurance rates are expected to become competitive and result in better policies and pricing for homeowners. Both Lloyd's of London and The Flood Insurance Agency (TFIA) are offering flood insurance policies in 33 States. The TFIA predicted an expansion from \$500M in insured property to \$1B by the end of 2014 (Hurtibise, 2014). Other insurance companies offering private flood insurance policies are Homeowners Choice Property & Casualty Insurance, who has just expanded their coverage area to include the State of Florida, Gridiron Insurance Underwriters, and Chubb Personal Flood Insurance. A number of private insurance providers also provide flood coverage that exceeds the maximum allowable limits statutorily authorized for the NFIP (\$250,000 for structural damage and \$100,000 for contents for residential properties, as well as \$500,000 each for structure and contents for non-residential properties) (Insurance Journal, 2014).

Even for non-subsidized policies (i.e., policies on post-FIRM buildings), premium rates are also increasing substantially from the recent legislative changes. As a result of Biggert Waters, FEMA is required to establish a Reserve Fund for the purpose of meeting the expected future obligations of the flood insurance program. FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment was introduced in October 2013 as a 5 percent assessment on all policies, and there is now a 15% assessment on all policies. That percentage is expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually. Additionally, as a result of HFIAA, all policyholders have to pay a surcharge of \$25 for policies on a primary residence and \$250 on all other policies. As such, even for non-subsidized policies, the market has grown significantly more competitive, and with the addition of these fees and surcharges, the NFIP is unlikely to be the most competitive insurer on the market in many cases.

Biggert Waters further removed obstacles to private market flood insurance by amending the Flood Disaster Protection Act of 1973 to allow federally-backed lenders to accept private flood insurance in satisfaction of the mandatory purchase requirement (42 U.S.C. § 4012a). Communities do not need to participate in the NFIP to ensure their eligibility for Federal assistance. As long as the purchase of flood insurance is required as a condition of receiving federally-backed loans and Federal assistance in special flood hazard areas, it is irrelevant whether that flood insurance is provided through the NFIP or through the private flood insurance market.

Private market participation has already increased significantly and will likely continue to do so as the NFIP moved further towards actuarial rates. To the extent that the availability of flood insurance has an influence on floodplain development, the private market will increase its influence in that respect. More to the point, as the market for private flood insurance grows, any influence the availability of NFIP flood insurance, in particular, may have on floodplain

development would diminish since even without participating in the NFIP, a community would still have access to flood insurance at the same price, but without the additional burden of compliance with the minimum floodplain management regulations and government-imposed assessments, fees, and surcharges.

3.6.3 NFIP's Role in Restricting Floodplain Development

There is some evidence that the NFIP discourages development in the SFHA through its floodplain management and flood hazard mapping activities (Rosenbaum & Boulware, 2006). NFIP participating communities must incorporate the NFIP's minimum floodplain management criteria into local laws and ordinances and ensure that development within the SFHA is compliant with those local laws and ordinances. However, NFIP participating communities can adopt more stringent standards and are encouraged to do so. Under the CRS, communities can get discounts on their flood insurance premiums for the adoption of higher regulatory standards. Additionally, flood hazard mapping promotes awareness of flood hazards, which can help to discourage floodplain development in areas where there is a significant risk of flooding. Each of these is discussed in detail in the subsections below.

However, even where development in the SFHA is discouraged, studies have shown that such development is likely to be displaced to non-floodplain locations, generally within the same community, rather than foregone altogether. This was considered the likely outcome of floodplain regulations at least as early as the 1981 FEMA study, *Evaluation of the Economic, Social and Environmental Effects of Floodplain Regulations* (Federal Emergency Management Agency, 1981). The conclusion of that study was based on projected impacts of different regulatory scenarios on future development in 21 case study communities across the U.S. This conclusion held even in communities with developable land constraints (e.g., steep topography).

3.6.4 Floodplain Management

3.6.4.1 Floodplain Management Criteria

Under the NFIP regulations, participating NFIP communities are required to regulate all development in FEMA-mapped SFHAs. Before a property owner can undertake any development in the SFHA, a permit must be obtained from the community. The community is responsible for reviewing the proposed development to ensure that it complies with the community's floodplain management ordinances and that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law. For many communities, if a "regulatory floodway" is required, the floodway must be designed to follow established guidelines under the NFIP. Once a floodway is designated, the community must only allow development in the floodway that would not cause an increase in flood heights. A 2006 AIR report found that in many communities, the NFIP has often restrained development in high-hazard floodplains and promoted safer construction in flood-prone areas through its floodplain management requirements (American Institutes for Research - Monday et al., 2006).

3.6.4.2 Community Rating System

A component of the NFIP that encourages conservation of floodplain resources and may benefit species listed as threatened or endangered and critical habitats is the CRS, which is discussed in Sections 2.1.1 and 6.1.1. The CRS is a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the goals of the CRS.

The CRS uses a class rating system to determine flood insurance premium reductions for residents. CRS classes are rated from 10 to 1. As a community engages in additional mitigation activities, community residents become eligible for additional NFIP premium policy discounts.

Flood insurance premium rates are discounted in increments of 5 percent (i.e., a Class 1 community would receive a 45 percent premium discount, while a Class 9 community would receive a 5 percent discount (Federal Emergency Management Agency, 2014c).

As premium rates continue to increase as a result of legislative changes under Biggert Waters and HFIAA, CRS will gain increasing importance as a source of flood insurance premium rate discounts. The CRS plays a key role in encouraging floodplain conservation and many of the creditable activities under the CRS may result in increased habitat protection beneficial to ESA species, critical habitat, and EFH. For example, FEMA has issued guidance entitled "CRS Credit for Habitat Protection" to describe the types of habitat protection activities that are eligible for CRS credit and, as such, flood insurance premium discounts. (Federal Emergency Management Agency, 2010)

3.6.5 Flood Hazard Mapping

By promoting broad based awareness of the risks associated with living in a floodplain, FEMA's flood hazard maps provide information that can encourage development away from flood hazard areas. FEMA also provides best available data, and upon request by the community, future conditions maps. This information may then be used by the communities and individuals to guide future decision-making regarding floodplain development and can discourage continued development in flood hazard areas.

4 LISTED/PROPOSED SPECIES AND DESIGNATED/PROPOSED CRITICAL HABITAT

The habitat classifications described in this chapter include all habitats that support ESA species and designated critical habitats that may be present throughout the U.S. and its territories. The Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and territories designated as SFHAs on a FIRM under the NFIP. A separate EFH Assessment is presented in Chapter 5.

The nationwide scope of the NFIP, and the vast geographic extent of the Action Area necessitated a broad, practical, and consistent approach to describing the numerous and varied ESA species and designated critical habitats throughout the U.S. and its territories. To enable an assessment of these resources, and subsequently a determination of effects, this document describes ESA species and designated critical habitat by first assigning them to broad habitat classifications (primary habitats) designed to allow a description of ESA species and designated critical habitats across the U.S. (environmental baseline). The environmental baseline provides a snapshot of a species health and or status at a given time and is used as the biological basis upon which to analyze the effects of the Proposed Action.

4.1 Habitat Classifications

FEMA considered various approaches to classify habitats; the approach described in this BE is only one that could be developed.

For example, we initially considered the use of EPA's broad Level I ecological regions that highlight 15 major ecological areas in North America (Environmental Protection Agency, 2013b). However, those 15 ecoregions are divided into 40 habitat classifications developed by the Commission for Environmental Cooperation (CEC) (Commission for Environmental Cooperation, 1997). A higher-level approach with a more manageable number of classifications was needed to describe habitats across the entire U.S.

The Anderson Land Use Classification System describes land uses across the U.S. in broad, simplified terms (Anderson, Hardy, Roach, & Witmer, 1976), and was found to be more suitable for a nationwide approach to classifying habitats. Habitat classifications in this document are based on the Anderson classifications, with some additions and modifications to the names and descriptions of each habitat classification to better fit the needs of this document. The habitat classifications as described here may differ from commonly used terms (rangelands vs grasslands) or similar habitat classifications used for other purposes. For example, "wetlands" as defined in this document are more inclusive than the statutory definition of wetlands applicable to USACE permitting activities under Section 404 of the Clean Water Act. Similarly, although forests occur in both upland and lowland areas, "forest land" as defined here includes only upland forests; lowland forests are included within the "forested wetland" classification.

The 12 main habitat classifications as defined in this document are described below.

4.1.1 Wetlands

Wetlands in this BE are separated into forested wetlands and nonforested wetlands. Forested wetlands are defined as perennially or intermittently flooded freshwater and saltwater lowland areas dominated by woody vegetation, such as trees and shrubs. Trees and shrubs present in a forested wetland may be deciduous, coniferous, or a mixture of both. Some typical characteristics of a forested wetland include a complex food web of organisms, canopy cover, leaf litter, hydric soils, hydrophytic vegetation, and the presence of a seasonal or permanent body of water that may be large (rivers, lakes) or small (streams, springs). Forested wetlands include forested

riparian areas, mangrove forests, wooded swamps and bogs, and lowland forested areas with seasonally flooding or water at or near the ground surface for at least part of the year.

Nonforested wetlands are defined as perennially or intermittently flooded freshwater or saltwater lowland areas dominated by herbaceous vegetation, such as mosses and emergent plants, or are not vegetated. Some typical characteristics of a nonforested wetland include a complex food web of organisms, open space, hydric soils, hydrophytic vegetation, and permanently or seasonally wet ground cover, possibly including small water bodies (streams, springs). Nonforested wetlands include freshwater meadows, open bogs, salt marshes, and wet prairies.

4.1.2 Fresh Waters

Streams and rivers are defined as freshwater linear bodies of water with perennial or intermittent flows while lakes are typically enclosed bodies of water that have no flow, either natural or manmade (reservoirs). Streams, rivers, and lakes are typically found in lowland areas that may be forested, herbaceous, or non-vegetated. Some typical characteristics of streams, rivers, and lakes include aquatic plants, varying depths, and varying flows.

Estuaries extend inland from the sea, where fresh and salt waters mix to create a brackish (slightly salty) water system. Estuaries are typically found in coastal areas where rivers meet marine waters and include areas below the low water line (National Oceanic and Atmospheric Administration, 2014c). Some typical characteristics of estuaries include a productive ecosystem, aquatic plants, brackish water, and a non-enclosed system.

4.1.3 Marine Waters

Marine waters are defined as salt waters along coastlines and include nearshore or offshore waters. Nearshore waters are loosely defined as generally within a few hundred feet of the shoreline; offshore waters occur beyond that point. Marine waters include bays, oceans, and areas below the low water line. Some typical characteristics of marine waters include varying depths, high biodiversity areas (e.g., coral reefs), and a general expanse of open water.

4.1.4 Beaches

Beaches are smooth sloping accumulations of sand and gravel along coastal shorelines that typically extend from the low water line to the upper extent of the 100-year flood. Beaches also include foredunes, or the non-vegetated or slightly vegetated (e.g., beachgrass) sand dunes closest to the shoreline. Some typical characteristics of beaches include a linear expanse of open space and a neighboring water body. Beaches can be found on the shorelines of marine waters, bays, estuaries, and lakes.

4.1.5 Barren Lands

Barren lands in this BE include inland sandy areas and bare exposed rock. Inland sandy areas are defined as accumulations of sand transported by wind. These areas occur in both mesic and arid areas, usually are sparsely vegetated, and have limited ability to support animal and plant life. Some typical characteristics of inland sandy areas include a barren expanse, sand dunes, and well-drained, sandy soils. Inland sandy areas are typically found in central Florida, and the west, and southwest regions of the contiguous U.S.

Bare exposed rock habitats are defined as accumulations of rock with sparse vegetative cover and a limited ability to support animal and plant life. Some typical characteristics of bare exposed rock include a barren expanse and a generally uneven, steep, and rocky environment. Bare exposed rock habitat includes exposed bedrock, desert pavement, scarps, talus, slides, volcanic material cover, and rock glaciers.

4.1.6 Caves

Caves are defined as hollows in the ground, especially those that open more or less horizontally into a hill or mountain and include karst caves, lava caves, and abandoned mines. Caves may contain standing or flowing water depending on local aquifers and the hydrologic processes of the area. Some typical characteristics of caves include a cool and dark subterranean environment, speleothems (mineral deposits that form on the cave floor and ceiling), and interconnecting passages (National Oceanic and Atmospheric Administration, 2015f). Small fissures and holes in hill and mountainsides that cannot support a substantial community of organisms are not included in this classification.

4.1.7 Rangelands

Rangelands are defined as areas dominated by upland species grasses and forbs (herbaceous rangeland), shrubs and brush (shrub and brush rangeland), or a mixture of both (mixed rangeland). Most rangelands are found in the western U.S., but can also be found in the central, eastern, and southeastern regions (where they are usually called grasslands), as well as in Alaska. Vegetation in herbaceous rangeland primarily includes short and tall grasses, bunch grasses, and desert grasses. Vegetation in shrub and brush rangeland primarily includes succulents or xeric vegetation with woody stems. A mixed rangeland will have herbaceous and shrub and brush plants. Some typical characteristics of rangelands include open space, short ground cover, and generally varied topography. Rangelands include, but are not limited to, previously used crop or pasture land, prairies, brushlands, and grasslands.

4.1.8 Forest Lands

Forest lands are defined as areas dominated by upland species of trees that may seasonally lose their leaves (deciduous forest land) or remain green throughout the year (evergreen forest land, which includes tropical hardwoods) or a combination of both (mixed forest land). As defined in this document, the forest land habitat does not include trees characteristic of forested wetlands. Some typical characteristics of forest lands include canopy cover, leaf litter, and a general lack of water bodies.

4.1.9 Perennial Snow or Ice

Perennial snow or ice habitats are defined as areas covered by snow, firn (course compacted granular snow), or ice year-round. This habitat features a barren expanse, freezing temperatures, snowbanks, a lack of vegetation, and glaciers. Perennial snow or ice in the U.S. primarily occurs in Alaska.

4.1.10 Urban/Built-Up Lands

Urban or built-up lands are defined as areas of intensive human use where much of the land is covered by man-made structures and impervious surfaces. Urban or built-up land includes residential, commercial, industrial, and transportation uses and typically has little to no natural vegetation and some level of human presence. The urban or built-up land classification includes cities, towns, highways, communication towers, shopping centers, manufacturing plants, and airports.

4.1.11 Agricultural Lands

Agricultural lands are areas primarily used for the production of food and fiber. Some typical characteristics of agricultural land are farming activities, the use of large, mechanized equipment, and tilled or compacted soil. Agricultural lands include cropland, livestock pastures, orchards, vineyards, greenhouse/nurseries, and confined feeding operations.

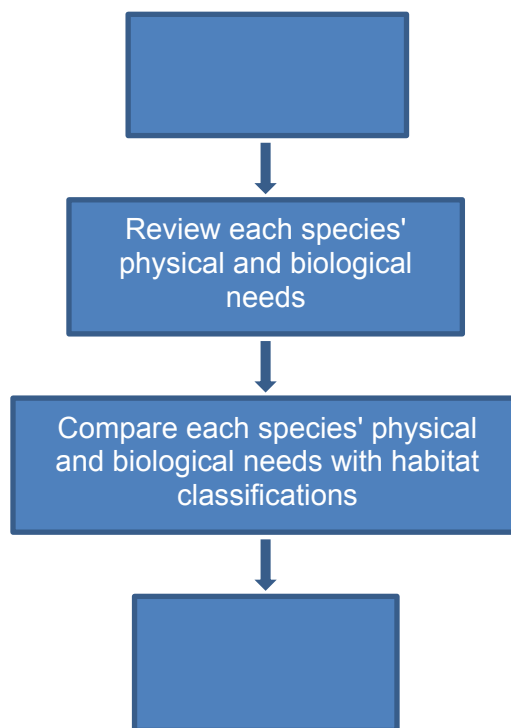
4.1.12 Tundra

Tundra is defined as treeless regions beyond the limit of the boreal forest and above the tree line in mountain ranges. Tundra in the U.S. primarily occurs in Alaska. Tundra vegetation includes woody shrubs and brush, sedges, grasses, and mosses. Some characteristics of tundra habitat include a permafrost layer in the soil, short and scarce vegetative cover, and freezing temperatures.

4.2 Primary Habitat Classifications that Support ESA Species

Habitats that met the physical and biological needs for at least one ESA species were considered likely to support ESA species (see Figure 4-1). To determine whether a habitat classification is likely to support ESA species, we first identified all species listed or proposed for listing under the ESA (U.S. Government Printing Office, 2015a) (U.S. Government Printing Office, 2015b) (National Marine Fisheries Service, 2015a) (U.S. Fish and Wildlife Service, 2015h). Information on each species' physical and biological needs was then obtained from the Services' websites—the USFWS Environmental Conservation Online System (ECOS) and Information, Planning, and Conservation System (IPaC), and the NOAA Fisheries Office of Protected Resources website. Other sources of information included ESA species' recovery plans and critical habitat designations, and other governmental, academic, and private sources. A team of biologists and ecologists reviewed the information and assigned each species to a primary habitat, defined here as the habitat classification, that meets most or all of a species' physical and biological needs for most or all of its life cycle.

Figure 4-1: ESA Habitat Classification Process



Based on this review of ESA species and their physical and biological needs, 9 of the 12 habitat classifications described in this BE were determined likely to support ESA species and critical habitats: wetlands, fresh waters, marine waters, beaches, barren lands, caves, rangelands, forest lands, and perennial snow or ice. Three habitat classifications were determined not likely to support ESA species and critical habitats: urban/built-up lands, agricultural lands, and tundra.

It was necessary to categorize species by primary habitats used, even though a species may use other habitats at various times. For example, endangered Mississippi sandhill cranes are assigned to the nonforested wetlands habitat in this document. These birds may sometimes forage in agricultural fields, but a review of the literature supports a determination that those areas are not considered the primary habitat for this species. Also, because critical habitats are species-specific and this document assesses broad species groups rather than individual species, designated and proposed critical habitats are considered a subset of the habitats that support ESA species and are not addressed individually.

4.3 Habitat Classifications within the Action Area

The extent of the Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as SFHAs on a FIRM under the NFIP and nearshore marine waters that may be affected by the Proposed Action.

The FEMA-mapped SFHA is the area where the NFIP's floodplain management regulations must be enforced (Federal Emergency Management Agency, 2014b). The SFHA is defined as "the land within the floodplain subject to a 1 percent or greater chance of flooding in any given year," often referred to as the 100-year floodplain (44 C.F.R. § 59.1). By definition, the SFHA does not extend into waters along the coastline. However, the ESA defines the Action Area as "all areas to be affected directly and indirectly by the Federal action and not merely the immediate area involved in the action" (50 C.F.R. § 402.02). Therefore, although FEMA's regulatory jurisdiction is limited to the SFHAs, the Action Area for this BE includes nearshore marine waters that may be affected by the Proposed Action.

We have adopted a habitat level approach to the description of the baseline condition of ESA species, critical habitats, and EFH. This is necessarily a high-level approach, given the nationwide extent of the Action Area and the myriad ecological conditions present throughout the U.S. and its territories.

Due to the extent of the area covered by this BE—the continental United States, Alaska, Hawaii, and U.S. territories—a modified version of Anderson's broad-scale land use classification system was used to develop 12 habitat classifications and descriptions, as described in more detail in Section 4.1. The classification of habitats in this document also uses SFHA boundaries as the demarcation line for a basic segregation of habitat types needed to analyze effects of the Proposed Action, some of which may occur within or outside of SFHAs. The 12 habitat classifications were divided into lowland/aquatic habitats and upland habitats.

Lowland/aquatic habitats are generally associated with inland waterways or coastlines and typically overlap partially or completely with SFHAs. These habitats (wetlands, fresh waters, nearshore marine waters, and beaches) are anticipated to have a high prevalence in SFHAs nationwide. Upland habitats (barren lands, caves, rangelands, forest lands, and perennial snow or ice) and offshore marine waters are geographically separated from waterways and coastlines and generally have little to no overlap with SFHAs. While upland habitats may sometimes occur within SFHAs, their prevalence in SFHAs nationwide is anticipated to be minimal.

FEMA recognizes that there are exceptions to this generalized approach and that upland habitats may sometimes occur within an SFHA. For example, the floodplain of a large river flowing through an upland rangeland habitat could include fringe areas adjacent to the river and within the SFHA but vegetated with the upland plants characteristic of rangelands. However, while upland habitats may occur within SFHAs, their abundance relative to the amount of lowland habitats within SFHAs is anticipated to be minimal nationwide. The basis for this generalized approach to determining which habitats overlap with SFHAs is provided below.

As part of our review of the EPA ecoregion approach that was initially considered to classify habitats (described in Section 4.1), we obtained National Gap Analysis Program (GAP) land cover spatial data (U.S. Geological Survey, 2011) that is based on the NatureServe Ecological Systems Classifications (NatureServe Explorer, 2015). We overlaid the GAP data on a map of Ecoregion 11 (Commission for Environmental Cooperation, 1997), to determine which habitat classes overlapped with SFHAs. Ecoregion 11 covers half of California with 22 habitat classifications.

California provides a good model for this comparison because: (1) it has a variety of climates and ecotypes, as well as coastal and inland areas (including deserts, large valleys, alpine mountains, and moist temperate areas); and (2) flood hazard mapping is well developed in a large portion of the State and therefore there is a high level of SFHA representation. Because the Anderson system is only used for classifying (i.e., not mapping) land cover, no spatial data exists. However, as shown in Table 4-1, the Anderson habitat classifications can be generally equated to the GAP land cover data for Ecoregion 11; for example, nonforested wetlands (Anderson classification) are generally equivalent to temperate and boreal freshwater wet meadow and marsh combined with salt marsh (GAP classifications). GAP data were spatially compared to FEMA-mapped SFHAs for Ecoregion 11. A review of the data shows that, in Ecoregion 11, approximately 76 percent of nonforested wetlands and 32 percent of forested wetlands occur in SFHAs. Conversely, approximately 2 percent of forest land and 4 percent of rangeland occurs within SFHAs.

Table 4-1: Percentage of Habitat Classifications in Ecoregion 11 within SFHAs

Anderson Classification used in this BE ¹	GAP Classification for Ecoregion 11 ²	Approximate Percentage that Occurs in SFHAs
Forested Wetlands	Temperate Flooded & Swamp Forest	32
Nonforested Wetlands	Temperate & Boreal Freshwater Wet Meadow & Marsh Salt Marsh	76
Fresh Waters	Open Water Marine & Estuarine Saltwater Aquatic Vegetation	82
Marine Waters	Not mapped	Not available
Beaches	Not mapped	Not available
Barren Lands	Polar & Alpine Cliff, Scree & Rock Vegetation Warm Semi-Desert Cliff, Scree & Rock Vegetation Temperate & Boreal Cliff, Scree & Rock Vegetation Mediterranean Cliff, Scree & Rock Vegetation Current and Historic Mining Activity Cool Semi-Desert Cliff, Scree & Rock Vegetation	4
Caves	Not mapped	Not available
Rangeland	Mediterranean Scrub Cool Semi-Desert Scrub & Grassland Mediterranean Grassland & Forb Meadow Warm Semi-Desert Scrub & Grassland Temperate Grassland, Meadow & Shrubland Temperate & Boreal Scrub & Herb Coastal Vegetation	4
Forest Land	Cool Temperate Forest Warm Temperate Forest	2
Perennial Snow or Ice	Does not occur in Ecoregion 11	0
Urban/Built-up Land	Recently Disturbed or Modified Introduced & Semi Natural Vegetation Developed & Urban	8
Agricultural Land	Herbaceous Agricultural Vegetation	31
Tundra	Does not occur in Ecoregion 11	0

¹Classifications are adapted from the Anderson Land Use Classification System (Anderson, Hardy, Roach, & Witmer, 1976), with minor modifications.

² Sources: (Environmental Protection Agency, 2013b) (U.S. Geological Survey, 2011) (NatureServe Explorer, 2015)

Although this approach proved to be too resource-intensive to be completed for the entire nation, the results of the analysis completed for Ecoregion 11 allow us to demonstrate the relationship of our Anderson habitat classifications relative to SFHAs, and provides justification for our determination of which habitat classifications typically overlap partially or completely with SFHAs.

Table 4-2 shows the habitat classifications and whether they support ESA species or critical habitat, and occur within the Action Area.

Table 4-2: Habitat Classifications within the Action Area

Habitat Classification ¹	Supports Listed/ Proposed Species or Designated/Proposed Critical Habitat?	Occurs in Action Area?
Wetlands		
Forested Wetlands	Likely	Yes
Nonforested Wetlands	Likely	Yes
Fresh Waters		
Streams and Rivers	Likely	Yes
Lakes	Likely	Yes
Estuaries	Likely	Yes
Marine Waters		
Nearshore	Likely	Yes
Offshore	Likely	No
Beaches	Likely	Yes
Barren Lands		
Inland Sandy Areas	Likely	Yes
Bare Exposed Rock	Likely	Yes
Caves	Likely	Yes
Rangeland		
Herbaceous Rangeland	Likely	Yes
Shrub and Brush Rangeland	Likely	Yes
Mixed Rangeland	Likely	Yes
Forest Land		
Deciduous Forest Land	Likely	Yes
Evergreen Forest Land	Likely	Yes
Mixed Forest Land	Likely	Yes
Perennial Snow or Ice	Likely	No
Urban/Built-up Land	Unlikely	Yes
Agricultural Land	Unlikely	Yes
Tundra	Unlikely	Yes

¹ Classifications are adapted from the Anderson Land Use Classification System (Anderson, Hardy, Roach, & Witmer, 1976), with minor modifications.

4.4 Species Groupings and Sub-groupings by Primary Habitat

Listed and proposed species were sorted into seven broad species groups using the high-level classifications from both USFWS and NMFS species listings: mammals, birds, reptiles,

amphibians, fish, invertebrates, and plants. Within each group, species were further assigned to sub-groups based on primary habitat (see Section 4.2). In this document, primary habitat is defined as meeting most or all of a species' physical and biological needs for most or all of its life cycle.

The following will be described for each species sub-group:

- Identification of the Service (USFWS or NMFS) with jurisdiction over species in the sub-group;
- Description of the primary habitat, whether that habitat occurs within the Action Area (see Section 4.3), and how that habitat meets the physical and biological needs of the species which occupy it;
- General descriptions of dietary, breeding, migration, and overwintering needs of species;
- Number of listed and proposed endangered and threatened species, and the number with designated or proposed critical habitat; and
- Threats to the species sub-group.

At the end of each main species group discussion, all listed and proposed species in the group are presented in a table arranged by sub-groups that provides common and scientific names, status (endangered, threatened, or proposed), State(s) within which the species is/has been found, and whether critical habitat has been designated or proposed for the species.

4.5 Mammals

Mammals are warm-blooded vertebrates of the class Mammalia. Distinguishing characteristics of mammal species includes giving birth to live young, mammary glands on females, and the presence of hair at some stage of development. Mammals in the U.S. range in size from tiny bats and shrews to the enormous blue whale. Because mammalian young are dependent on mothers for nourishment, they learn to copy their elders; thus, mammals have great behavioral adaptability. Because they are warm-blooded, mammals also have the ability to physically adapt to a wide range of climates and conditions.

This species group has eight sub-groups: wetland mammals, nearshore marine mammals, offshore marine mammals, beach mammals, barren land mammals, rangeland mammals, forest land mammals, and perennial snow or ice mammals. Almost all mammal species are under the jurisdiction of USFWS; marine mammals, except for sea otters and manatees, are regulated by NMFS (National Marine Fisheries Service, 2015a).

4.5.1 Wetland Mammals

Information on wetland mammals has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1983a) (U.S. Fish and Wildlife Service, 1997b) (U.S. Fish and Wildlife Service, 1997c) (U.S. Fish and Wildlife Service, 1998c) (U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 2007) (U.S. Fish and Wildlife Service, 2007a) (U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2010a) (U.S. Fish and Wildlife Service, 2014o) (U.S. Fish and Wildlife Service, Southwest Region, 1990) (U.S. Fish and Wildlife Service, 1998l).

Wetland mammals include large predators, small ground mammals, bats, and deer. These species occupy forested or nonforested wetlands. The shrews, voles, beaver, and some mice species are fossorial, and spend the majority of their time in underground burrows, bats roost in

caves or trees and forage in riparian areas, while the rest of these wetland species spend the majority of their time foraging in the forested areas or dense grasses and vegetation near surface waters of the wetland. Some species are generally active year-round, while other species hibernate during the winter months in dense vegetation or burrows. Most of the small wetland mammals, as well as the deer species, are herbivores, foraging on grasses, seeds, roots, bark, and other plant matter. The shrew and rat species are omnivorous and include insects and other small invertebrates in their otherwise herbivorous diet, while bats tend to be insectivores. The large predators (feline, bear, and wolf species) are carnivorous and prey on small mammals and birds, ungulates, and fish.

The large wetland predators and small wetland mammals generally remain solitary unless mating or rearing young. Other small wetland mammals such as voles tend to spend most of their time with small family-based groups, becoming solitary when they are ready to mate or give birth. During mating season, deer species form herds and bat species will often roost in small groups or become solitary for a short time. Reproduction times are highly variable among the wetland mammal species, ranging from autumn to early summer, and can fluctuate depending on temperatures and food availability. Females will typically care for their young until they are weaned.

The habitat needs of the wetland mammals vary widely, but tend to include proximity to water; availability of wetland vegetation for food and cover; and large areas of continuous, unfragmented habitat. Some of the small burrowing mammals require a cool moist environment for their burrows, while other species, including voles and the woodrat, rely on dense ground-level marsh vegetation. Certain vole species have an inability to conserve water and concentrate urine, and therefore require proximity to water sources. The large predators rely on sizeable areas of unfragmented habitat to provide feeding, reproduction, and shelter needs.

Of the 22 wetland mammal species, 20 are endangered and 2 are threatened. Critical habitat has been designated for seven species.

The following representative threats to wetland mammals have been synthesized from information available for several species:

- Loss and degradation of habitat from urban development, agriculture, logging, filling, and other human development activities;
- Naturally occurring disease and parasites;
- Extreme and adverse weather conditions (such as hurricanes, floods, or storms);
- Invasive plants changing the composition and quality of habitat;
- Invasive wildlife creating competition for food and habitat;
- Low genetic diversity and viability due to isolation and small population size;
- Predation of adults and young by snakes, birds, and feral cats can occur from nearby human development providing food and water for predators and increasing their abundance; and
- Illegal hunting of large carnivores for sport or to protect livestock.

4.5.2 Nearshore Marine Mammals

Information on nearshore marine mammals has been synthesized from a variety of sources: (National Marine Fisheries Service, 2007a) (U.S. Fish and Wildlife Service, 2013e) (National Marine Fisheries Service, 2014i) (U.S. Fish and Wildlife Service, 2014l) (National Marine Fisheries Service, 2008b).

Nearshore marine mammals include manatees, sea lions, sea otters, seals, the killer whale, and the beluga whale. All nearshore marine mammals fall under the jurisdiction of NMFS except for sea otters and manatees, which are regulated by USFWS (National Marine Fisheries Service, 2015a).

In general, nearshore marine mammals live in bays and nearshore ocean waters, though manatees and beluga whales will travel between freshwater (estuaries and river basins) and marine environments. While killer whales are often pelagic, the only resident population known to occur in the U.S. (the southern resident killer whales) spends much of its time in shallow, coastal, and nearshore marine waters, where critical habitat has been designated (National Marine Fisheries Service, 2015f). The nearshore marine mammals spend most of their time traveling and foraging in the aquatic environment and usually breed and rest on beaches and rocky shores. The manatee is herbivorous with a diet consisting primarily of aquatic grasses and algae. Seals, sea lions, and sea otters are generally predatory, feeding primarily on fish, mollusks (cephalopods, bivalves), and crustaceans. Sea lions also occasionally eat birds and other marine mammals. Beluga whales feed on a variety of marine organisms such as fish, crustaceans, and squid.

These nearshore marine mammals are generally communal animals and may rest, feed, breed, and migrate in groups. The movement of sea otters tends to vary depending on the size and social structure of a population, but they can travel long distances within their home ranges. Certain marine mammals, such as sea lions, will migrate to follow their food sources, often moving from pelagic to nearshore waters. Beluga whales and seals tend to breed in the spring and sea lions during the summer, whereas breeding manatees have been reported in all seasons. While the whales and manatees are strictly aquatic, seals, sea otters, and sea lions will typically mate and give birth in coastal areas, on sandy or rocky beaches. Females care for their young until they are weaned and independent; the young, upon reaching adulthood, sometimes become incorporated into the same communal group as their parents. Males in most of these nearshore marine species typically provide little paternal care.

The habitat needs of the nearshore marine mammals vary among the species. Because marine mammals spend most of their time in aquatic environments, they require good water quality. Seals, sea otters, and sea lions also rely on undisturbed coastal habitats to mate and give birth.

Of the seven nearshore marine mammal species, five are endangered and two are threatened. Critical habitat has been designated for five species.

The following representative threats to marine mammals have been synthesized from information available for several species:

- Loss and modification of beach nesting habitat due to urban development, beach armoring, and dredging;
- Contamination of the marine environment by herbicides, pesticides, heavy metals, oil spills, and human trash/waste;
- Entrapment and entanglement in fishing equipment;
- Disturbance by and collision with recreational and commercial vessels;

- Changes in habitat (water temperature, sea levels), which may be amplified by climate change; and
- Slow recovery from significant population declines due to historical overhunting.

4.5.3 Offshore Marine Mammals

Information on offshore marine mammals has been synthesized from a variety of sources: (National Marine Fisheries Service, 1985) (National Marine Fisheries Service, 1991) (National Marine Fisheries Service, 1998) (National Marine Fisheries Service, 2010) (National Marine Fisheries Service, 2011) (National Marine Fisheries Service, Northwest Regional Office, 2008).

Offshore marine mammals include several species of whales, the spotted seal, and the Guadalupe fur seal, all of which are under the jurisdiction of NMFS (National Marine Fisheries Service, 2015a).

Offshore marine mammals live in deep, offshore open ocean waters and spend most of their time traveling and foraging in the aquatic environment. The spotted seals will also climb onto the outer margins of ice floes and Guadalupe fur seals are found in caves and coastal rocky habitats during breeding season. The baleen whales (blue, humpback, right, sei, bowhead, and finback), often feed on small crustaceans and plankton (passively floating or weakly swimming, usually minute animal and plant life, found in a body of water) filtering these small organisms (such as krill and copepods) through their baleen bristles. Other whales, including the sperm whale and false killer whale feed on a variety of marine organisms such as fish, crustaceans, and squid (National Oceanic and Atmospheric Administration Office of Protected Resources, 2015b). The seals feed by diving for squid, crustaceans, mackerel, and other fish.

With the exception of Guadalupe fur seals, which are solitary animals, the offshore marine mammals are generally communal and may rest, feed, breed, and migrate in groups. Whales tend to migrate considerable distances between summering and wintering areas. Mating and breeding times are variable among the offshore marine mammal species, with some species, including sei whales, breeding in early winter, spotted seals breeding during the winter and spring, and Guadalupe fur seals breeding during the summer. Females care for their young until they are weaned and independent; the young, upon reaching adulthood, sometimes become incorporated into the same communal group as their parents. While males in most of these marine species typically provide little paternal care, certain whale species will travel in small family groups called "pods" that consist of the male, female, and their calves. Spotted seals also form family groups during the breeding season, consisting of a male, female, and the pup.

The habitat needs of the offshore marine mammals vary among the species. Because these marine mammals spend their lives in aquatic environments, they require good water quality. The species that spend the majority of their time in open ocean waters tend to require large areas undisturbed by humans, particularly vessels.

Of the 11 offshore marine mammals, 9 are endangered and 2 are threatened. Critical habitat has been designated for two species.

The following representative threats to offshore marine mammal have been synthesized from information available for several species:

- Contamination of the marine environment by herbicides, pesticides, heavy metals, oil spills, and human trash/waste;
- Entrapment and entanglement in fishing equipment;

- Disturbance by and collision with recreational and commercial vessels;
- Changes in habitat (water temperature, sea levels), which may be amplified by climate change; and
- Slow recovery from significant population declines due to historical overhunting.

4.5.4 Beach Mammals

Information on beach mammals has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1987a) (U.S. Fish and Wildlife Service, 1993c) (U.S. Fish and Wildlife Service, 2010a) (U.S. Fish and Wildlife Service, Region 1, 1998).

Beach mammals include several species of mice that live near bays and estuaries on beaches, foredunes, and coastal bluffs that are lightly vegetated with grasses and scrub. These mice typically live in burrows dug in the sand and are herbivorous, eating primarily seeds, beachgrasses, and sea oats. Beach mice may also occasionally eat invertebrates, especially in the late winter and early spring when seeds are scarce.

Beach mice tend to establish small home ranges and usually remain there for the duration of their lives. They are typically nocturnal, moving around within their home range at night to forage, breed, and maintain the various burrows within the range. Male and female beach mice typically form a mated pair bond for life (monogamous), but they are generally territorial of their burrow range and do not typically associate with other beach mice outside of their mated pair. Breeding and reproduction tends to peak in the winter. Females typically provide care until the young are weaned and independent. The habitat needs of beach mice include sandy coastal dunes and nearby scrub habitat, as they build their burrows into the sloping sides of dunes. Beach mice also require proximity to beach vegetation, including grasses.

Of the seven beach mammal species, six are endangered and one is threatened. Critical habitat has been designated for four species.

The following representative threats to beach mammals have been synthesized from information available for several species:

- Habitat destruction or disturbance from commercial, residential, and recreational development of beaches and coastal areas;
- Mortalities from motor vehicles, including off-road vehicles (ORVs);
- Extreme and adverse weather conditions (hurricanes, storms);
- Loss of coastal habitat to erosion and sea level rise;
- Predation by raptors, snakes, raccoons, and feral cats, dogs, and pigs. Nearby human development can provide food and water for predators, increasing their abundance.

4.5.5 Barren Land Mammals

Information on barren land mammals has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1998d) (U.S. Fish and Wildlife Service, Region 1, 2000) (U.S. Fish and Wildlife Service, 2007b).

Barren land mammals are pronghorns and bighorn sheep that occupy arid upland, rocky, and sandy habitats. Pronghorn prefer inland sandy areas and bighorn sheep prefer bare exposed rock areas.

Species in this sub-group find shelter from the arid environment in ephemeral washes, caves, or shade from boulders, cliffs, or vegetation. Barren land mammals generally have herbivorous diets of cacti, sedges, grasses, mesquite, and flowering desert plants. Water sources are rarely needed as these animals obtain sufficient water from plants they eat.

Barren land mammals will rest and feed in intraspecies (same species) groups and are often most active in the early morning and late evening. These hooved mammals are agile on rocky, steep, and mountainous slopes and use the visibility of the open terrain and steep slopes of their habitat to escape from predators. The bighorn sheep will often migrate seasonally between high and low elevations. Pronghorns do not typically migrate but may travel outside their home range to forage.

Reproduction typically occurs in seasons when there is more rain and therefore a greater abundance of food. Females of both pronghorns and bighorn sheep bed in caves or in the shade of cliffs or available vegetation and will give birth in secluded areas, often on treacherous terrain to protect their young. Young generally receive paternal care until they are weaned and independent.

The habitat needs of the barren land mammals include succulent cacti, grasses, and other plants for foraging, along with areas of shade or shelter. Bighorn sheep are wide-ranging animals that require steep topography to escape from predators and open terrain for good visibility. Bighorn sheep also need areas of flat land for easy access to other mountain ranges, and therefore other sources of food and breeding gene pools. Pronghorns also require open terrain for good visibility but prefer areas where topography is generally level.

All three of the barren land mammals are endangered. Critical habitat has been designated for two species.

The following representative threats to barren land mammals have been synthesized from information available for several species:

- Loss or modification of habitat from urban development, mining, livestock grazing, agriculture, and other human development activities;
- Declines in available food sources, either due to natural causes or human-induced habitat loss;
- Mortalities from motor vehicles, including ORVs;
- Predation by mountain lions and coyotes. Nearby human development can provide food and water for predators, increasing their abundance; and
- Changes in habitat (rainfall amounts, temperature).

4.5.6 Rangeland Mammals

Information on rangeland mammals has been synthesized from a variety of sources (U.S. Fish and Wildlife Service, 1991a) (U.S. Fish and Wildlife Service, 1995a) (U.S. Fish and Wildlife Service, 1997a) (U.S. Fish and Wildlife Service, 1998b) (U.S. Fish and Wildlife Service, 1999b) (U.S. Fish and Wildlife Service, 2003c) (U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 2009a) (U.S. Fish and Wildlife Service, 2012c) (U.S. Fish and Wildlife Service, 2013c) (U.S. Fish and Wildlife Service, 2013d) (U.S. Fish and Wildlife Service, 2014n) (U.S. Fish and Wildlife Service, 2012d) (U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 2014) (U.S. Fish and Wildlife Service, 2011e).

Rangeland mammals occupy upland, open space habitats dominated by grasses and herbaceous growth (i.e., grasslands), shrubs and brush, or a mixture of both. The rangeland mammals include

several species of kangaroo rats, pocket gophers, foxes, and two species of jaguarundi, as well as one species of bison, rabbit, ferret, ground squirrel, prairie dog, and bat.

The small ground mammals (ferret, pocket gophers, prairie dog, ground squirrel, rabbit, kangaroo rats, and vole) are fossorial, spending most of their time in burrows, some of which can have complex underground structures. The one bat species roosts in caves and mines.

The foxes, ferrets, and jaguarundis prey on small mammals, such as prairie dogs, rabbits, and ground squirrels. The other rangeland mammals are herbivorous, foraging on grasses, seeds, and other plant materials. The bat feeds on nectar, pollen, and fruit of cacti and agave plants.

The level of social interactions and communal living varies among the rangeland mammals. The jaguarundis, foxes, ferret, and kangaroo rats remain solitary unless mating, while the other species tend to form groups, some of which have complex communal structures. Some of the small, fossorial rangeland mammals hibernate in the colder months. Breeding seasons vary widely among these species, for example, between early spring and early summer for kangaroo rats, November and December for jaguarundis, mid-March and early April for ferrets, and July and October for bison. With the exception of the foxes, males typically provide little to no paternal care; females care for young until they are weaned and independent.

The habitat needs for the rangeland mammals vary widely. For example, kangaroo rats need sandy, well-drained soils for burrowing, the rabbit is dependent on tall, dense stands of sagebrush for food and shelter year-round, the bat needs a habitat with roosting sites in caves or mines, and foxes require an established population of small mammals for prey. Large, unfragmented areas of habitat are important for several of these rangeland mammals, such as the bison and pocket gophers, as isolated populations are at a greater risk of extinction.

Of the 24 rangeland mammal species, 17 are endangered and 7 are threatened. Critical habitat has been designated for seven species.

The following representative threats to rangeland mammals have been synthesized from information available for several species:

- Loss and fragmentation of habitat due to agriculture, industrial development, urban development, recreation, and other human development activities;
- Predation by raptors, snakes, coyotes, and weasels. Nearby human development can provide food and water for predators, increasing their abundance;
- Native and invasive wildlife competing for food and habitat;
- Contamination of the rangeland environment from pesticides, herbicides, rodenticides, and other agricultural pollutants;
- Invasive plants changing the composition and quality of habitat and altering food abundance; and
- Disease and parasites, such as the non-native sylvatic plague disease that caused a historical drop in prairie dog and ferret populations.
- Disease, such as the canine distemper virus that caused a drop in an island fox population and is believed to have been transmitted through infected raccoons.

4.5.7 Forest Land Mammals

Information on forest land mammals has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1982c) (U.S. Fish and Wildlife Service, 1984d) (U.S. Fish and Wildlife

Service, 1990a) (U.S. Fish and Wildlife Service, 1990g) (U.S. Fish and Wildlife Service, 1993a) (U.S. Fish and Wildlife Service, 1993b) (U.S. Fish and Wildlife Service, 1994a) (U.S. Fish and Wildlife Service, 2005c) (U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 2008) (Northern Continental Divide Ecosystem, 2013) (U.S. Fish and Wildlife Service, 2014p) (U.S. Fish and Wildlife Service, Oregon Fish & Wildlife Office, 2015) (U.S. Fish and Wildlife Service, 2015i) (U.S. Fish and Wildlife Service, 2015k).

Mammals in this sub-group include large predators (bears, lynxes, and wolves), rodents (woodrats, mice, and squirrels), caribou, and bats that occupy upland forested habitats dominated by trees – deciduous, evergreen, or mixtures of the two. Forest land rodents can often be found on the forest floor. The squirrels also tend to nest in tree cavities while woodrats use rock crevices and piles to create stick nests. Bats can also be found in caves. Wolves are wide-ranging mammals that may use other habitats, as well, such as tundra and grasslands. Forest land mammals tend to be crepuscular (active at dawn and dusk) or nocturnal (active at night). Certain species, particularly the rodents and caribou, are herbivorous, having a diet consisting of fruit, seeds, leaves, and other plant matter, while others, including the bats, lynxes, and wolves, are carnivorous, primarily preying on insects, rabbits, or other small mammals. The diet of bears can include plants, mammals, fish, insects, and more. Caribou and squirrels eat the wood-borne fungi and lichens on mature trees. Fishers are opportunistic predators that eat small mammals and birds, and occasionally plant material.

Some forest land mammals, primarily rodents, bats, and bears, hibernate in the colder months. Hibernating mammals can usually be found in caves, leaf litter, or in underground burrows (either existing or created). Bears tend to dig dens on steep slopes. Certain bats in this sub-group may migrate to a warmer location instead of hibernating.

Several forest land species, including the bears and fisher, are solitary except when mating and rearing young, whereas the wolves, caribou, bats, and several rodent species, such as the squirrels, tend to form groups. Breeding and reproduction times vary among the forest land mammals, but tend to occur during the warmer months and can fluctuate depending on temperature and food availability. Bears tend to breed from May through July. Woodrats tend to breed in the summer while the wolves and bats breed during the winter. Most males in this sub-group generally leave the female after mating and provide little paternal care. However, both male and female wolves will bring food to their young. Females will typically care for young until they are weaned and independent.

The habitat needs of forest mammals vary widely. For instance, the flying squirrels require mature trees and down snags for movement, nesting in cavities, and wood-borne fungi and lichens for food. In addition, many species, including the large predators, require large areas of unfragmented forest habitat, as isolated populations and gene pools increase the risk of extinction. These predators also rely on the ability of the forest habitat to support populations of their prey.

Of the 18 forest land mammal species, 12 are endangered, 3 are threatened, 2 are proposed endangered, and 1 is proposed threatened. Critical habitat has been designated for six listed species.

The following representative threats to forest land mammal have been synthesized from information available for several species:

- Loss and modification of habitat from urban development, agriculture, timber harvest, and other human development activities;

- Disturbance of breeding and nesting activities by human recreational activities (such as caving, camping, or use of off road vehicles);
- Predation by feral cats, snakes, and birds. Nearby human development can provide food and water for predators, increasing their abundance;
- Extreme and adverse weather conditions (temperature, rainfall);
- Invasive plants and insects changing the composition and quality of habitat;
- Native and invasive wildlife creating competition for food and habitat; and
- Disease and parasites.

4.5.8 Perennial Snow or Ice Mammals

There are two animals assigned to the perennial snow or ice habitat, the polar bear and the ringed seal; information has been taken from the Federal Register notice of critical habitat designation for polar bear (U.S. Fish and Wildlife Service, 2010b) and the final rule to list ringed seal (National Marine Fisheries Service, 2012).

Polar bears in the U.S. are found in Alaska in upland habitats covered with snow and ice year-round. Polar bears rely on sea ice habitats, including land-fast ice (ice frozen to the land or sea bottom) and pack ice (dynamic ice located in open ocean areas), that provide areas for feeding, travelling, and resting. On land portions of this habitat, snow cover provides insulation and cover for dens.

Polar bears are predatory and feed mainly on fish and seals, including ringed seals, hunting near holes in the ice or from ice platforms. Polar bears forage in open marine waters, and sometimes in bays and estuaries; their movements are influenced by the availability and accessibility of prey. These bears tend to migrate within their range, moving north during the summer and south during the winter, following the movement and formation of sea ice.

Polar bears are typically solitary outside of the breeding season, which generally occurs in the fall and winter months. Pregnant females will bed in snowy dens and care for their young until they are weaned and independent, sometimes for as long as two years. During times of food scarcity, a polar bear can slow its metabolism and will typically create a den in a snowdrift and remain there in a hibernation-like state until food sources are more abundant.

Ringed seals generally spend their entire lives on floating or shorefast ice and in surrounding Arctic waters; they rarely haul-out in beaches or coastlines. Ringed seals also dig dens and give birth in snowdrifts on floating or shorefast ice (National Marine Fisheries Service, 2012). They may be found near shore or further from the coast, depending on the extent and location of suitable floating ice. Ringed seals forage for fish and invertebrates in nearby waters. They are typically solitary animals, except when caring for young.

The polar bear is threatened and has designated critical habitat; the ringed seal is also threatened, but no critical habitat has been designated.

Threats to polar bears and ringed seals include:

- Loss and fragmentation of habitat due to road construction, recreational development, and other human development activities;
- Loss of prey due to contamination of the marine environment by pollutants, particularly petroleum spills;

- Authorized removal of nuisance or dangerous bears near populated areas; and
- Loss of coastal habitat to erosion, melting ice, and sea level rise due to climate change.
- Changes in the extent, thickness, and seasonality of Arctic Ocean ice coverage due to climate change.

Table 4-3 lists all U.S. mammals, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-3: Threatened and Endangered Mammals in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Wetland Mammals: Occur in the Action Area				
Point Arena mountain beaver	<i>Aplodontia rufa nigra</i>	E	CA	No
Red wolf	<i>Canis rufus</i>	E	FL, NC, SC; Presumed extinct in wild	No
Florida bonneted bat	<i>Eumops floridanus</i>	E	FL	No
Ocelot	<i>Leopardus (=Felis) pardalis</i>	E	AZ, TX	No
Amargosa vole	<i>Microtus californicus scirpensis</i>	E	CA	Yes
Florida salt marsh vole	<i>Microtus pennsylvanicus dukecampbelli</i>	E	FL	No
Gray bat	<i>Myotis grisescens</i>	E	AL, AR, FL, GA, IL, IN, KS, KY, MO, MS, NC, OK, TN, VA, WV	No
Indiana bat	<i>Myotis sodalis</i>	E	AL, AR, FL, GA, IA, IL, IN, KY, MD, MI, MO, MS, NC, NJ, NY, OH, OK, PA, TN, VA, VT, WV	Yes
Riparian woodrat (=San Joaquin Valley)	<i>Neotoma fuscipes riparia</i>	E	CA	No
Key deer	<i>Odocoileus virginianus clavium</i>	E	FL	No
Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	E	OR, WA	No
Rice rat	<i>Oryzomys palustris natator</i>	E	FL	Yes
Jaguar	<i>Panthera onca</i>	E	AZ, NM	Yes
Florida panther	<i>Puma (=Felis) concolor coryi</i>	E	FL, LA, AR, SC	No
Eastern puma (=cougar)	<i>Puma (=Felis) concolor cougar</i>	E	CT, DE, GA, IN, KY, MA, MD, ME, MI, MO, NC, NH, NJ, NY, OH, PA, RI, SC, VA, VT, WV*	No
Salt marsh harvest mouse	<i>Reithrodontomys raviventris</i>	E	CA	No
Buena Vista Lake ornate shrew	<i>Sorex ornatus relictus</i>	E	CA	Yes
Riparian brush rabbit	<i>Sylvilagus bachmani riparius</i>	E	CA	No
Lower Keys marsh rabbit	<i>Sylvilagus palustris hefneri</i>	E	FL	No
Louisiana black bear	<i>Ursus americanus luteolus</i>	T	LA, MS, TX	Yes
New Mexico meadow jumping mouse	<i>Zapus hudsonius luteus</i>	E	AZ, CO, NM	No
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T	CO, WY	Yes
Nearshore Marine Mammals: Occur in the action area				
Beluga whale, Cooks Inlet DPS	<i>Delphinapterus leucas</i>	E	AK	No
Northern sea otter, Southwest Alaska DPS	<i>Enhydra lutris kenyoni</i>	T	AK, WA	Yes
Southern sea otter	<i>Enhydra lutris nereis</i>	T	CA, OR, WA	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Steller sea lion, Western DPS	<i>Eumetopias jubatus</i>	E	WA, OR, CA, AK	Yes
Hawaiian monk seal	<i>Monachus schauinslandi</i>	E	HI	Yes
Killer whale, Southern Resident DPS	<i>Orcinus orca</i>	E	CA, OR, WA	Yes
West Indian manatee	<i>Trichechus manatus</i>	E	AL, FL, GA, LA, MS, NC, PR, SC, TX	Yes
Offshore Marine Mammals: Do not occur in the Action Area				
Guadalupe fur seal	<i>Arctocephalus townsendi</i>	T	CA	No
Bowhead whale	<i>Balaena mysticetus</i>	E	AK	No
Sei whale	<i>Balaenoptera borealis</i>	E	CA, MA	No
Blue whale	<i>Balaenoptera musculus</i>	E	AK, CA, MA	No
Finback whale	<i>Balaenoptera physalus</i>	E	AK, AL, CA, CT, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, PR, RI, SC, VA, VI	No
North Atlantic right whale	<i>Eubalaena glacialis</i>	E	CT, DE, FL, GA, MA, MD, ME, NC, NJ, NY, RI, SC, VA	Yes
North Pacific right whale	<i>Eubalaena japonica</i>	E	AK	Yes
Humpback whale	<i>Megaptera novaeangliae</i>	E	AK, AL, CA, DE, FL, GA, LA, MA, MD, ME, MS, NC, NJ, NY, OR, RI, SC, VA, WA	No
Spotted seal, Southern DPS	<i>Phoca largha</i>	T	AK	No
Sperm whale	<i>Physeter catodon</i> (=macrocephalus)	E	AK, CA, NC, PR, VI	No
False killer whale, Main Hawaiian Islands Insular DPS	<i>Pseudorca crassidens</i>	E	AK, OR, WA, CA, TX, LA, FL, GA, SC, NC, HI	No
Beach Mammals: Occur in the Action Area				
Pacific pocket mouse	<i>Perognathus longimembris pacificus</i>	E	CA	No
Choctawhatchee beach mouse	<i>Peromyscus polionotus allophrys</i>	E	FL	Yes
Alabama beach mouse	<i>Peromyscus polionotus ammobates</i>	E	AL	Yes
Southeastern beach mouse	<i>Peromyscus polionotus niveiventris</i>	T	FL	No
St. Andrew beach mouse	<i>Peromyscus polionotus peninsularis</i>	E	FL	Yes
Anastasia Island beach mouse	<i>Peromyscus polionotus phasma</i>	E	FL	No
Perdido Key beach mouse	<i>Peromyscus polionotus trissyllepsis</i>	E	AL, FL	Yes
Barren Land Mammals: Occur in the Action Area				
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	E	AZ	No
Peninsular bighorn sheep	<i>Ovis canadensis nelsoni</i>	E	CA	Yes
Sierra Nevada bighorn sheep	<i>Ovis canadensis sierrae</i>	E	CA	Yes
Rangeland Mammals: Occur in the Action Area				

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Wood bison	<i>Bison athabasca</i>	T	AK	No
Pygmy rabbit	<i>Brachylagus idahoensis</i>	E	WA	No
Utah prairie dog	<i>Cynomys parvidens</i>	T	UT	No
Morro Bay kangaroo rat	<i>Dipodomys heermanni morroensis</i>	E	CA	Yes
Giant kangaroo rat	<i>Dipodomys ingens</i>	E	CA	No
San Bernardino Merriam's kangaroo rat	<i>Dipodomys merriami parvus</i>	E	CA	Yes
Fresno kangaroo rat	<i>Dipodomys nitratoides exilis</i>	E	CA	Yes
Tipton kangaroo rat	<i>Dipodomys nitratoides</i>	E	CA	No
Stephens' kangaroo rat	<i>Dipodomys stephensi</i> (incl. <i>D. cascus</i>)	E	CA	No
Gulf Coast jaguarondi	<i>Herpailurus (=Felis) yagouaroundi cacomitli</i>	E	TX	No
Sinaloa jaguarondi	<i>Herpailurus (=Felis) yagouaroundi tolteca</i>	E	AZ	No
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuenae</i>	E	AZ, NM	No
Hualapai Mexican vole	<i>Microtus mexicanus hualpaiensis</i>	E	AZ	No
Black-footed ferret	<i>Mustela nigripes</i>	E	AZ, CO, KS, MT, ND, NE, NM, SD, UT, WY	No
Northern Idaho ground squirrel	<i>Spermophilus brunneus</i>	T	ID	No
Roy Prairie pocket gopher	<i>Thomomys mazama glacialis</i>	T	WA	Yes
Olympia pocket gopher	<i>Thomomys mazama pugetensis</i>	T	WA	Yes
Tenino pocket gopher	<i>Thomomys mazama tumuli</i>	T	WA	Yes
Yelm pocket gopher	<i>Thomomys mazama yelmensis</i>	T	WA	Yes
Santa Catalina Island fox	<i>Urocyon littoralis catalinae</i>	E	CA	Yes
San Miguel Island fox	<i>Urocyon littoralis</i>	E	CA	Yes
Santa Cruz Island fox	<i>Urocyon littoralis santacruzae</i>	E	CA	Yes
Santa Rosa Island fox	<i>Urocyon littoralis santarosae</i>	E	CA	Yes
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	E	CA	No
Forest Land Mammals: Occur in the Action Area				
Gray wolf	<i>Canis lupus</i>	E	CA, MI, NM, OR, WI, WA	Yes
Gray wolf, MN population	<i>Canis lupus</i>	T	MN	No
Ozark big-eared bat	<i>Corynorhinus (=Plecotus) townsendii ingens</i>	E	AR, MO, OK	No
Virginia big-eared bat	<i>Corynorhinus (=Plecotus) townsendii virginianus</i>	E	KY, NC, VA, WV	Yes
Pacific sheath-tailed bat	<i>Emballonura semicaudata rotensis</i>	PE	Northern Mariana Islands	No
Carolina northern flying squirrel	<i>Glaucomys sabrinus coloratus</i>	E	NC, TN, VA	No
Hawaiian hoary bat	<i>Lasiurus cinereus semotus</i>	E	HI	No
Mexican long-nosed bat	<i>Leptonycteris nivalis</i>	E	NM, TX	No
Canada lynx	<i>Lynx canadensis</i>	T	CA, CO, ID, ME, MI, MN, MT, OR, UT, WA, WI, WY, NH, NY, VT	Yes
Fisher	<i>Martes pennanti</i>	PT	CA, OR	No
Northern long-eared bat	<i>Myotis septentrionalis</i>	PE (Listed as T as	AL, AR, CT, DE, DC, GA, IL, IN, IA, KS, KY, LA,	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
		of 5/4/15)	ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, VT, VA, WV, WI, WY	
Key Largo woodrat	<i>Neotoma floridana smalli</i>	E	FL	No
Key Largo cotton mouse	<i>Peromyscus gossypinus allapaticola</i>	E	FL	No
Mariana fruit bat (=Mariana flying fox)	<i>Pteropus mariannus</i>	T	GU, NMI	Yes
Little Mariana fruit bat	<i>Pteropus tokudae</i>	E	GU; Possibly extinct	No
Woodland caribou	<i>Rangifer tarandus caribou</i>	E	ID, WA	Yes
Delmarva Peninsula fox squirrel	<i>Sciurus niger cinereus</i>	E	DE, MD, VA, PA	No
Mount Graham red squirrel	<i>Tamiasciurus hudsonicus grahamensis</i>	E	AZ	Yes
Grizzly bear	<i>Ursus arctos horribilis</i>	T	ID, MT, WA, WY	No
Perennial Snow or Ice Mammals: Although perennial snow or ice habitat does not occur in the Action Area, the polar bear will sometimes forage in estuaries, which do.				
Polar bear	<i>Ursus maritimus</i>	T	AK	Yes
Ringed seal	<i>Phoca hispida</i>	T	AK	No

Source: (U.S. Fish and Wildlife Service, 2014m) (NatureServe, 2009c)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.6 Birds

Birds are warm-blooded vertebrates of the class Aves, which bear young in a hard-shelled egg and have a body covered with feathers, forelimbs modified into wings, scaly legs, a beak, and no teeth.

This species group is entirely under the jurisdiction of USFWS and includes both migratory and non-migratory birds. Migratory birds travel from one place to another at regular times often over long distances, typically to reach breeding and overwintering areas. Migration allows birds to escape harsh weather or access seasonally available resources. Non-migratory birds are present in the same area year-round and have adapted their feeding and nesting activities to accommodate seasonal changes within that area. There are eight sub-groups of birds: forested wetland birds, nonforested wetland birds, freshwater birds, nearshore marine birds, offshore marine birds, beach birds, rangeland birds, and forest land birds.

4.6.1 Forested Wetland Birds

Information on forested wetland birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2010d) (U.S. Fish and Wildlife Service, 2008e) (U.S. Fish and Wildlife Service, 2002c) (U.S. Fish and Wildlife Service, 1997f) (U.S. Fish and Wildlife Service, 1998j).

The members of this sub-group are defined by their dependence on forested wetland areas for breeding, nesting, and foraging habitat. Such areas include riparian forests along waterways, mangrove forests, forested marshes, and forested swamplands. This sub-group consists of

passerine (perching birds), cuckoo, woodpecker, kingfisher, and wading bird species. The passerines and woodpeckers within this sub-group are insectivores, preying on flying insects while in flight or insect larva found on trees, logs, or foliage. Cuckoo and kingfisher species in this sub-group will also consume a large number of insects, but they will also eat small amphibians and reptiles, such as frogs and lizards, as well. Wading birds in this sub-group will primarily feed on larger wetland prey items such as fish. The wading birds in the forested wetland sub-group are communal and often forage and nest in flocks.

Passerine, woodpecker, and cuckoo species in this sub-group generally reproduce in the spring. Kingfisher species in this sub-group will generally reproduce between the winter to early summer months. Reproduction times in the wading birds of third sub-group varies depending on their geographic location; those that are located geographically south within their range will generally breed in the fall and those that are located geographically north within their range will generally breed in the spring. The passerines, cuckoo, and wading birds in this sub-group typically build nests of varying shapes and materials within tree canopies, while the woodpecker and kingfisher species typically creates or uses existing cavities in trees. The breeding pairs in this sub-group can range from monogamous to polygamous and produce varying clutch sizes. Hatchlings in this sub-group are typically altricial and are typically reared by the adults until they are fledged and independent. However, wading bird hatchlings are typically subprecocial and mobile, able to leave the nest upon hatching. Adult wading birds will assist the young with feeding until they are independent. In general, nesting pairs share the responsibilities of building or creating a nest, protecting and incubating the eggs, and feeding and caring for the young.

The habitat needs of the forested wetland birds include mature trees for nesting and foraging and nearby bodies of water or perennially or intermittently flooded areas. These birds rely on water of good quality, particularly the wading birds that prey on fish, as water quality can affect the health of their prey populations.

Of the six forested wetland bird species, four are endangered and two are threatened. Critical habitat has been designated for three species.

The following representative threats have been synthesized from information available for several species:

- Loss, modification, and fragmentation of habitat due to dams, timber harvesting, urban development, agriculture, and other human development activities;
- Invasive plants and insects that affect the vegetation composition and food abundance;
- Human-caused or natural wildfires;
- Loss of suitable migration stop-over habitats;
- Avian diseases (avian malaria, avian pox) and parasitism;
- Predation at nesting sites from such predators as snakes, raptors, rats, and skunks;
- Changes (drought, temperature) in habitat influenced by climate change;
- Low genetic diversity and viability due to small, isolated populations;
- Environmental contaminants (pesticides, heavy metals, lead) that affect reproduction rates, loss of prey, or cause direct injury;
- Illegal hunting; and

- Collisions with manmade structures (such as radio and cell towers, wind turbines, or powerlines).

4.6.2 Nonforested Wetland Birds

Information on water and nonforested wetland birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2013) (U.S. Fish and Wildlife Service, 2014i) (U.S. Fish and Wildlife Service, 2011c) (U.S. Fish and Wildlife Service, 1998k) (U.S. Fish and Wildlife Service, 1996d) (U.S. Fish and Wildlife Service, 1999a) (U.S. Fish and Wildlife Service, Southeast Region, 2010).

Nonforested wetland birds include passerines (warbler, sparrow, and blackbird), a raptor (snail kite), and wading birds (crane, rail, and moorhen). Birds in this sub-group spend most of their time in nonforested wetland habitats, such as mudflats, salt marshes, inland freshwater marshes, and seasonally wet prairies. The passerine species in this sub-group forage in the grasses and reeds of the nonforested wetland habitat, primarily preying on terrestrial insects. The raptor species in this sub-group, a snail kite, is a molluscivore; primarily eating snails and other mollusks that it grabs out of the shallow wetlands waters with its feet before returning to a terrestrial perch to feed on its catch. Wading bird species in this sub-group have long legs and specially adapted feet that allow them to traverse the soft sediments of shallow water where they spend most of their time foraging on fish, amphibians, and aquatic invertebrates. Species in this sub-group often have specialized bills or feeding behaviors specific to feeding on their prey items. Some of the passerines and wading birds in this sub-group are communal and often forage and nest in flocks.

Reproduction times vary greatly between species in this sub-group. Species in this sub-group nest, either alone or in colonies, near the water's edge in tree canopies, in dead tree or stump cavities, or in marsh vegetation. Some of the passerine and wading bird species migrate north for the breeding season in response to temperature changes or precipitation patterns. The breeding pairs in this sub-group can range from monogamous to polygamous and produce varying clutch sizes. Hatchlings in this sub-group are typically altricial and are typically reared by the adults until they are fledged and independent. However, wading bird hatchlings are typically subprecocial and mobile, able to leave the nest upon hatching. Adult wading birds will assist the young with feeding until they are independent. In general, nesting pairs (the male and female) in this sub-group share the responsibilities of building or creating a nest, protecting and incubating the eggs, and feeding and caring for the young.

The habitat needs of the nonforested wetland birds include perennially or intermittently flooded areas and a habitat with dense herbaceous and marsh vegetation, such as reeds, for foraging and nesting. These species also require undisturbed areas for nesting, as disturbance can affect the health of eggs or chicks. Good water quality in these aquatic habitats is also important to support healthy populations of prey species.

All of the 15 nonforested wetland bird species are endangered. Critical habitat has been designated for five species.

The following representative threats to nonforested wetland birds have been synthesized from information available for several species:

- Loss of wetland and shallow water habitat to urban, agricultural, and industrial development, often in the form of filling or diking and draining of wetlands;
- Loss of flooded wetland habitat due to flood control and other hydrologic alterations;

- Human disturbance of nesting areas where excessive disturbance may cause the parents to desert the nest, exposing eggs or chicks to weather conditions and predators, and interrupting feeding may stress juvenile birds during critical periods in their development;
- Predation at nesting sites resulting from development near breeding areas that provides food attracting increased numbers of predators, such as raccoons, skunks, and foxes, and some predators that are non-native, such as the Burmese python and mongoose;
- Collisions with manmade objects, such as power lines and fences;
- Pollution of aquatic habitat from spills and runoff;
- Loss of genetic diversity resulting from historic overhunting;
- Extreme and adverse weather conditions (hurricanes, storms);
- Parasitism, particularly by other bird species such as the shiny cowbird; and
- Alteration of aquatic food webs due to overfishing and climate change.

4.6.3 Freshwater Birds

Information on freshwater birds has been synthesized from a several sources: (U.S. Fish and Wildlife Service, 2011c) (U.S. Fish and Wildlife Service, 2009b) (U.S. Fish and Wildlife Service, 2015f).

The freshwater birds include ducks and coots. These birds spend most of their time swimming, resting, and foraging in open freshwater streams, rivers, and lakes (including reservoirs) that may be part of a forested or nonforested wetland system, as well as in estuarine waters along coastlines. Ducks and coots have physical characteristics that allow them to spend long periods of time on the water, such as oily feathers for buoyancy and webbed or lobed feet for ease of swimming. These birds primarily prey on aquatic invertebrates, but may also feed on small fish and aquatic plants. They may forage on the water's surface or dive underwater for short periods. The coots are typically communal and will forage and nest in flocks. The ducks will sometimes feed and nest in groups, but are often alone or in pairs.

Reproduction typically occurs in the spring. The ducks are generally ground nesters, concealing their grass nests under herbaceous vegetation near the water or upland, while the coots typically create floating grass nests on the open water. Breeding pairs are typically monogamous and produce varying clutch sizes. Hatchlings are typically precocial and able to forage upon hatching. Adult freshwater birds will assist their young with foraging until they are independent. In general, eggs may be incubated and young cared for by the breeding pair (the male and female) or by just the female.

The freshwater birds reside in the Hawaiian Islands year-round. Although the Hawaiian coot migrates in response to precipitation patterns, migration is typically only between the islands of Hawaii.

These freshwater birds rely on good water quality, as they spend the majority of their time in aquatic environments. Water bodies with good water quality are also important to support healthy populations of the prey species. The freshwater birds require undisturbed areas and dense herbaceous vegetation near the water for nesting.

All three of the freshwater bird species are endangered. Critical habitat has not been designated for any of the species.

The following representative threats to freshwater birds have been synthesized from information available for several species:

- Loss of freshwater habitat to urban, agricultural, and industrial development, often in the form of filling or diking and draining of freshwater sources;
- Human disturbance of nesting areas, where excessive disturbance may cause the parents to desert the nest, exposing eggs or chicks to weather conditions and predators, and interrupting feeding may stress juvenile birds during critical periods in their development;
- Predation at nesting sites resulting from development near breeding areas that provides food attracting increased numbers of predators, such as the non-native mongoose, and domestic and feral cats and dogs pose a threat to species that nest on the ground;
- Collisions with manmade objects, such as power lines and fences;
- Pollution of aquatic habitat from spills and runoff;
- Hybridization with more common waterfowl species or inbreeding due to small population sizes; and
- Alteration of aquatic food webs due to overfishing and climate change.

4.6.4 Nearshore Marine Birds

Information on nearshore marine birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1990h) (Northeast Roseate Tern Recovery Team, 1998) (U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 2009) (U.S. Fish and Wildlife Service, Southeast Region and Northeast Region, 2010) (U.S. Fish and Wildlife Service, 2011f).

Nearshore marine birds, including the marbled murrelet, terns, and one species of eider, spend most of their time in shallow, nearshore marine waters, though they nest on beaches and in nearby terrestrial habitats. These birds forage in shallow ocean waters, concentrating in areas where fish are brought to the surface by predatory fish or the movement of the water. While marbled murrelets spend most of their time foraging in the nearshore marine environments, they tend to breed in old-growth forests located close to the shore. Steller's eiders often nest in vegetation in tundra habitats generally located near the ocean. Hatchlings of nearshore marine birds are typically semiprecocial or precocial and are usually mobile upon hatching. Adult nearshore marine birds will feed young or assist them with foraging until the young are able to feed themselves. The terns usually breed on small islands or barrier beaches, often in areas of dense vegetative cover, and migrate between wintering and breeding locations.

Physical characteristics of the nearshore marine birds include webbed feet for swimming or wading, efficient flight capability for long distance travel, and specialized bills for specific feeding habits. Nearshore marine birds feed almost exclusively on fish, although some species, such as the eider, also occasionally eats insect larvae and plants.

The habitat needs of nearshore marine birds include undisturbed shallow marine waters for foraging. Because these birds spend the majority of their time in the water, they rely on water free from pollution, which also supports healthy fish populations these birds require as a food source. Nearshore marine birds also rely on undisturbed terrestrial habitats near the ocean for breeding and nesting, with the murrelets requiring old-growth forests, terns requiring beaches, and the eider requiring tundra.

Of the five nearshore marine bird species, two are endangered, two are threatened, and one species has populations that are listed as endangered in some States and as threatened in others. Critical habitat has been designated for two species.

The following representative threats to nearshore marine birds have been synthesized from information available for several species:

- Incidental capture and death resulting from commercial fishing;
- Introduction of predators or other non-native animals, such as pigs, rats, and goats, to nesting areas;
- Destruction or modification of nesting and foraging areas resulting from coastal development, including dredging and sand and gravel extraction;
- Collision with manmade structures;
- The spread of invasive, non-native vegetation at nesting sites; and
- Inundation of nesting areas due to rising sea levels influenced by climate change.

4.6.5 Offshore Marine Birds

Information on offshore marine birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1983b) (U.S. Fish and Wildlife Service, 1996e) (U.S. Fish and Wildlife Service, 2008f) (U.S. Fish and Wildlife Service, Pacific Island, 2011) (U.S. Fish and Wildlife Service, Anchorage Fish and Wildlife Office, 2014).

Offshore marine birds rely on open ocean waters as their primary habitat. These pelagic birds include an albatross, eider, shearwater, and petrel that spend the majority of their lives far from shore in the open ocean, only coming to land to nest. The albatross nests on offshore islands in open areas with little to no vegetation. The shearwaters and petrel typically nest in areas of steep topography, with the shearwater preferring densely vegetated areas and the petrel preferring more sparsely vegetated areas. The eider nests in sedge or grass marshes near shorelines or in large river deltas and tundra habitats with numerous lakes. Hatchlings of offshore marine birds are typically semiprecocial or semialtricial and are typically mobile shortly after hatching. Adult offshore marine birds will feed their young until they are fledged and independent.

Physical characteristics of this sub-group include webbed feet for swimming, efficient flight capability for long distance travel, and specialized bills for specific feeding habits. Offshore marine birds feed on fish, crustaceans, squid, and shrimp, though the albatrosses also feed on blubber, offal, and carcasses of marine mammals.

Because these birds spend the majority of their time in open ocean waters, they rely on good water quality, which also supports healthy populations of their prey. Petrels and shearwaters tend to rely on the corridors between the open ocean and their nesting habitats being free from obstructions and bright lights, as fledglings are often attracted to lights and may be thrown off the path.

Of the four offshore marine bird species, two are endangered and two are threatened. Critical habitat has been designated for one species.

The following representative threats to offshore marine birds have been synthesized from information available for several listed species:

- Incidental capture and death resulting from commercial fishing;

- Introduction of predators or other non-native animals, such as pigs, rats, and goats, to nesting areas;
- Destruction or modification of nesting and foraging areas resulting from coastal development, including dredging and sand and gravel extraction;
- Collision with manmade structures;
- The spread of invasive, non-native vegetation at nesting sites; and
- Inundation of nesting areas due to rising sea levels influenced by climate change.

4.6.6 Beach Birds

Information on beach birds has been synthesized from two sources: (U.S. Fish and Wildlife Service, 1996f) and (U.S. Fish and Wildlife Service, 2007e).

The two beach birds, western snowy plover and piping plover, rely on the beaches as their primary habitat. These birds nest above the high tide line on coastal beaches, sand flats, sparsely vegetated dunes, or beaches at the mouths of creeks and rivers. During the winter, western snowy plovers are found on mud flats and salt ponds and piping plovers are found at the end of barrier islands and along sandy peninsulas. These plovers tend to nest in areas with little or no vegetation, though driftwood, debris, and dune plants often provide cover for chicks. Hatchlings of beach birds are typically precocial – mobile and able to forage upon hatching. Adult beach birds will assist the young with foraging until they are independent.

Physical characteristics of beach birds include bills specialized to feed on aquatic and terrestrial invertebrates, such as marine worms, beetles, and crustaceans.

The habitat needs of these birds include undisturbed beach areas for breeding and nesting. These birds also rely on kelp and driftwood on the beaches for easy access to the invertebrate prey populations that congregate around these materials.

The western snowy plover is threatened and piping plover has populations listed as endangered in some States and as threatened in others. Critical habitat has been designated for both species.

The following representative threats to beach birds have been synthesized from information available for several species:

- Introduction of predators or other non-native animals, such as pigs, rats, and goats, to nesting areas;
- Destruction or modification of nesting and foraging areas resulting from coastal development, including dredging and sand and gravel extraction;
- The spread of invasive, non-native vegetation at nesting sites; and
- Inundation of nesting areas due to rising sea levels influenced by climate change.

4.6.7 Rangeland Birds

Information on rangeland birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1984j) (U.S. Fish and Wildlife Service, 1990i) (U.S. Fish and Wildlife Service, 1992b) (U.S. Fish and Wildlife Service, 1996g) (U.S. Fish and Wildlife Service, 1998m) (U.S. Fish and Wildlife Service, 2008d) (U.S. Fish and Wildlife Service, Pacific Island, 2008), (U.S. Fish and Wildlife Service, 2013h) (U.S. Fish and Wildlife Service, 2014h) (U.S. Fish and Wildlife Service, Buenos Aires National, 2014) (U.S. Fish and Wildlife Service, Pacific Island, 2014d) (U.S. Fish and Wildlife Service, 2014q) (U.S. Fish and Wildlife Service, 2015j).

Rangeland birds, including birds of prey, passerines, shrub-nesting birds, and ground-nesting birds, are those species that rely on open upland habitats dominated by grasses, shrubs, and herbaceous growth that lack trees; these habitats include the herbaceous, shrub and brush, and mixed rangeland habitat types. The shrub-nesting species (including towhees and loggerhead shrikes) and ground-nesting species (including larks, prairie-chickens, and bobwhites) are often cryptically colored, and spend a large amount of time on the ground, rather than in flight or perching. Others, particularly the birds of prey such as condors and falcons, are soaring birds that spend most of the time flying in search of food. The rangeland sub-group also includes passerines, such as the finches, which typically have a small to medium body size, are relatively vocal, have relatively bright colors or distinct markings, and feet specially adapted to perching. The Mariana grey swiftlets also nest in limestone caves, though they prefer to forage in open grassland where they can catch small insects while in flight.

The physical and behavioral adaptations of the rangeland birds allow them to capitalize on the unique elements within the open habitats they inhabit. The shrub and ground-nesting species typically exhibit an omnivorous diet that consists of a variety of seeds, grasses, buds, catkins, and insects. The falcons eat small birds, insects, rodents, and reptiles, while condors are opportunistic scavengers, feeding on dead animals (Wildlife Habitat Management Institute and Wildlife Habitat Council, 1999) (Pima County Government, 2002).

The females of ground-nesting rangeland species will typically excavate a shallow depression within the grassland soil that has enough vegetative concealment to disguise the nest from predators. The shrub-nesting rangeland species create nests within the crowns of shrubs using various materials. Others, including the birds of prey, tend to nest in the few, sparse trees or inaccessible barren areas like rocky cliffs. Breeding pairs are either monogamous or polygamous. The young of most ground-nesting birds are precocial (born covered with down and with open eyes, active and able to feed themselves almost immediately) and leave the nest soon after hatching. The young of birds of prey and passerines are altricial (born with little down and with eyes closed, unable to move or feed themselves without help), and require care from the parent(s) to survive (Texas Parks and Wildlife Department, Undated) (Wildlife Habitat Management Institute and Wildlife Habitat Council, 1999) (U.S. Fish and Wildlife Service, 2012f) (Kauffman, 2014) (Hunt, 2014).

The habitat needs of the rangeland birds tend to vary among the species. Several small, ground-dwelling birds require areas of bare ground for unrestricted movement. However, these birds also rely on some low, sparse vegetation for cover and protection from predators. Several birds, such as the falcons, require open terrain for searching for prey and a few trees for nesting.

Of the 21 rangeland bird species, 13 are endangered, 7 are threatened, and 1 is proposed threatened. Critical habitat has been designated for four listed species and proposed for one species.

The following representative threats to this rangeland birds have been synthesized from information available for several species:

- Loss and fragmentation of habitat due to agriculture, urban development, and other human development activities;
- Alteration of vegetation composition and food abundance due to grazing activities and invasive grasses and plants;
- Human-caused or natural wildfires;

- Hydrologic management efforts creating a wetter, and sometimes flooded, area in nesting locations;
- Predation at nesting sites from such predators as snakes, raptors, coyotes, and raccoons;
- Avian diseases (avian malaria, avian cholera) and parasitism, including brood infiltration by cowbirds;
- Collisions with manmade structures (such as radio and cell towers, wind turbines, or powerlines);
- Changes to habitat from extreme weather events and changes in rainfall patterns that may be influenced by climate change;
- Illegal hunting; and
- Low genetic diversity due to small, isolated populations.

4.6.8 Forest Land Birds

Information on forest land birds has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Pacific Island, 2009) (U.S. Fish and Wildlife Service, 2009a) (U.S. Fish and Wildlife Service, East Lansing Field Office, 2012) (U.S. Fish and Wildlife Service, Pacific Island, 2014c) (U.S. Fish and Wildlife Service, 2011d) (U.S. Fish and Wildlife Service, 2013j) (U.S. Fish and Wildlife Service, 1982b) (U.S. Fish and Wildlife Service, 1984i).

The members of this sub-group are defined by their dependence on upland forested areas for breeding, nesting, and foraging habitat. These forest lands may be dominated by deciduous or evergreen (coniferous or broad-leaved) trees, or a combination of both. This sub-group consists of raptor, parrot, crow, pigeon, nightjar, and passerine (honeycreepers, thrushes, warblers, white-eyes) species. Species in this sub-group typically rely on trees for food, nesting, and shelter. This sub-group is very diverse in terms of feeding strategies and includes birds that eat fruit (frugivores), flower nectar (nectarivorous), insects (insectivores), grains and seeds (granivores), other animals (carnivores), or a combination of those food types. The nightjar species and some of the raptor species (owls) are generally nocturnal; they forage and hunt for their prey at night.

The raptor, some passerine, crow, pigeon, and honeycreeper species tend to nest on tree branches, while parrot species tend to nest in tree cavities and nightjar and some passerine species tend to nest on the forest floor. Species can be monogamous or polygamous and produce varying clutch sizes. Hatchlings of most forest land species are altricial and are reared by the adults until they are fledged and independent.

Some of the passerine and parrot species migrate north within their range during breeding season and south within their range for wintering. While migrating, these species may utilize stopover sites to feed and rest before reaching their final breeding or wintering destination. Migrating species may travel in groups or alone.

The habitat needs of the forest land birds include mature deciduous or evergreen trees, as most of these species nest on branches or in tree cavities. The forest litter present in this habitat also provides cover for several species and supports the prey species of the carnivores.

Of the 36 forest land bird species, 34 are endangered and 2 are threatened. Critical habitat has been designated for eight species.

The following representative threats to forest land birds have been synthesized from information available for several species:

- Loss, modification, and fragmentation of habitat due to dams, timber harvesting, urban development, agriculture, and other human development activities;
- Invasive plants and insects that affect the vegetation composition and food abundance;
- Wildfires, either manmade or natural;
- Loss of suitable migration stop-over habitats;
- Avian diseases (avian malaria, avian pox) and parasitism;
- Predation at nesting sites by snakes, raptors, rats, and skunks;
- Changes (drought, temperature) in habitat that may be influenced by climate change;
- Low genetic diversity and viability due to small, isolated populations;
- Environmental contaminants (pesticides, heavy metals, lead) that affect reproduction rates, loss of prey, or cause direct injury;
- Illegal hunting; and
- Collisions with manmade structures (such as radio and cell towers, wind turbines, or powerlines).

Table 4-4 lists all U.S. birds, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-4: Threatened and Endangered Birds in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Forested Wetland Birds: Occur in the Action Area				
Ivory-billed woodpecker	<i>Campephilus principalis</i>	E	AR	No
Yellow-billed cuckoo, Western U.S. DPS	<i>Coccyzus americanus</i>	T	AZ, CA, CO, MT, NM, NV, OR, TX, UT, WA, WY	No
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	AZ, CA, CO, NM, NV, TX, UT	Yes
Guam Micronesian kingfisher	<i>Halcyon cinnamomina</i>	E	GU	Yes
Wood stork	<i>Mycteria americana</i>	T	AL, FL, GA, MS, NC, SC	No
Least Bell's vireo	<i>Vireo bellii pusillus</i>	E	CA	Yes
Nonforested Wetland Birds: Occur in the Action Area				
Nightingale reed warbler (old world warbler)	<i>Acrocephalus luscini</i>	E	GU, NMI	No
Yellow-shouldered blackbird	<i>Agelaius xanthomus</i>	E	PR	Yes
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	E	FL	Yes
Mariana common moorhen	<i>Gallinula chloropus guami</i>	E	GU, NMI; West Pacific Ocean U.S. (GU, NMI)	No
Hawaiian common moorhen	<i>Gallinula chloropus sandvicensis</i>	E	HI	No
Whooping crane	<i>Grus americana</i>	E	CO, KS, MT, ND, NE, OK, SD, TX;	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
			Ex.Pop. WI, FL	
Mississippi sandhill crane	<i>Grus canadensis pulla</i>	E	MS	Yes
Hawaiian stilt	<i>Himantopus mexicanus knudseni</i>	E	HI	No
Eskimo curlew	<i>Numenius borealis</i>	E	AK, NE, OK, TX	No
California clapper rail	<i>Rallus longirostris obsoletus</i>	E	CA	No
Guam rail	<i>Rallus owstoni</i>	E	GU	No
Light-footed clapper rail	<i>Rallus longirostris levipes</i>	E	CA	No
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E	AZ, CA, NV	No
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E	FL	Yes
Bachman's warbler (=wood)	<i>Vermivora bachmanii</i>	E	FL, SC	No
Freshwater Birds: Occur in the Action Area				
Laysan duck	<i>Anas laysanensis</i>	E	HI	No
Hawaiian (=koloa) Duck	<i>Anas wyvilliana</i>	E	HI	No
Hawaiian coot	<i>Fulica americana alai</i>	E	HI	No
Nearshore Marine Birds: Occur in the Action Area				
Marbled murrelet	<i>Brachyramphus marmoratus</i>	T	CA, OR, WA	Yes
Steller's Eider	<i>Polysticta stelleri</i>	T	AK	Yes
California least tern	<i>Sterna antillarum browni</i>	E	AZ, CA	No
Least tern	<i>Sterna antillarum</i>	E	AR, CO, IA, IL, IN, KS, KY, LA, MO, MS, MT, ND, NE, NM, OK, SD, TN, TX	No
Roseate tern	<i>Sterna dougallii</i>	E	CT, MA, ME, NC, NH, NJ, NY, RI, VA	No
Roseate tern	<i>Sterna dougallii</i>	T	FL, NC, PR, SC, VI	No
Offshore Marine Birds: Although offshore marine waters do not occur in the Action Area, the spectacled eider nests in nonforested wetlands (sedge or grass marshes near shorelines) and the short-tailed albatross nests on beaches, both of which do.				
Short-tailed albatross	<i>Phoebastria (=Diomedea) albatrus</i>	E	AK, CA, HI, OR, WA	No
Hawaiian dark-rumped petrel	<i>Pterodroma phaeopygia sandwichensis</i>	E	HI	No
Newell's Townsend's shearwater	<i>Puffinus auricularis newelli</i>	T	AS, HI	No
Spectacled eider	<i>Somateria fischeri</i>	T	AK	Yes
Beach Birds: Occur in the Action Area because beaches overlap with SFHAs.				
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	T	CA, OR, WA	Yes
Piping Plover, Great Lakes	<i>Charadrius melodus</i>	E	IL, IN, MI, MN, MS, NY, OH, PA, WI	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Piping plover	<i>Charadrius melodus</i>	T	AL, AR, CO, CT, DE, FL, GA, IA, KS, LA, MA, MD, ME, MN, MT, NC, ND, NE, NH, NJ, NM, NY, OK, RI, SC, SD, TX, VA, PR, VI	Yes
Rangeland Birds: Occur in the Action Area				
Nihoa millerbird (old world warbler)	<i>Acrocephalus familiaris kingi</i>	E	HI	No
Mariana gray swiftlet	<i>Aerodramus vanikorensis bartschi</i>	E	GU, NMI	No
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	E	FL	No
San Clemente sage sparrow	<i>Amphispiza belli clementeae</i>	T	CA	No
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	T	FL	No
Hawaiian goose	<i>Branta (=Nesochen) sandvicensis</i>	E	HI	No
Greater sage-grouse	<i>Centrocercus urophasianus</i>	PT in CA/NV Region	CT, NV, WA, CO, ID, MT, ND, OR, SD, UT, WY	Proposed
Masked bobwhite (quail)	<i>Colinus virginianus ridgwayi</i>	E	AZ	No
Golden-cheeked warbler (=wood)	<i>Dendroica chrysoparia</i>	E	TX	No
Streaked Horned lark	<i>Eremophila alpestris strigata</i>	T	OR, WA	Yes
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	E	TX, NM, AZ	No
California condor	<i>Gymnogyps californianus</i>	E	OR, CA, AZ	Yes
San Clemente loggerhead shrike	<i>Lanius ludovicianus mearnsi</i>	E	CA	No
Inyo California towhee	<i>Pipilo crissalis eremophilus</i>	T	CA	Yes
Coastal California gnatcatcher	<i>Poliophtila californica</i>	T	CA	Yes
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T	TX, NM, LA, FL, AZ	No
Laysan finch (honeycreeper)	<i>Telespyza cantans</i>	E	HI	No
Nihoa finch (honeycreeper)	<i>Telespyza ultima</i>	E	HI	No
Attwater's greater prairie-chicken	<i>Tympanuchus cupido attwateri</i>	E	TX	No
Lesser prairie-chicken	<i>Tympanuchus pallidicinctus</i>	T	CO, KS, NM, OK, TX	No
Black-capped Vireo	<i>Vireo atricapilla</i>	E	OK, TX	No
Forest Land Birds: Occur in the Action Area				
Puerto Rican sharp-shinned hawk	<i>Accipiter striatus venator</i>	E	PR	No
Puerto Rican parrot	<i>Amazona vittata</i>	E	PR	No
Puerto Rican broad-winged hawk	<i>Buteo platypterus brunescens</i>	E	PR	No
Hawaiian (=lo) Hawk	<i>Buteo solitarius</i>	E	HI	No
Puerto Rican nightjar	<i>Caprimulgus noctitherus</i>	E	PR	No
Oahu Elepaio	<i>Chasiempis sandwichensis ibidis</i>	E	HI	Yes
Puerto Rican plain Pigeon	<i>Columba inornata wetmorei</i>	E	PR	No
Hawaiian (=alala) Crow	<i>Corvus hawaiiensis</i>	E	HI	No
Mariana (=aga) Crow	<i>Corvus kubaryi</i>	E	GU, NMI	Yes
White-necked crow	<i>Corvus leucognaphalus</i>	E	PR	No
Nukupū'u (honeycreeper)	<i>Hemignathus lucidus</i>	E	HI	No
Akiapola'au (honeycreeper)	<i>Hemignathus munroi</i>	E	HI	No
Kauai akialoa (honeycreeper)	<i>Hemignathus procerus</i>	E	HI	No
Palila (honeycreeper)	<i>Loxioides bailleui</i>	E	HI	Yes
Akekee	<i>Loxops caeruleirostris</i>	E	HI	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Hawaii akepa (honeycreeper)	<i>Loxops coccineus</i>	E	HI	No
Maui akepa (honeycreeper)	<i>Loxops coccineus ochraceus</i>	E	HI	No
Micronesian megapode	<i>Megapodius laperouse</i>	E	GU, NMI, PW	No
Po'ouli (honeycreeper)	<i>Melamprosops phaeosoma</i>	E	HI	No
Kauai 'o'o (honeyeater)	<i>Moho braccatus</i>	E	HI	No
Large Kauai (=kamao) Thrush	<i>Myadestes myadestinus</i>	E	HI	No
Molokai thrush	<i>Myadestes lanaiensis rutha</i>	E	HI	No
Small Kauai (=puaiohi) Thrush	<i>Myadestes palmeri</i>	E	HI	No
Akikiki	<i>Oreomystis bairdi</i>	E	HI	Yes
Hawaii creeper	<i>Oreomystis mana</i>	E	HI	No
Crested honeycreeper	<i>Palmeria dolei</i>	E	HI	No
Molokai creeper	<i>Paroreomyza flammea</i>	E	HI	No
Oahu creeper	<i>Paroreomyza maculata</i>	E	HI	No
'O'u (honeycreeper)	<i>Psittirostra psittacea</i>	E	HI	No
Maui parrotbill (honeycreeper)	<i>Pseudonestor xanthophrys</i>	E	HI	No
Thick-billed parrot	<i>Rhynchopsitta pachyrhyncha</i>	E	NM, AZ	No
Kirtland's Warbler	<i>Setophaga kirtlandii</i> (= <i>Dendroica kirtlandii</i>)	E	FL, MI, SC, WI	No
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	AZ, CO, NM, TX, UT	Yes
Northern spotted owl	<i>Strix occidentalis caurina</i>	T	CA, OR, WA	Yes
Bridled white-eye	<i>Zosterops conspicillatus</i>	E	GU	No
Rota bridled White-eye	<i>Zosterops rotensis</i>	E	NMI	Yes

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.7 Reptiles

Reptiles are any cold-blooded vertebrate of the class Reptilia, comprised of turtles, snakes, lizards, crocodilians, and amphisbaenians (worm lizards). Key features that separate this group from amphibians are the presence of scales and the dependence of all life stages on breathing air.

This species group has five sub-groups: wetland reptiles, offshore marine reptiles, inland sandy areas reptiles, rangeland reptiles, and evergreen forest reptiles. All species are under the jurisdiction of USFWS, except for offshore marine reptiles (sea turtles), which are regulated by NMFS.

4.7.1 Wetland Reptiles

Information on wetland reptiles has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Endangered Species Program, 1985) (U.S. Fish and Wildlife Service, Southeast Region, 1990) (U.S. Fish and Wildlife Service, Southeast Region, 1993) (U.S. Fish and Wildlife Service, Southeast Region, 1999b) (U.S. Fish and Wildlife Service, Pennsylvania Field Office, 2001) (U.S. Fish and Wildlife Service, Midwest Region, 2008) (U.S. Fish and Wildlife Service, Southeast Region, 1999a).

Wetland reptiles include turtles, crocodiles, and snakes that rely on forested or nonforested wetlands. These reptiles occupy habitats with characteristics such as slow-moving water, wet soils, grassy, herbaceous vegetation, and canopy cover. The wetland reptiles typically spend the majority of their time basking, either in or out of water, and are generally active during the day, although some, including certain species of snakes, become crepuscular (active in twilight) in the height of summer. Wetland reptiles forage both on land and in the water and are primarily carnivorous and opportunistic, eating small mammals, invertebrates, fish, amphibians,

crustaceans, and birds. Freshwater turtles are typically omnivorous, with a diet consisting of plant material, seeds, and algae, as well as fish, insects, and other invertebrates.

In the winter months, some of the wetland reptiles will burrow into soft mud or a plant's roots or use an existing abandoned burrow to brummate. Certain species, including several turtles, hibernate in dense patches of vegetation. While breeding and reproduction typically occur in the spring, snakes also may breed in the fall and turtles may breed in the summer. Egg-laying reptiles, including the crocodiles and turtles, will generally lay eggs on the ground in the sand or vegetation at the water's edge. The crocodiles nest on the shorelines or banks of swamps and creeks. Non-egg-layers, such as the garter snakes, are ovoviviparous. Hatchlings and young generally receive little to no parental care.

The habitat needs of the wetland reptiles include availability of water and wetland vegetation for cover. Because these reptiles spend much of their time in water, water quality is an important factor in the health of their habitats and they are affected by siltation and accumulations of chemicals. These wetland reptiles also tend to rely on the presence of both water and terrestrial environments, requiring the diversity for basking, food, shelter, and more.

Of the 13 wetland reptiles, 3 are endangered and 10 are threatened. Critical habitat has been designated for one species.

The following representative threats to wetland reptiles have been synthesized from information available for several species:

- Loss and modification of habitat from urban development, agriculture, drainage projects, dams, reservoirs, and other human development activities;
- Contaminant run-off, such as fertilizer, road salt, septic, and motor vehicle pollutants, traveling into aquatic systems and degrading the water quality, causing direct injury, and causing a loss of prey;
- Recreation (such as camping, fishing, or boating) disturbing nesting and breeding;
- Increases in motor vehicle traffic and road densities cause road mortalities;
- Extreme and adverse weather conditions (hurricanes, drought), which may be influenced by climate change;
- Illegal collection and trade; and
- Predation of adults and of young and eggs at nesting sites by raptors, raccoons, herons, and foxes. Nearby human development can provide food and water for predators, increasing their abundance.

4.7.2 Offshore Marine Reptiles

Information on offshore marine reptiles has been synthesized from a variety of sources: (National Marine Fisheries Service, Office of Protected Resources, and U.S. Fish and Wildlife Service, Southeast Region, 2007b) (National Marine Fisheries Service, Office of Protected Resources, and U.S. Fish and Wildlife Service, Southeast Region, 2007a) (National Marine Fisheries Service, U.S. Fish and Wildlife Service, and SEMARNAT, 2011) (National Marine Fisheries Service, Office of Protected Resources, and U.S. Fish and Wildlife Service, Southeast Region, 2013) (U.S. Fish and Wildlife Service, 2014g).

Offshore marine reptiles consist exclusively of sea turtles. Sea turtles spend the majority of their lives in the marine environment, resting and foraging near the water's surface within marine grasses or algae or in rocks and coral at the ocean bottom. All sea turtles are carnivores or

omnivores, except for adult green sea turtles, which are primarily herbivores. Sea turtles typically feed on sponges, crustaceans, marine grasses and algae (notably Sargassum), and jellyfish.

Sea turtles generally remain solitary except when mating. Male sea turtles often spend their entire lives in the marine environment; female sea turtles will leave the marine environment only briefly to lay their eggs in the sand of the beaches where they hatched. Female sea turtles usually come ashore at night and use their flippers to dig a nest in the sand. After laying their soft-shelled eggs, the females cover up the nest with sand and retreat to the water; the females do not return to the nest. After an incubation period, hatchling sea turtles generally emerge from their nests at night and make their way immediately to the ocean. Both hatchling and adult sea turtles migrate, sometimes significant distances, between nesting and foraging grounds and between summer and wintering waters.

The habitat needs of offshore marine reptiles include adequate, undisturbed nesting habitats with a lack of artificial lighting. These sea turtles also depend on good water quality, as they spend the majority of their time in the water, and can be adversely affected by the presence of pollutants and trash.

Of the six sea turtles, two are listed or proposed as endangered (in one State each) and threatened (in multiple States each); critical habitat has been designated for the populations listed or proposed as threatened. Of the remaining four species, three are listed or proposed as endangered and one is threatened; critical habitat has been designated for two species.

The following representative threats to sea turtles have been synthesized from information available for several species:

- Loss and modification of nesting habitat from urban development, beach armoring, dredging, and other human development activities;
- Disorientation of hatchlings or adults from artificial lighting near nesting areas;
- Contamination of the marine environment by such pollutants as herbicides, pesticides, heavy metals, oil spills, and trash or waste;
- Illegal hunting and collection and trade of eggs and tortoiseshells;
- Disease, namely Fibropapillomatosis, which is believed to be caused by a virus (Jones A. G., 2004);
- Predators at nesting sites, such as feral pigs, lizards, birds, and raccoons; and
- Changes (temperature, sea levels, prey distribution) in habitat influenced by climate change.

4.7.3 Inland Sandy Areas Reptiles

Information on inland sandy areas reptiles has been synthesized from various sources: (U.S. Fish and Wildlife Service, 1984a) (U.S. Fish and Wildlife Service, Southeast Region, 2007).

Inland sandy areas reptiles are lizards that occupy arid desert dunes (a fringe-toed lizard) or mesic areas with well-drained sandy soils (two skinks). These reptiles are most often active in early mornings and late afternoons. To escape the mid-afternoon heat, these lizards may spend the majority of the day burrowed beneath the sand or in the shade of vegetation. The lizards are able to dive into sand and "swim" through it to avoid predators. The inland sandy area reptiles are primarily insectivorous. Although vegetation is generally scarce in their preferred habitats, these reptiles will sometimes feed on plant matter.

The lizards tend to breed in the spring after emerging from winter dormancy, with the breeding season extending from late April to mid-August or between February and May. Nests are typically made under the sand and hatchlings receive little to no parental care.

The habitat needs of inland sandy areas reptiles include sandy deposits for cover and rainfall for desert vegetation growth, which is important for attracting insect populations used as prey. These reptiles also prefer undisturbed areas, as low-compacted soils are easier to burrow into, and habitats with low soil moisture and temperature.

All three inland sandy area reptiles are threatened. Critical habitat has been designated for one species.

The following representative threats to inland sandy areas reptiles have been synthesized from information available for several species:

- Loss or modification of habitat from urban development, grazing, agriculture, and other human development activities;
- Invasive plants changing the composition of the habitat and food abundance;
- Predation by raptors, coyotes, foxes, and snakes. Nearby human development can provide food and water for predators, increasing their abundance;
- Changes (rainfall amounts, temperature) in habitat due to climate change; and
- Low genetic diversity and viability due to small population size.

4.7.4 Rangeland Reptiles

Information on rangeland reptiles has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1982a) (U.S. Fish and Wildlife Service, 1985a) (U.S. Fish and Wildlife Service, 1986a) (U.S. Fish and Wildlife Service, 1990b) (U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2010c) (U.S. Fish and Wildlife Service, Pacific Southwest Region, 2011) (U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2011).

Rangeland reptiles include snakes, lizards, tortoises, and geckos that inhabit herbaceous, shrub and brush, and mixed rangeland habitats. These reptiles occupy arid habitats that contain patches of herbaceous or woody vegetation. When not foraging or breeding, these reptiles will typically spend their time in burrows, rock outcrops, or in the shade of vegetation. The tortoises in this sub-group are primarily herbivorous, foraging on grasses and the fruit on woody shrubs and cacti. Snake species are generally carnivorous, preying on small mammals, lizards, and small birds. The lizard and gecko species in this sub-group are typically opportunistic omnivores, feeding on plant matter and insects.

Rangeland reptiles are generally solitary except when mating. Egg-laying reptiles, including tortoises and lizards, typically lay their eggs in burrows, underneath the soil surface, or on rock outcrops. Non-egg-layers, such as the rattlesnakes, are ovoviviparous, retaining eggs inside their body until the eggs are ready to hatch and then giving birth to live young. Hatchlings in this sub-group generally receive little to no parental care. Some rangeland reptiles, such as the tortoises, will brummate (enter into a hibernation-type state of dormancy) in underground burrows.

The habitat needs of rangeland mammals include herbaceous vegetation and small rock crevices for protection from predators. Several species, including snakes, tortoises, and geckos, require plenty of sunlight for warmth.

Of the seven rangeland reptile species, two are endangered and five are threatened. Critical habitat has been designated for four species.

The following representative threats to rangeland reptiles have been synthesized from information available for several species:

- Loss or modification of habitat from urban development, grazing, agriculture, oil and gas exploration, and other human development activities;
- Illegal collection and trade;
- Human-caused or natural wildfires;
- Mortalities from motor vehicles, including ORVs;
- Invasive plants changing the composition of the habitat and food abundance;
- Predation by raptors, coyotes, foxes, feral cats, and snakes. Nearby development can provide food and water sources for predators, increasing their abundance;
- Changes (rainfall amounts, temperature) in habitat influenced by climate change; and
- Low genetic diversity and viability due to small population size.

4.7.5 Evergreen Forest Reptiles

Information on evergreen forest reptiles has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Region 4, 1983) (U.S. Fish and Wildlife Service, 1984b) (U.S. Fish and Wildlife Service, 1984c) (U.S. Fish and Wildlife Service, 1984k) (U.S. Fish and Wildlife Service, 1986b) (U.S. Fish and Wildlife Service, Southeast Region, 2009a) (U.S. Fish and Wildlife Service, Southeast Region, 2014) (U.S. Fish and Wildlife Service, 2015g) (U.S. Fish and Wildlife Service, 2015l).

Reptiles in this sub-group are a pine snake, three boas, and three lizards (an ameiva, an anole, and an iguana) that occupy forested habitats with significant amounts of canopy cover and leaf litter. These reptiles primarily forage, rest, and bask on the ground or in trees, but two of the lizards live mainly on the ground. The boas and the lizards prefer sub-tropical broad-leaved evergreen forests; the black pine snake occupies temperate coniferous evergreen forests.

The majority of the evergreen forest reptiles are opportunistic predatory feeders, having a diet consisting of small prey such as lizards, insects, bats, amphibians, and rodents. Several of the lizard species also eat amphipods. Some evergreen forest lizard species are omnivorous, and eat fruit, plant matter, and insects. Egg-laying evergreen forest reptiles, such as several of the lizard species, lay their eggs on the ground in leaf litter, soil, or vegetation. Non-egg-layers in this sub-group, including several boa species, are ovoviviparous. Young of all species generally receive little to no parental care.

The habitat needs of evergreen forest reptiles include trees that provide canopy cover and shelter. However, these species also need gaps in the canopy to bask in the sun, which helps to raise their body temperatures.

Of the seven evergreen forest reptile species, four are endangered, two are threatened, and one is proposed threatened. Critical habitat has been designated for four listed species.

The following representative threats have been synthesized from information available for several species:

- Loss and modification of habitat from urban development, agriculture, grazing, deforestation, and other human development activities;
- Human recreational activities disturbing nesting and breeding;

- Illegal collection and trade;
- Predation of young and eggs at nesting sites by introduced predators, such as feral pigs, cats, and mongoose;
- Extreme and adverse weather conditions (hurricanes, storms);
- Human-caused or natural wildfires; and
- Invasive plants changing the composition and quality of habitat.

Table 4-5 lists all U.S. reptiles, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-5: Threatened and Endangered Reptiles in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Wetland Reptiles:				
Occur in the Action Area				
Bog (=Muhlenberg) turtle	<i>Clemmys muhlenbergii</i>	T	CT, DE, MA, MD, NJ, NY, PA, VA, TN, SC, NC, GA	No
American crocodile	<i>Crocodylus acutus</i>	T	FL	No
Ringed map turtle	<i>Graptemys oculifera</i>	T	LA, MS	No
Yellow-blotched map turtle	<i>Graptemys flavimaculata</i>	T	MS	No
Atlantic salt marsh snake	<i>Nerodia clarkii taeniata</i>	T	FL	No
Copperbelly water snake	<i>Nerodia erythrogaster neglecta</i>	T	IN, MI, OH, KY, IL	No
Alabama red-belly turtle	<i>Pseudemys alabamensis</i>	E	AL, MS	No
Plymouth red-bellied turtle	<i>Pseudemys rubriventris bangsi</i>	E	MA	Yes
Flattened musk turtle	<i>Sternotherus depressus</i>	T	AL	No
Northern Mexican gartersnake	<i>Thamnophis eques megalops</i>	T	AZ, NM	No
Giant garter snake	<i>Thamnophis gigas</i>	T	CA	No
Narrow-headed garter snake	<i>Thamnophis rufipunctatus</i>	T	AZ, NM	No
San Francisco garter snake	<i>Thamnophis sirtalis tetrataenia</i>	E	CA	No
Offshore Marine Reptiles:				
Offshore marine reptiles occur in the Action Area because, although offshore marine waters do not occur in the Action Area, sea turtles nest on beaches, which do				
Green sea turtle, North Atlantic DPS	<i>Chelonia mydas</i>	PT	AL, CT, DE, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, PR, RI, SC, TX, VA, VI,	Yes
Green sea turtle, East Pacific DPS	<i>Chelonia mydas</i>	PT	CA	No
Green sea turtle, Central North Pacific DPS	<i>Chelonia mydas</i>	PT	HI	No
Green sea turtle, Central South Pacific DPS	<i>Chelonia mydas</i>	PE	AS, PW,	No
Green sea turtle, Central West Pacific	<i>Chelonia mydas</i>	PE	GU, FM, MH, NMI	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Loggerhead sea turtle, Northwest Atlantic DPS	<i>Caretta caretta</i>	T	AL, FL, GA, LA, MS, NC, SC, TX, VA	Yes
Loggerhead sea turtle, North Pacific DPS	<i>Caretta caretta</i>	E	OR	No
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	AK, AL, CA, CT, DE, FL, GA, HI, LA, MA, MD, ME, MS, NC, NH, NJ, NY, OR, PR, RI, SC, TX, VA, VI, WA	Yes
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	AL, AS, CT, DE, FL, GA, GU, HI, LA, MA, MD, ME, MS, NC, NH, NM, NJ, NY, PR, PW, RI, SC, TX, VA, VI	Yes
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	AL, CT, DE, FL, GA, LA, MA, MD, MS, NC, NJ, NY, RI, SC, TX, VA	No
Olive ridley sea turtle	<i>Lepidochelys olivacea</i>	T	CA, HI, OR	No
Inland Sandy Areas Reptiles: Occur in the Action Area				
Bluetail mole skink	<i>Eumeces egregius lividus</i>	T	FL	No
Sand skink	<i>Neoseps reynoldsi</i>	T	FL	No
Coachella Valley fringe-toed lizard	<i>Uma inornata</i>	T	CA	Yes
Rangeland Reptiles: Occur in the Action Area				
Bluetail mole skink	<i>Eumeces egregius lividus</i>	T	FL	No
New Mexican ridge-nosed rattlesnake	<i>Crotalus willardi obscurus</i>	T	AZ, NM	Yes
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T	AL, FL, GA, SC, MS	No
Blunt-nosed leopard lizard	<i>Gambelia silus</i>	E	CA	No
Desert tortoise	<i>Gopherus agassizii</i>	T	AZ, CA, NV, UT	Yes
Gopher tortoise	<i>Gopherus polyphemus</i>	T	AL, LA, MS, SC, GA, FL	No
Alameda whipsnake (=striped racer)	<i>Masticophis lateralis euryxanthus</i>	T	CA	Yes
Monito gecko	<i>Sphaerodactylus micropithecus</i>	E	PR	Yes
Evergreen Forest Reptiles: Occur in the Action Area				
St. Croix ground lizard	<i>Ameiva polops</i>	E	VI	Yes
Culebra Island giant anole	<i>Anolis roosevelti</i>	E	PR, VI	Yes
Mona ground Iguana	<i>Cyclura stejnegeri</i>	T	PR	Yes
Puerto Rican boa	<i>Epicrates inornatus</i>	E	PR	No
Virgin Islands tree boa	<i>Epicrates monensis granti</i>	E	PR, VI	No
Mona boa	<i>Epicrates monensis</i>	T	PR	Yes
Black pine snake	<i>Pituophis melanoleucus lodingi</i>	PT	AL, MS	No

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.8 Amphibians

Amphibians are cold-blooded vertebrates of the class Amphibia, comprising frogs, toads, newts, and salamanders. The four sub-groups of amphibians are wetland amphibians, freshwater amphibians, cave amphibians, and forest land amphibians. All threatened and endangered amphibians are under the jurisdiction of USFWS.

4.8.1 Wetland Amphibians

Information on wetland amphibians has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1999e) (U.S. Fish and Wildlife Service, 1999d) (U.S. Fish and Wildlife Service, 2013f) (U.S. Fish and Wildlife Service, 2014f) (U.S. Fish and Wildlife Service, 2007c).

The wetland amphibians are salamander, toad, and frog species found in either forested or nonforested wetland habitat, such as riparian areas, mangrove forests, marshes, inland freshwater marshes, and seasonally wet prairies. These species generally require both aquatic and adjacent upland habitats that may be dominated by woody or herbaceous vegetation. Wetland amphibians typically occupy lowland water habitats when they are young and upland forested or herbaceous habitats as adults. Some of the frog species have both aquatic and terrestrial life stages; generally, the larvae are aquatic and breathe through gills and the adults are semiterrestrial, breathing with lungs or through moist, glandular skin. Mammal burrows are important to some salamander species for hibernation and protection from weather extremes. Frogs and toads in this sub-group may find shelter in rodent burrows, vegetation, damp soil, or rock crevices. Wetland amphibians typically feed on invertebrate prey, including zooplankton, small crustaceans, insects, and the juveniles of other amphibians.

Most adult wetland amphibians return to lowland water habitats to breed in slow-moving streams, springs, shallow pools, or ephemeral ponds. The breeding and reproduction periods vary widely among these species and can occur during the winter, spring, or early to mid-summer; salamanders tend to breed during the winter months and frogs and toads tend to breed in the spring and summer months. Eggs of wetland amphibians are often attached to submerged aquatic vegetation or benthic substrate (sand, gravel, or mud). Eggs and young are typically unattended by adults.

The habitat needs of wetland amphibians include access to both aquatic or flooded habitats as well as adjacent upland terrestrial habitats with woody or herbaceous vegetation. Many species also require aquatic vegetation for laying eggs. Due to these species' reliance on aquatic environments, suitable water quality is essential.

Of the 20 wetland amphibian species, 11 are endangered and 8 are threatened; 1 species has a population listed as endangered and a population listed as threatened. Critical habitat has been designated for 12 species.

The following representative threats have been synthesized from information available for several species:

- Habitat loss due to urbanization, agriculture, dam construction, road construction, livestock grazing, mining, and human recreational activities;
- Habitat loss due to exotic plants, such as tamarisk and giant reed;
- Predation from introduced species, such as crayfish and bullfrogs;

- Water quality degradation caused by nearby urban and agricultural runoff promoting pollution and siltation;
- Small population sizes and limited distribution causing a decrease in genetic diversity; and
- Disease, including chytridiomycosis, which is believed to be introduced and spread into a native amphibian population by non-native amphibians.

4.8.2 Freshwater Amphibians

Information on freshwater amphibians has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2012e) (U.S. Fish and Wildlife Service, 2015b) (U.S. Fish and Wildlife Service, 1996a).

This sub-group consists of two salamander species, the Ozark hellbender and the San Marcos salamander. These species live in freshwater aquatic habitats, including, but not limited to, cool and flowing streams, springs, rivers, lakes, pools, and reservoirs. The species in this sub-group are permanently aquatic and spend their whole life in freshwater. These amphibians prefer well-oxygenated water that has consistent temperature and flow. Species in this sub-group respire underwater through gills or permeable skin and primarily consume a diet of macroinvertebrates, such as crayfish, crane fly larvae, and amphipods. These salamanders typically dwell underneath mats of algae or aquatic moss or beneath benthic substrate, such as rocks or gravel beds.

The Ozark hellbender usually breeds in the fall or winter while the San Marco salamander usually breeds in the summer. Females of both species lay their eggs on aquatic plant material, on benthic substrate, or on submerged woody debris. The male Ozark hellbenders will defend its nest against predators such as fish and other hellbenders.

The habitat needs for freshwater amphibians include flowing, well-oxygenated water (they respire under water), and aquatic vegetation or a rocky/gravel benthic substrate for shelter. Because these species spend their lives in aquatic habitats, they rely on good water quality to maintain healthy prey populations.

Of the two freshwater amphibians, one is endangered and one is threatened. Critical habitat has been designated for one species.

The following representative threats to freshwater amphibians have been synthesized from information available for several species:

- Loss and modification of habitat from urban development, agriculture, dams, and other human development activities;
- Recreational activities (such as hiking, camping, or swimming) that disturb habitat and nesting sites;
- Predation by introduced predators such as non-native fish and crayfish;
- Disease, namely chytridiomycosis, which is believed to be introduced and spread into a native amphibian population by non-native amphibians;
- Loss of water quality and oxygenation with the introduction of contaminants (fertilizer, heavy metals, sediment);
- Low genetic diversity and viability due to small population size; and
- Loss of spring and stream flow due to lack of rainfall and groundwater pumping. Lack of rainfall may be influenced by climate change.

4.8.3 Cave Amphibians

Information on cave amphibians has been synthesized from various sources: (U.S. Fish and Wildlife Service, 1996a) (U.S. Fish and Wildlife Service, 2013i) (U.S. Fish and Wildlife Service, 2014e).

Cave amphibians consist of neotenic salamanders, which do not transform into a terrestrial adult and are permanently aquatic. These species live in subterranean wetted caves that are water-filled from the groundwater of connected aquifer systems. Cave amphibians may also spend some of their time in other sub-surface areas that have a groundwater source, such as a water-filled substrate matrix below a stream bed. Most, but not all, of these salamander species will also spend some time aboveground in springs and pools that may form in wetter months. Species in this sub-group require high quality groundwater for survival that has constant conditions such as temperature, pH, and flow. Cave amphibians consume a diet of aquatic macroinvertebrates such as ostracods, water mites, fly larvae, and amphipods.

Reproduction for cave amphibians is generally unknown because of their sub-surface life cycle. It is likely that reproduction in these species occurs year-round due to their constant habitat conditions. Eggs of these species have not been documented aboveground, so eggs are likely laid belowground. Captive species in this sub-group had females laying their eggs on benthic substrate in the aquarium.

The main habitat need of cave amphibians is a sufficient amount of high quality ground water with consistent pH, temperature, and flow.

Of the six cave amphibian species, three are endangered and three are threatened. Critical habitat has been designated for two species.

The following representative threats to forest land amphibians have been synthesized from information available for several species:

- Loss of spring and aquifer flow due to lack of rainfall and groundwater pumping. Groundwater pumping may be influenced by human demand for well water. Lack of rainfall may be influenced by climate change;
- Recreational activities (such as hiking or spelunking) that disturb habitat;
- Predation by introduced predators such as non-native fish and crayfish; and
- Loss of water quality and oxygenation with the introduction of contaminants (fertilizer, heavy metals, sediment).

4.8.4 Forest Land Amphibians

Information on forest land amphibians has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1984e) (U.S. Fish and Wildlife Service, 1991b) (U.S. Fish and Wildlife Service, 1994b) (U.S. Fish and Wildlife Service, 2014d).

Forest land amphibians, which include salamanders and frogs, typically occupy deciduous, evergreen, or mixed forests in mountainous areas. The forest canopy promotes a shaded, cool, and moist ground environment, promoting skin surface moisture, which is vital to several of these species for maintaining skin moisture. The species in this sub-group generally require a constantly moist skin surface for hydration and respiration. The salamander species in this sub-group typically dwell on the forest floor living in damp leaf litter, logs, or rock crevices. The frog species in this subgroup are typically found living in water-filled bromeliads, which are plants that grow on trees, mountainsides, or on the ground and have the ability to store water in the deep pockets between their leaf bases. Amphibians in this sub-group are typically nocturnal, hiding

under vegetation and in rock crevices during the day. Forest land amphibians feed on insects and other invertebrates found in the soil or in bromeliads, such as mites.

Forest land amphibians generally reproduce during the spring or summer months. The female salamander species in this sub-group lay eggs in damp logs, moss, or rock crevices, and typically guards them until hatching. The frog species in this sub-group is ovoviviparous. The species in this sub-group are generally unique from other amphibians because they do not have an aquatic stage and do not require proximity to water to breed.

The habitat needs of forest land amphibians include canopy cover, which promotes a shaded, moist ground, allowing these species to maintain the moist skin essential for respiration and hydration. These species also require leaf litter, logs, and rock crevices for shelter. The frog species, the Golden coqui, also often relies on water-filled bromeliads for hydration and shelter.

Of the four forest land amphibian species, two are endangered and two are threatened. Critical habitat has been designated for two species.

The following representative threats to forest land amphibians have been synthesized from information available for several species:

- Loss of habitat from the removal of the forest canopy and forest floor litter due to road development, mining activities, ski slopes, and other human development activities;
- Loss of habitat from human-caused or natural wildfires;
- Degradation of habitat through tree defoliation caused by invasive or pest insects, such as gypsy moths;
- Degradation of habitat through changes in soil chemistry and destruction of canopy vegetation from acid deposition and other air pollution sources; and
- Competition for food and habitat with other aggressive species (red-backed salamander).

Table 4-6 lists all U.S. amphibians, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-6: Threatened and Endangered Amphibians in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Wetland Amphibians: Occur in the Action Area				
Reticulated flatwoods salamander	<i>Ambystoma bishopi</i>	E	FL, GA	Yes
Arroyo (=arroyo southwestern) toad	<i>Anaxyrus californicus</i>	E	CA	Yes
California tiger salamander, Santa Barbara County DPS	<i>Ambystoma californiense</i>	E	CA	Yes
California tiger salamander, Sonoma County DPS	<i>Ambystoma californiense</i>	E	CA	Yes
California tiger Salamander, Central California DPS	<i>Ambystoma californiense</i>	T	CA	Yes
Frosted Flatwoods salamander	<i>Ambystoma cingulatum</i>	T	FL, GA, SC	Yes
Santa Cruz long-toed salamander	<i>Ambystoma macrodactylum croceum</i>	E	CA	No
Sonora tiger salamander	<i>Ambystoma tigrinum stebbinsi</i>	E	AZ	No
Wyoming toad	<i>Anaxyrus baxteri</i>	E	WY	No
Yosemite toad	<i>Anaxyrus canorus</i>	T	CA	No
Desert slender salamander	<i>Batrachoseps aridus</i>	E	CA	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Houston toad	<i>Bufo houstonensis</i>	E	TX	Yes
Guaion	<i>Eleutherodactylus cooki</i>	T	PR	Yes
Llanero coqui	<i>Eleutherodactylus juanariveroi</i>	E	PR	Yes
Puerto Rican crested toad	<i>Peltophryne lemur</i>	T	PR	No
Red Hills salamander	<i>Phaeognathus hubrichti</i>	T	AL	No
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	T	AZ, NM	Yes
California red-legged frog	<i>Rana draytonii</i>	T	CA	Yes
Mountain yellow-legged frog, Southern California DPS	<i>Rana muscosa</i>	E	CA, NV	Yes
Mountain yellow-legged frog, Northern California DPS	<i>Rana muscosa</i>	E	CA	No
Oregon spotted frog	<i>Rana pretiosa</i>	T	CA, OR, WA	No
dusky gopher frog	<i>Rana sevosa</i>	E	MS, LA, AL	Yes
Sierra Nevada yellow-legged frog	<i>Rana sierrae</i>	E	CA, NV	No
Freshwater Amphibians: Occur in the Action Area				
Ozark hellbender	<i>Cryptobranchus alleganiensis bishopi</i>	E	AR, MO	No
San Marcos salamander	<i>Eurycea nana</i>	T	TX	Yes
Cave Amphibians: Occur in the Action Area				
Salado salamander	<i>Eurycea chisholmensis</i>	T	TX	No
Georgetown salamander	<i>Eurycea naufragia</i>	T	TX	No
Barton Springs salamander	<i>Eurycea sosorum</i>	E	TX	No
Jollyville Plateau salamander	<i>Eurycea tonkawae</i>	T	TX	Yes
Austin blind salamander	<i>Eurycea waterlooensis</i>	E	TX	Yes
Texas blind salamander	<i>Typhlomolge rathbuni</i>	E	TX	No
Forest Land Amphibians: Occur in the Action Area				
Golden coqui	<i>Eleutherodactylus jasperii</i>	T	PR	Yes
Jemez Mountains salamander	<i>Plethodon neomexicanus</i>	E	NM	Yes
Cheat Mountain salamander	<i>Plethodon nettingi</i>	T	WV	No
Shenandoah salamander	<i>Plethodon shenandoah</i>	E	VA	No

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.9 Fish

Fish are any of the various cold-blooded, aquatic vertebrates, having gills, fins, and typically, an elongated body covered with scales. Fish are divided here into four sub-groups: freshwater resident fish, nearshore marine fish, anadromous fish, and cave fish. Freshwater resident fish and cave fish are under the jurisdiction of the USFWS; NMFS has jurisdiction over nearshore marine fish and anadromous fish (fish that migrate from saltwater into fresh water to spawn or fish that remain in fresh water but migrate upstream to spawn).

4.9.1 Freshwater Resident Fish

Information on freshwater resident fish has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Bay Delta Fish and Wildlife Office, 2013) (U.S. Fish and Wildlife Service, 1985b) (U.S. Fish and Wildlife Service, 1994c) (U.S. Fish and Wildlife Service, 1994d) (U.S. Fish and Wildlife Service, 2007d) (U.S. Fish and Wildlife Service, Southeast Region, 2009b) (NatureServe, 2009a) (U.S. Fish and Wildlife Service, Southeast Region – Georgia Ecological Services Field Office, 2009) (U.S. Fish and Wildlife Service, Southeast Region, 2012).

Freshwater resident fish include taxonomically diverse species that occupy a particular freshwater body of water or watershed for their entire life cycle. This body of water could be a large river or lake, a particular estuary, an underground stream, or a small spring-fed desert oasis, many of which are isolated as a result of geologic or hydrologic processes.

Habitats used by freshwater resident fish vary widely depending on the species, but include cold mountain streams, spring-fed pools, the meandering waterways of large rivers, or the brackish water areas of estuaries. Freshwater resident fish are found in both shallow and deep portions of rivers, streams, lakes, reservoirs, and estuaries. Many of the freshwater resident species are habitat specialists or have adapted to rather extreme environments, such as isolated desert pools, canyons subject to extreme flooding, or highly alkaline waters.

Feeding strategies of freshwater resident fish vary widely, from bottom feeders of invertebrates to top-tier predators of other fish. Species within this sub-group include small, relatively short-lived fish (such as pupfish and dace), as well as large, long-lived fish (such as sturgeon and suckers). Many of the ESA listed or proposed fish in this sub-group are only found (endemic to) one or a few bodies of water and have limited ranges. Some freshwater resident species may migrate within their range to reach breeding grounds or take advantage of seasonal resources. Shiners, darters, dace, logperch, sculpin, and madtom are small fish that typically inhabit small streams and the margins of larger waterways. Suckers, shiners, and chubs typically inhabit lakes or slow moving streams and rivers and are tolerant of warm water temperatures. Pupfish, gambusia, and springfish inhabit isolated spring-fed pools and waterways in deserts. Freshwater resident sturgeon are large, slow-growing fish of large waterways.

Habitats used by freshwater resident fish vary widely depending on the species, but include cold mountain streams, spring-fed pools, the meandering waterways of large rivers, or the brackish water areas of estuaries. Freshwater resident fish are found in both shallow and deep portions of rivers, streams, lakes, reservoirs, and estuaries. Many of the freshwater resident species are habitat specialists or have adapted to rather extreme environments, such as isolated desert pools, canyons subject to extreme flooding, or highly alkaline waters.

Needs for freshwater resident fish include aquatic habitat of suitable water quality; aquatic habitat with suitable depths or flows; access to spawning, rearing, and holding areas; available suitable forage; suitable cover or protection from excessive predation; and protection from excessive fishing or collection to maintain populations.

Of the 121 freshwater resident fish species, 41 are threatened and 80 are endangered, and 70 have critical habitat designated.

The following representative threats to resident fish species have been synthesized from information available for several species:

- Creation of dams and diversions that have fragmented habitat, altered flow regimes, and restrict fish movement;
- Erosion and sedimentation of habitat from agricultural, urban, and infrastructure development;
- Reduction in spring-water discharges due to groundwater extraction;
- Introduction of non-native fish that compete with or prey on fish within this sub-group;
- Degradation of genetic integrity caused by hybridization with introduced, closely related taxa;

- Non-point source pollution from agricultural and urban areas;
- Channelization of waterways, which changes flow regimes, decreases habitat complexity, and alters sediment transport;
- Capture or death of individuals from illegal fishing or collection for aquarium fish; and
- Destruction of riparian habitat which contributes to shelter and the food webs of riverine habitat.

4.9.2 Nearshore Marine Fish

Information on nearshore marine fish has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, 2007) (NatureServe, 2009b) (U.S. Fish and Wildlife Service, Bay Delta Fish and Wildlife Office, 2013) (National Marine Fisheries Service, 2014f) (National Marine Fisheries Service, 2014g) (National Marine Fisheries Service, 2014h).

Nearshore marine fish complete their entire life cycle in nearshore marine waters, including ocean waters along the coastline and the protected salt waters of bays. One of these species (smalltooth sawfish) sometimes forages within estuarine areas, but does not enter freshwater as anadromous fish do (National Marine Fisheries Service, 2015e). Scalloped hammerhead sharks are wide-ranging fish that move throughout nearshore tropical waters (National Marine Fisheries Service, 2014f). Rockfish are associated with kelp forests and rocky habitat and do not make migrational movements. Nearshore marine fish include benthic fish that live and feed near the bottom (sawfish, scalloped hammerhead shark, and rockfish). These bottom-oriented fish feed on a variety of invertebrates and fish.

Reproduction of nearshore marine species varies widely, as some species are viviparous (giving birth to live young), while others are broadcast spawners (eggs are fertilized in the water) with a planktonic larval stage (drifting on currents).

Needs for these fish include nearshore marine habitats free from contaminants; access to spawning, rearing, and holding areas; available suitable forage; suitable cover or protection from excessive predation or entrainment at water intake facilities; and to maintain populations, protection from excessive fishing, bycatch, or collection.

Of the five nearshore marine fish species, two are endangered, two are threatened, and one has multiple distinct populations that are either endangered or threatened. Critical habitat designated has been designated for one species.

The following representative threats to nearshore marine fish have been synthesized from information available for several species:

- Entrainment by water intakes;
- Alteration of salinity or flow regimes in estuarine areas due to upstream water exports;
- Overfishing or bycatch in other fisheries;
- Non-point source pollution from agricultural and urban areas;
- Alteration of estuarine habitats due to dredging and channelization;
- Loss of nearshore habitats, such as mangrove forests and seagrass beds due to development and coastal erosion; and
- Changing habitat conditions influenced by climate change.

4.9.3 Anadromous Fish

Information on anadromous fish has been synthesized from a variety of sources: (National Marine Fisheries Service, 2013a) (National Marine Fisheries Service, 2014a) (National Marine Fisheries Service, 2014b) (National Marine Fisheries Service, 2014c) (National Marine Fisheries Service, 2014d) (National Marine Fisheries Service, 2014e).

Habitats used by this anadromous fish include both nearshore and offshore marine waters, as well as freshwater rivers, streams, lakes, and estuaries. Anadromous fish mature in oceanic environments rich in food and migrate to spawn in rivers and streams where there is less predation of eggs and juvenile fish (Willson, 1997). Sub-adults and adults forage in nearshore and offshore marine waters during growth to maturity. Spawning typically occurs in freshwater streams with suitable substrate and water quality, which vary by species. After spawning, larvae and juveniles typically remain in freshwater habitat for some time before migrating back to the ocean. Some anadromous species only migrate short distances up natal waterways, while others may migrate hundreds of miles upstream to reach spawning locations. There are three classes of anadromous fish: sturgeon, salmonids, and smelt (the only smelt in this sub-group is the eulachon). Sturgeon are long-lived, large fish that do not reach sexual maturity until 10 or more years of age; once sexual maturity is reached, sturgeon will return to natal waters every few years to spawn. Salmon and eulachon are smaller than sturgeon, reach sexual maturity more quickly, and typically die after spawning in their natal waters.

Sturgeon are bottom-oriented and feed primarily on benthic invertebrates, while salmon and eulachon are typically found in the water column, feeding on plankton, invertebrates, or other fish, depending on the species and life-stage.

The habitat needs of anadromous fish are complex and vary throughout the life cycle of the species. Anadromous fish require passable migratory pathways from marine foraging habitat to freshwater spawning areas; freshwater areas with substrates, flow rates, and water quality suitable for spawning; freshwater foraging areas with suitable water quality, prey items, and free from excessive predation; estuarine and nearshore/offshore marine waters with suitable prey items, water quality, and freedom from excessive predation or pressure from recreational/commercial fishing.

Of the 11 anadromous fish species, 2 are endangered, 4 are threatened, and 5 have populations that are both endangered and threatened. Critical habitat has been designated for seven species.

The following representative threats to anadromous fish have been synthesized from information available for several species:

- Creation of dams and diversions that have fragmented habitat, altered flow regimes, and prevented fish from accessing spawning and rearing areas;
- Erosion and sedimentation of habitat from agricultural, urban, and infrastructure development;
- Reduction in availability of habitat and flows due to water withdrawals for agricultural and urban use;
- Entrainment into water diversions;
- Introduction of non-native fish that compete with or prey on fish within this group;
- Degradation of genetic integrity caused by hybridization with hatchery stock derived from non-indigenous populations;

- Non-point source pollution from agricultural and urban areas;
- Dredging and channelization of waterways, which changes flow regimes, decreases habitat complexity, and alters sediment transport;
- Capture or death of individuals from illegal fishing or bycatch of commercial fisheries;
- Diseases spreading from aquaculture facilities to wild populations; and
- Alteration of oceanic conditions and freshwater flows influenced by climate change.

4.9.4 Cave Fish

Information on cave fish has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2015e) (U.S. Fish and Wildlife Service, 2015d) (U.S. Fish and Wildlife Service, 1990f).

This sub-group includes three species that exclusively occupy pools and flooded passageways in karst caves. Habitats used by cave fish are limited to pools and flooded passageways in karst caves. Juvenile grotto sculpin may inhabit waters flowing into karst caves at the surface, but adults are generally found in subterranean areas (Missouri Department of Conservation, 2015b). Like other cave-dwelling animals, cave fish have reduced pigmentation and eyes, or no eyes at all. These species may have ranges limited to one cavern or cave system. These species feed on cave-dwelling invertebrates as well as invertebrates and other food items that are washed into the cave system from aboveground areas. In some cave systems, bat droppings provide a source of nutrients for cave food webs (Missouri Department of Conservation, 2015a). Cave fish often exhibit slow growth, low reproductive rates, and long lifespans as a result of living in such stable and energy limited systems (Missouri Department of Conservation, 2015a).

Needs for cave fish include: aquatic habitat of suitable water quality; access to food sources that enter the cave system (such as bat guano); and protection from collection in order to maintain populations.

Of the three cave fish species, one is threatened and two are endangered. Critical habitat has been designated for two species.

The following representative threats have been synthesized from information available for several species:

- The filling or closure of sinkholes or cave entrances which reduces terrestrial inputs to supporting habitat;
- Erosion and sedimentation of waterways that flow into caves from agricultural, urban, and infrastructure development;
- Reduction in spring-water discharges due to groundwater extraction;
- Habitat disturbance from recreational cave exploration;
- Non-point source pollution from agricultural and urban areas that enters aquatic habitat for these species; and
- Capture or death of individuals from collection for aquarium fish.

Table 4-7 lists all U.S. fish, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-7: Threatened and Endangered Fish in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Freshwater Resident Fish:		Occur in the Action Area		
White sturgeon, Kootenai River Population	<i>Acipenser transmontanus</i>	E	MT, ID	Yes
Zuni bluehead sucker	<i>Catostomus discobolus yarrowi</i>	E	AZ, NM	No
Modoc sucker	<i>Catostomus microps</i>	E	CA, OR	Yes
Santa Ana sucker	<i>Catostomus santaanae</i>	T	CA	Yes
Warner sucker	<i>Catostomus warnerensis</i>	T	CA, NV, OR	Yes
Shortnose Sucker	<i>Chasmistes brevirostris</i>	E	CA, OR	Yes
Cui-ui	<i>Chasmistes cujus</i>	E	NV	No
June sucker	<i>Chasmistes liorus</i>	E	UT	Yes
Laurel dace	<i>Chrosomus saylari</i>	E	TN	Yes
Pygmy sculpin	<i>Cottus paulus</i> (=pygmaeus)	T	AL	No
Diamond darter	<i>Crystallaria cincotta</i>	E	WV; Entire	Yes
White River springfish	<i>Crenichthys baileyi</i>	E	NV	Yes
Hiko White River springfish	<i>Crenichthys baileyi grandis</i>	E	NV	Yes
Railroad Valley springfish	<i>Crenichthys nevadae</i>	T	NV	Yes
Beautiful shiner	<i>Cyprinella formosa</i>	T	AZ, NM	Yes
Blue shiner	<i>Cyprinella caerulea</i>	T	AL, GA, TN	No
Leon Springs pupfish	<i>Cyprinodon bovinus</i>	E	TX	Yes
Devils Hole pupfish	<i>Cyprinodon diabolis</i>	E	NV	No
Comanche Springs pupfish	<i>Cyprinodon elegans</i>	E	TX	No
Desert pupfish	<i>Cyprinodon macularius</i>	E	AZ, CA	Yes
Ash Meadows Amargosa pupfish	<i>Cyprinodon nevadensis mionectes</i>	E	NV	Yes
Warm Springs pupfish	<i>Cyprinodon nevadensis pectoralis</i>	E	NV	No
Owens pupfish	<i>Cyprinodon radiosus</i>	E	CA	No
Lost River sucker	<i>Deltistes luxatus</i>	E	CA, OR	Yes
Devils River minnow	<i>Dionda diabolii</i>	T	TX	Yes
Guadalupe roundnose minnow	<i>Dionda nigrotaeniata</i>	E	TX	No
Spring pygmy sunfish	<i>Elassoma alabamae</i>	T	AL	No
Pahrump poolfish	<i>Empetrichthys latos</i>	E	NV	No
Desert dace	<i>Eremichthys acros</i>	T	NV	Yes
Spotfin chub	<i>Erimonax monachus</i>	T	AL, NC, TN, VA, GA	Yes
Slender chub	<i>Erimystax cahni</i>	T	TN, VA	Yes
Bluemask (=jewel) darter	<i>Etheostoma sp.</i>	E	TN	No
Slackwater darter	<i>Etheostoma boschungii</i>	T	AL, TN	Yes
Vermilion darter	<i>Etheostoma chermocki</i>	E	AL	Yes
Relict darter	<i>Etheostoma chienense</i>	E	KY	No
Etowah darter	<i>Etheostoma etowahae</i>	E	GA	No
Fountain darter	<i>Etheostoma fonticola</i>	E	TX	Yes
Yellowcheek darter	<i>Etheostoma moorei</i>	E	AR	Yes
Niangua darter	<i>Etheostoma nianguae</i>	T	MO	Yes
Watercress darter	<i>Etheostoma nuchale</i>	E	AL	No
Okaloosa darter	<i>Etheostoma okaloosae</i>	T	FL	No
Duskytail darter	<i>Etheostoma percnum</i>	E	KY, TN, VA	No
Rush Darter	<i>Etheostoma phytophilum</i>	E	AL	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Bayou darter	<i>Etheostoma rubrum</i>	T	MS	No
Cherokee darter	<i>Etheostoma scotti</i>	T	GA	No
Maryland darter	<i>Etheostoma sellare</i>	E	MD; Possibly extinct	Yes
Cumberland darter	<i>Etheostoma susanae</i>	E	KY, TN	Yes
Tippecanoe darter	<i>Etheostoma tippecanoe</i>	E	IN, KY, OH, PA, TN, WV	No
Boulder darter	<i>Etheostoma wapiti</i>	E	AL, TN	No
Tidewater goby	<i>Eucyclogobius newberryi</i>	E	CA	Yes
Big Bend gambusia	<i>Gambusia gaigei</i>	E	TX	No
San Marcos gambusia	<i>Gambusia georgei</i>	E	TX; Possibly extinct	Yes
Clear Creek gambusia	<i>Gambusia heterochir</i>	E	TX	No
Pecos gambusia	<i>Gambusia nobilis</i>	E	NM, TX	No
Unarmored threespine stickleback	<i>Gasterosteus aculeatus williamsoni</i>	E	CA	No
Hutton tui chub	<i>Gila bicolor ssp.</i>	T	OR	No
Mohave tui chub	<i>Gila bicolor ssp. Mohavensis</i>	E	CA	No
Owens tui chub	<i>Gila bicolor ssp. Snyderi</i>	E	CA	Yes
Borax Lake chub	<i>Gila boraxobius</i>	E	OR	Yes
Humpback chub	<i>Gila cypha</i>	E	AZ, CO, UT, WY	Yes
Sonora chub	<i>Gila ditaenia</i>	T	AZ	Yes
Bonytail chub	<i>Gila elegans</i>	E	AZ, CA, CO, NV, UT, WY	Yes
Gila chub	<i>Gila intermedia</i>	E	AZ, NM	Yes
Chihuahua chub	<i>Gila nigrescens</i>	T	NM	No
Yaqui chub	<i>Gila purpurea</i>	E	AZ	Yes
Pahranagat roundtail chub	<i>Gila robusta jordani</i>	E	NV	No
Virgin River chub	<i>Gila seminuda (=robusta)</i>	E	AZ, NV, UT	Yes
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	E	TX, NM	Yes
Delta smelt	<i>Hypomesus transpacificus</i>	T	CA	Yes
Yaqui catfish	<i>Ictalurus pricei</i>	T	AZ	Yes
White River spinedace	<i>Lepidomeda albivallis</i>	E	NV	Yes
Big Spring spinedace	<i>Lepidomeda mollispinis pratensis</i>	T	NV	Yes
Little Colorado spinedace	<i>Lepidomeda vittata</i>	T	AZ	Yes
Spikedace	<i>Meda fulgida</i>	E	AZ, NM	Yes
Waccamaw silverside	<i>Menidia extensa</i>	T	NC	Yes
Moapa dace	<i>Moapa coriacea</i>	E	NV	No
Palezone shiner	<i>Notropis albizonatus</i>	E	AL, KY	No
Smalleye Shiner	<i>Notropis buccula</i>	E	TX	Yes
Cahaba shiner	<i>Notropis cahabae</i>	E	AL	No
Arkansas River shiner	<i>Notropis girardi</i>	T	AR, KS, NM, OK, TX	Yes
Cape Fear shiner	<i>Notropis mekistocholas</i>	E	NC	Yes
Sharpnose shiner	<i>Notropis oxyrhynchus</i>	E	TX	Yes
Pecos bluntnose shiner	<i>Notropis simus pecosensis</i>	T	NM	Yes
Topeka shiner	<i>Notropis topeka (=tristis)</i>	E	IA, KS, MN, MO, NE, SD	Yes
Smoky madtom	<i>Noturus baileyi</i>	E	TN	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Chucky madtom	<i>Noturus crypticus</i>	E	TN	Yes
Yellowfin madtom	<i>Noturus flavipinnis</i>	T	TN, VA	Yes
Neosho madtom	<i>Noturus placidus</i>	T	KS, MO, OK	No
Pygmy madtom	<i>Noturus stanauli</i>	E	TN	No
Scioto madtom	<i>Noturus trautmani</i>	E	OH; Possibly extinct	No
Apache trout	<i>Oncorhynchus apache</i>	T	AZ	No
Little Kern golden trout	<i>Oncorhynchus aguabonita whitei</i>	T	CA	Yes
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>	T	CA, NV, OR, UT	No
Paiute cutthroat trout	<i>Oncorhynchus clarkii seleniris</i>	T	CA	No
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	T	CO, UT	No
Gila trout	<i>Oncorhynchus gilae</i>	T	AZ, NM	No
Oregon chub	<i>Oregonichthys crameri</i>	T	OR	Yes
Amber darter	<i>Percina antesella</i>	E	GA, TN, AL	Yes
Goldline darter	<i>Percina aurolineata</i>	T	AL, GA, TN	No
Conasauga logperch	<i>Percina jenkinsi</i>	E	GA, TN	Yes
Leopard darter	<i>Percina pantherina</i>	T	AR, OK	Yes
Roanoke logperch	<i>Percina rex</i>	E	NC, VA	No
Snail darter	<i>Percina tanasi</i>	T	AL, GA, TN	Yes
Blackside dace	<i>Phoxinus cumberlandensis</i>	T	KY, TN, VA	No
Woundfin	<i>Plagopterus argentissimus</i>	E	AZ, NM, NV, UT	Yes
Gila topminnow (incl. Yaqui)	<i>Poeciliopsis occidentalis</i>	E	AZ, NM	No
Colorado pikeminnow (=squawfish)	<i>Ptychocheilus lucius</i>	E	AZ, CA, CO, NM, UT, WY, NV,	Yes
Foskett speckled dace	<i>Rhinichthys osculus ssp.</i>	T	OR	No
Independence Valley speckled dace	<i>Rhinichthys osculus lethoporus</i>	E	NV	No
Ash Meadows speckled dace	<i>Rhinichthys osculus nevadensis</i>	E	NV	Yes
Clover Valley speckled dace	<i>Rhinichthys osculus oligoporus</i>	E	NV	No
Kendall Warm Springs dace	<i>Rhinichthys osculus thermalis</i>	E	WY	No
Bull trout	<i>Salvelinus confluentus</i>	T	CA, ID, MT, NV, OR, WA	Yes
Pallid sturgeon	<i>Scaphirhynchus albus</i>	E	AR, IA, IL, KS, KY, LA, MO, MS, MT, ND, NE, SD, TN	No
Alabama sturgeon	<i>Scaphirhynchus suttkusi</i>	E	MS, AL	Yes
Loach minnow	<i>Tiaroga cobitis</i>	E	AZ, NM	Yes
Razorback sucker	<i>Xyrauchen texanus</i>	E	AZ, CA, CO, NM, NV, UT, WY	Yes
Nearshore Marine Fish: Occur in the Action Area				
Smalltooth sawfish, United States DPS	<i>Pristis pectinata</i>	E	AL, FL, GA, LA, MS, NC, SC, TX	Yes
Bocaccio, Puget Sound-Georgia Basin DPS	<i>Sebastes paucispinis</i>	E	AK, CA	No
Canary rockfish, Puget Sound-Georgia Basin DPS	<i>Sebastes pinniger</i>	T	AK, CA	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Yelloweye rockfish, Puget Sound-Georgia Basin DPS	<i>Sebastes ruberrimus</i>	T	AK, CA	No
Scalloped hammerhead shark, Central and Southwest Atlantic DPS	<i>Sphyrna lewini</i>	T	FL, PR	No
Scalloped hammerhead shark, Eastern Pacific DPS	<i>Sphyrna lewini</i>	E	CA	No
Anadromous Fish: Occur in the Action Area				
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	CT, DE, FL, GA, MA, MD, ME, NC, NJ, NY, PA, RI, SC, VA	No
Green sturgeon, Southern DPS	<i>Acipenser medirostris</i>	T	AK, CA, OR, WA	No
Atlantic sturgeon (Gulf subspecies)	<i>Acipenser oxyrinchus (=oxyrhynchus) desotoi</i>	T	AL, FL, LA, MS, GA	Yes
Atlantic Sturgeon, Carolina DPS	<i>Acipenser oxyrinchus</i>	E	NC, SC, VA	No
Atlantic Sturgeon, Chesapeake Bay DPS	<i>Acipenser oxyrinchus</i>	E	DE, MD, PA, VA	No
Atlantic Sturgeon, New York Bight DPS	<i>Acipenser oxyrinchus</i>	E	CT, DE, MD, NY, PA, RI	No
Atlantic Sturgeon, South Atlantic DPS	<i>Acipenser oxyrinchus</i>	E	FL, GA, SC	No
Atlantic Sturgeon, Gulf of Maine DPS	<i>Acipenser oxyrinchus</i>	T	MA, ME, NH	No
Chinook salmon, California Coastal ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	E / T	CA	Yes
Chinook salmon, Central Valley Spring ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	CA	Yes
Chinook salmon, Sacramento Winter ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	E	CA	Yes
Chinook salmon, California Coastal ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	CA	Yes
Chinook salmon, Lower Columbia ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	OR, WA	Yes
Chinook salmon, Upper Columbia Spring ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	E	WA	Yes
Chinook salmon, Puget Sound ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	WA	Yes
Chinook salmon, Snake River Fall ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	ID, OR, WA	Yes
Chinook salmon, Snake River Spring/Summer ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	ID, OR, WA	Yes
Chinook salmon, Upper Willamette River ESU	<i>Oncorhynchus (=Salmo) tshawytscha</i>	T	OR	Yes
Chum salmon, Hood Canal Summer ESU	<i>Oncorhynchus keta</i>	T	WA	Yes
Chum salmon, Columbia River ESU	<i>Oncorhynchus keta</i>	T	OR, WA	Yes
Coho salmon, Central California Coast ESU	<i>Oncorhynchus (=Salmo) kisutch</i>	E	CA,	Yes
Coho salmon, Southern OR/Northern CA Coast ESU	<i>Oncorhynchus (=Salmo) kisutch</i>	T	CA, OR	Yes
Coho salmon, Oregon Coast ESU	<i>Oncorhynchus (=Salmo) kisutch</i>	T	OR	Yes
Coho salmon, Lower Columbia ESU	<i>Oncorhynchus (=Salmo) kisutch</i>	T	OR, WA	No
Steelhead, Southern California DPS	<i>Oncorhynchus (=Salmo) mykiss</i>	E	CA	Yes
Steelhead, South-Central CA DPS	<i>Oncorhynchus (=Salmo) mykiss</i>	T	CA	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Steelhead, Central California Coast DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	CA	Yes
Steelhead, California Central Valley DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	CA	Yes
Steelhead, Northern California DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	CA	Yes
Steelhead, Lower Columbia DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	OR, WA	Yes
Steelhead, Middle Columbia DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	OR, WA	Yes
Steelhead, Upper Columbia DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	OR, WA	No
Steelhead, Snake River Basin DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	CA, ID, OR, WA	Yes
Steelhead, Upper Willamette River DPS	<i>Oncorhynchus</i> (=Salmo) <i>mykiss</i>	T	OR, WA	Yes
Sockeye salmon, Ozette Lake ESU	<i>Oncorhynchus</i> (=Salmo) <i>nerka</i>	T	WA	Yes
Sockeye salmon, Snake River ESU	<i>Oncorhynchus</i> (=Salmo) <i>nerka</i>	E	CA, OR, WA, ID	Yes
Atlantic salmon, Gulf of Maine DPS	<i>Salmo salar</i>	E	ME	Yes
Eulachon, Southern DPS	<i>Thaleichthys pacificus</i>	T	CA	No
Cave Fish: Occur in the Action Area				
Ozark cavefish	<i>Amblyopsis rosae</i>	T	AR, MO, OK	No
Grotto sculpin	<i>Cottus specus</i>	E	MO	Yes
Alabama cavefish	<i>Speoplatyrhinus poulsoni</i>	E	AL	Yes

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.10 Invertebrates

Invertebrates account for more than 95 percent of all animals on earth, and are found almost everywhere in both terrestrial and aquatic environments. Invertebrates include any living animal that does not have a backbone; animals that make up this large species group include insects, worms, clams, snails, crayfish, and shrimp.

This species group includes both aquatic and terrestrial invertebrates. Invertebrates are found in a wide variety of habitats represented by nine sub-groups: forested wetland invertebrates (snails, insects, and arachnids); nonforested wetland invertebrates (snails and insects); fresh water invertebrates (mussels, snails, crustaceans, and insects); nearshore marine invertebrates (corals and snails); beach invertebrates (snails and insects); barren land invertebrates (snails, crustaceans, insects, and arachnids); cave invertebrates (insects and arachnids); rangeland invertebrates (insects); and forest land invertebrates (snails, insects, and arachnids). All species are under the jurisdiction of USFWS, except for the marine invertebrates (snails and corals), which are regulated by NMFS. Threatened and endangered invertebrates in the U.S. are all listed as threatened or endangered; there are no U.S. species of invertebrates proposed for listing.

4.10.1 Forested Wetland Invertebrates

Information on forested wetland invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2006c) (U.S. Fish and Wildlife Service, 2008a) (U.S. Fish and Wildlife Service, 2010c) (U.S. Fish and Wildlife Service, 2014c).

Snails and insects (beetles, butterflies, damselflies, and flies) are both found in the forested wetland habitat, and these various species use different components of this habitat. Some forested wetland invertebrates are dependent on the cool, moist conditions created under the forest canopy within waterfall spray, whereas other forested wetland invertebrates depend on a

specific host plant found only in a specific location (such as the humid Everglades region). Most forested wetland invertebrates require the cycling of clean water within the habitat.

Snails generally feed on algae, detritus, microbes, and other vegetation growing on submerged rocks. Beetles are generally predatory, with adults and larvae hunting using sight. Beetles typically hunt smaller invertebrates. Butterflies are typically dependent on specific plants, such as a larval host plant and a nectar plant for feeding when an adult. Damselflies are predatory, hunting smaller insects while in flight. Flies in wetland and coastal environments are typically generalists, feeding on microbes and decaying plant material.

Snails tend to be dimorphic, although hermaphroditism does exist in nearly all pulmonate species. Some snail species lay eggs from which a free-swimming larvae hatches. Beetles generally lay eggs in early winter, with four successive stages: larva, pre-pupa, pupa, and adult. Beetles may have a mating process that is species-specific. Butterflies generally lay eggs in the debris and dried stems of the larval host plant. After hatching, caterpillars may enter a diapause (animal dormancy) for overwintering. After passing through several development phases, the caterpillar forms a chrysalis and after a few weeks, the adult butterfly emerges. Each stage in the life cycle generally takes seven days, with adults typically living about one year. Flies generally lay eggs in the decomposing bark of trees, and hatchlings fall to the ground to pupate. Some species of Hawaiian damselflies have terrestrial naiads. These naiads typically are found on wet rock faces or in damp terrestrial conditions (such as leaf litter or moist leaf axils several feet above the ground) and are typically unable to swim.

The habitat needs of forested wetland invertebrates include a cool, moist environment promoted by adequate forest canopy, as well as damp leaf litter and vegetation. Consistently clean water free from pollutants is essential.

Of the 19 species of forested wetland invertebrates, 15 are listed as endangered, and 4 as threatened. Critical habitat has been designated for five species.

The following representative threats have been synthesized from information available for several forested wetland species:

- Habitat destruction due to wetland drain and fill;
- Sea level rise and severe weather conditions (hurricanes, floods, storms);
- Changes in natural fire regimes¹⁶ and succession¹⁷, and fuels reduction¹⁸ projects;
- Recreational development projects;
- Alteration of flora due to intrusion of non-native species;
- Chemical and water pollution; and
- Illegal collection and trade.

4.10.2 Nonforested Wetland Invertebrates

Information on nonforested wetland invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1995c) (U.S. Fish and Wildlife Service, 1998e) (U.S. Fish and

¹⁶ A natural fire regime is the pattern, frequency, duration, and intensity of a wildfire in an area.

¹⁷ Succession is the change in an ecological community over time.

¹⁸ Fuels reduction projects remove dry brush and grasses to decrease the spread of wildfires.

Wildlife Service, 2005a) (U.S. Fish and Wildlife Service, 2005d). Nonforested wetland invertebrates include snails, crustaceans (fairy shrimp), and insects (beetles), and include species with habitats in vernal pools (temporary shallow pools), wet meadows, and marshes. ESA listed nonforested wetland species are endemic to specific restricted ranges.

Snails are restricted to wet soils or shallow standing water, although some species may utilize vole burrows. Fairy shrimp are found in the water column of vernal pools, which are shallow, temporary pools. ESA listed beetles are associated with vernal pools, or often found in vegetation or in cracks in the ground.

Snails feed on host plants, algae, fungi, and bacteria. Fairy shrimp swim on the pool surface with legs up, ventral side down, seemingly upside-down. These shrimp may be filter feeders as well as using legs to scrape algae is scraped from the surface of the water. Beetles are predatory, feeding on smaller invertebrates.

Most pulmonate snails are hermaphroditic and capable of self-fertilization. ESA listed species live for approximately one year, reproducing in the summer months and undergoing dormancy in the winter. Fairy shrimp utilize a brood pouch, where embryos develop. Species of fairy shrimp may be differentiated by the shape and position of the brood pouch. Eggs are laid in the pool and do not hatch until the vernal pool is replenished. Beetles emerge from diapause to lay eggs in early winter. Beetles live for approximately one year, and are believed to be active during the winter, emerging at the beginning of winter rains and remaining active during the winter to spring wet season.

The habitat needs of nonforested wetland invertebrates include wet soils and the presence of shallow pools. Because of the species' reliance on water, good water quality is essential. Many of these species also rely on wetland or aquatic vegetation for food and shelter.

Of the 11 species of nonforested wetland invertebrates, 9 are endangered and 2 are threatened; critical habitat has been designated for 8 species.

The following representative threats to nonforested wetland invertebrate have been synthesized from information available for several species:

- Habitat loss and fragmentation due to urbanization, infrastructure, and agriculture;
- Altered hydrology;
- Alteration of flora due to intrusion of non-native species;
- Overgrazing of vegetative cover; and
- High flow events, severe weather conditions, and floods.

4.10.3 Freshwater Invertebrates

Information on freshwater invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1984g) (U.S. Fish and Wildlife Service, 1989a) (U.S. Fish and Wildlife Service, 1990c) (U.S. Fish and Wildlife Service, 1993d) (U.S. Fish and Wildlife Service, 1994e) (U.S. Fish and Wildlife Service, 1995b) (U.S. Fish and Wildlife Service, 1996a) (U.S. Fish and Wildlife Service, 1997d) (U.S. Fish and Wildlife Service, 2000b) (U.S. Fish and Wildlife Service, 2002a) (U.S. Fish and Wildlife Service, 2003d) (U.S. Fish and Wildlife Service, 2004) (U.S. Fish and Wildlife Service, 2006a) (U.S. Fish and Wildlife Service, 2006b) (U.S. Fish and Wildlife Service, 2006e) (U.S. Fish and Wildlife Service, 2010c) (U.S. Fish and Wildlife Service, 2013a) (U.S. Fish and Wildlife Service, 2014b).

Freshwater invertebrates occur in or have a life cycle stage within a body of fresh or brackish water, typically a river, stream, lake, or estuary. Freshwater invertebrates are diverse, and include mussels, snails, crustaceans, and insects.

Once entering the adult phase, mussels are sessile, living in communities in the substrate of moving water such as rivers and streams. Mussels are generally endemic to a specific river system, and populations are easily fragmented. Snails are widespread in the freshwater environment, with habitat on rocks, sand, and other substrate in rivers, lakes, estuaries, and springs. Crustaceans inhabit the substrate of several types of habitat, including rivers, streams, estuaries, springs, and pools. Freshwater invertebrates include two types of purely aquatic insects, beetles, and naucoroids. Beetles may be surface-dwelling or substrate-dwelling. Naucorids generally exist where water flows over rocks and pebbles. Water beetles live in stream riffles. Two types of insects that exhibit an aquatic life cycle stage, dragonflies and damselflies, have larvae found in stream pools and open water.

Mussels filter-feed on algae, plant detritus, and bacteria from the water flowing over the top of the mussel. Freshwater snails generally feed on algae, plant detritus, microbes, and other vegetation growing on submerged rocks. Crustaceans tend to graze on plant detritus, microbes, protozoans, and algae. Naucorids feed on larvae of other aquatic insects, whereas beetles are herbivorous, often found in areas of dense aquatic vegetation. Dragonfly nymphs and damselfly naiads are aquatic and feed on smaller aquatic insects; adults are generally predatory, hunting and capturing insects while flying.

Mussels exhibit discrete genders with a distinct breeding season. Larvae are released into the streamflow and attach to a host fish using hooks or spines on the outside of their bodies. Freshwater snails tend to be dimorphic (having two distinct forms), although hermaphroditism does exist in nearly all pulmonate (air breathing) snail species. Crustaceans typically exhibit discrete genders, although some species of shrimp are hermaphrodites and other crustaceans may change sex during their lifespan. Aquatic insect reproduction is seasonal, generally occurring in early spring to summer. Dragonfly and damselfly eggs and nymphs are aquatic.

Of the 136 freshwater invertebrate species, 110 are endangered, 23 are threatened, and 3 are proposed endangered. Critical habitat has been designated for 59 species.

The following representative threats to freshwater invertebrates have been synthesized from information available for several species:

- Impoundment and population fragmentation due to locks and dams or high flow releases from dams;
- Non-point source pollution, especially from fertilizers;
- Groundwater contamination and depletion;
- Sedimentation from intensive land use, land use changes, and wetland drain and fill;
- Stream channelization and maintenance to allow for boat passage and flood control;
- Gravel and sand mining;
- Decimation of host fish populations;
- Low reproductive success;
- Competition from exotic species (i.e., zebra mussels, quagga mussels, golden mussels);
- Overharvesting;

- Water quality changes and/or contamination including agricultural, municipal, industrial, and mining runoff;
- Decimation of host fish population, including predation by non-native fish; and
- Mosquito control measures.

4.10.4 Nearshore Marine Invertebrates

Information on marine invertebrates has been synthesized from a variety of sources: (Smith, 2003) (National Marine Fisheries Service, 2013b) (National Oceanic and Atmospheric Administration, 2014a) (National Marine Fisheries Service, 2014j) (U.S. Fish and Wildlife Service, 2014k). Marine invertebrates include snails and corals. All listed marine invertebrates are located in nearshore marine waters.

Shells of marine snails may resemble globes or have a flattened appearance, exhibit different thicknesses and size, and may have spines or ridges. Listed marine snails are present in the rocky intertidal zone and at depths of 80 feet to 100 feet, and are generally found wedged between intertidal and sub-tidal rocks or in boulder habitat interspersed with sand channels. Spaces between rocks and sand channels may be important for the channeling and collection of the algae on which marine snails feed. Corals are colonial animals; each coral is composed of thousands of small animals. Corals are located on the ocean floor at a depth of 3 feet, limited by wave action, to a depth 100 feet, limited by the amount of available light. All listed coral species are tropical stony corals.

Listed snails are herbivores feeding on kelp and algae varieties. Tropical corals have a symbiotic (interdependent) relationship with algae, and receive most of their energy from the organic byproducts of photosynthesis. However, corals are also predators, and may capture and consume living small fish and zooplankton.

In the case of the marine abalone, gametes are released into the ocean, producing free-swimming larvae. After approximately 15 days, the larvae create the shell and settle into a rocky crevice. As the abalone grows, they increase in size and seek out unsheltered habitat. Reproduction of stony corals is typically asexual, with new colonies forming through grafting of coral pieces that have broken. Sexual reproduction occurs yearly when millions of gametes are expelled into the current. Each polyp is hermaphroditic, releasing both eggs and sperm.

The habitat needs of nearshore marine invertebrates include saltwater habitats with rocks, boulders, and sand channels. Coral species rely on algae for the byproducts of photosynthesis. Because marine species spend their lives in the aquatic environment, they need unpolluted, suitable water quality.

Of the 17 nearshore marine invertebrates, 2 are endangered and 15 are threatened. Critical habitat has been designated for four species.

The following representative threats to nearshore marine invertebrates have been synthesized from information available for several species:

- Overfishing and illegal take;
- Disease, such as the withering syndrome;

- Coral bleaching;¹⁹ and
- Habitat destruction.

4.10.5 Beach Invertebrates

Information on beach invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1994g) (U.S. Fish and Wildlife Service, 1998h) (U.S. Fish and Wildlife Service, 2003e) (U.S. Fish and Wildlife Service, 2008b). Beach invertebrates include snails and insects (beetles, butterflies, and flies).

Beach invertebrates may exhibit cryptic coloration and small size. Population sizes may fluctuate widely from year to year. Beach species are sensitive to habitat fragmentation, which can cause inbreeding and isolated population pockets. All beach invertebrates utilize the beach dune habitat.

Snails inhabit coastal scrub communities, typified with many low-lying branches touching the ground. Snails may be specific to coastal scrub, maritime chaparral, or may range across both. Beetles use shallow burrows in the mid- to above-high tide drift zone, often with the female inside the burrow and the male guarding the mouth. Beetles are often found near the water's edge on sunny days, hunting, mating, and basking for thermoregulation. Beach species of butterfly have specific host plants endemic to beach dunes, such as the early blue violet, and are often dependent on specific plants through each life stage. Flies are generally found in dune systems of inland desert valleys, rivers, deltas, and beach strands.

It is assumed that coastal snails feed on fungus from decaying plant matter. Beetles are predatory, preying upon smaller invertebrates. Butterflies are typically dependent on specific plants: a larval host plant and a nectar plant for feeding when an adult. Very little is known about beach flies, but the positioning of eggs near ant nests may indicate a possible food source for larvae. Adults generally feed on nectar of dune plants, but it is unknown if nectar is a primary food source.

Little is known about coastal snail reproduction, other than that sarcophagid flies parasitize the snail, and mortality often occurs before the larvae reach adulthood. Beetles lay eggs in burrows, and larvae often plug the burrow mouth with sand during high tide. Larvae may relocate to a more favorable location and dig a new burrow. Butterfly eggs are laid in the debris and dried stems of the host plant. Overwintering occurs in diapause, and the adult flight stage generally lasts only a few weeks. Flies lay eggs in loose sand during late summer, larvae develop underground, and adults emerge in July through September. Flight stages may begin as early as July, with adults being most active on warm, sunny days.

Of the eight beach invertebrates, six are endangered and two are threatened. Critical habitat has been designated for two species.

The following representative threats to beach invertebrates have been synthesized from information available for several species:

- Loss of habitat due to development and agriculture;
- Alteration of flora due to intrusion of non-native species;
- Habitat fragmentation;

¹⁹ Warmer water temperatures can result in coral bleaching as when water is too warm, corals can release the algae living in their tissues turning the corals white.

- Changes in natural fire regimes and succession, including overgrowth;
- Destruction of sand dunes; and
- Beach nourishment activities.

4.10.6 Barren Land Invertebrates

Information on barren land invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1984h) (U.S. Fish and Wildlife Service, 1998i) (U.S. Fish and Wildlife Service, 2002b) (Lockwood & Lockwood, 2008) (Santa Barbara Museum of Natural History, 2009) (U.S. Fish and Wildlife Service, 2011a) (U.S. Fish and Wildlife Service, 2013g). Barren land invertebrates include snails and insects (beetles, butterflies, flies, and grasshoppers).

Snail species are generally found near rock cracks and fissures or between boulders, where air can circulate through the leaf litter and damp shaded areas between rocks. Insects are found in sandhills, alluvial fans, alkali flats, volcanic rock, and other varied habitats.

Snails are largely herbivores feeding on leaves and other forage, although some species are opportunistic feeders, scavenging and feeding on detritus. A few species of terrestrial snails are predatory. Beetles are either herbivorous (scarab beetles) or predatory (tiger beetles). Tiger beetles prey on smaller invertebrates. Butterflies and moths are typically dependent on specific host plants. Larvae generally feed on the leaves, stems, and flowers, whereas the adult feeds on nectar. While the larvae are typically plant-specific, adults may not be. Grasshoppers are herbivorous. While some grasshoppers are restricted to feeding on one specific plant, others are non-specific.

Most snails are hermaphroditic, but do not self-fertilize. There is typically a definite breeding season, and multiple egg clutches from during the breeding season is not uncommon. Beetles emerge from burrows one to two months during the summer; eggs are laid in the bottom of burrows, and adults die a short time later. Butterflies lay eggs at the base of the host plant. Most grasshoppers have one cache of eggs per year laying eggs in clusters ranging from very small in number (3) to large in number (up to 200). Eggs are laid in the soil in late fall or early winter, hatching between May and August.

The habitat needs of barren land invertebrates include arid areas such as boulders, volcanic rock, and sandhills, with damp, shaded areas in between. These species rely on a variety of food sources, but require some vegetation, whether for leaves and stems, or the detritus.

Of the 20 barren land invertebrates, 17 are endangered, and 3 are threatened. Critical habitat has been designated for 14 species.

The following representative threats to barren land invertebrates been synthesized from information available for several species:

- Habitat destruction and fragmentation due to urban and agricultural development;
- Alteration of flora and increased predation due to intrusion of non-native species;
- Sand mining;
- Pesticide and bio-control agents, especially for mosquitos; and
- Changes in natural fire regimes and succession.

4.10.7 Cave Invertebrates

Information on cave invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2006d) (U.S. Fish and Wildlife Service, 2008c) (U.S. Fish and Wildlife Service,

1988). Cave invertebrates include crustaceans, insects (beetles) and arachnids. These species are found in subterranean cave systems with groundwater or underwater springs or streams, karst cave formations, or lava formations. Certain features, such as eyes and wings, may have become vestigial in cave invertebrates.

Cave crustaceans are detritivores that feed on plant roots and rotting plant material and fecal matter of other organisms. Beetles primarily feed on fungus, microbes, and smaller invertebrates. Arachnids are primarily predators; prey is generally smaller crustaceans, insects, and arachnids.

Very little is known of the reproductive habits of cave crustaceans. Insects utilize low metabolic and reproductive rates; therefore, reproductive rates are very low, and individuals are believed to have a longer life span. Arachnids are dimorphic, and courtship is generally a complicated process. Eggs are typically deposited into a protected site and no further care is given.

The habitat needs of cave invertebrates include adequate water sources, such as groundwater or underwater springs, within the caves. These species often need vegetation as well, whether as a direct food source or as a food source that supports prey populations.

Of the 27 cave invertebrates, 26 are endangered, one is threatened, and critical habitat has been designated for 14 species.

The following representative threats to cave invertebrates have been synthesized from information available for several species:

- Habitat destruction through fill or quarry;
- Habitat degradation due to aquifer depletion;
- Excessive human visitation; and
- Predation and/or competition from invasive species.

4.10.8 Rangeland Invertebrates

Information on rangeland invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 2001b) (U.S. Fish and Wildlife Service, 2003a) (U.S. Fish and Wildlife Service, 2014a).

Rangeland invertebrates consist of beetles, butterflies, and moths that use open upland habitats dominated by grasses, shrubs, and herbaceous growth that lack trees. These habitats include the herbaceous, shrub and brush, and mixed rangeland habitat types.

Beetles are fossorial and found in herbaceous rangeland areas. Most of the butterflies and moths have particular flowering host plants. Host plants for these species often require an open canopy and dry soils.

Beetles are predatory or carrion scavengers. Predatory beetles feed mainly on other insects. Butterflies and moths are herbivorous. Butterfly and moth larvae generally feed on the leaves, stems, and flowers, whereas the adults feed on nectar. While the larvae are typically plant-specific, adults may not be.

Beetles lay eggs in a small tunnel, and after hatching enlarge the tunnel into a burrow. Beetle larvae go through several instars, requiring several years to reach adulthood. Adult beetles emerge from the burrow and reproduction typically begins immediately. Beetles are highly habitat-specific due to the limited egg and larvae range of tolerance for soil moisture, composition, and temperature. Butterflies and moths lay eggs on the stalk or in the debris of the larval host plant. During the first year, butterflies often enter a period of suspended growth, or diapause, as eggs and again as larvae. It is believed that additional periods of diapause may be undertaken

during periods of unfavorable conditions. As adults, butterflies generally do not survive more than one to two weeks.

The habitat needs of rangeland invertebrates include open areas without trees, particularly as they rely on certain plant species that may only grow in open environments with plenty of sunshine. The beetles require undisturbed areas of soil, to nest and lay eggs in burrows.

Of the 15 rangeland invertebrate species, 13 are endangered and 2 are threatened. Critical habitat has been designated for six species.

The following representative threats to rangeland invertebrates have been synthesized from information available for several species:

- Loss or modification of habitat from urban development and recreational use;
- Farming and ranching practices (pesticide use, grazing/trampling of habitat);
- Illegal collection and trade;
- Lack of natural succession regime; and
- Reduction of host plants due to competition with non-native plants.

4.10.9 Forest Land Invertebrates

Information on forest land invertebrates has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1984f) (U.S. Fish and Wildlife Service, 2001a) (U.S. Fish and Wildlife Service, 2005b) (U.S. Fish and Wildlife Service, 2015m) (U.S. Fish and Wildlife Service, 2014p).

Forest land invertebrates include snails, insects (butterflies and moths), and arachnids that occupy upland forested areas dominated by deciduous or evergreen trees, or a combination of both.

Snails rely on ferns and other forest undergrowth as well as fallen leaf litter resulting from the forest canopy. Butterflies and moths require a host plant only found in the mesic forest, generally reliant on specific host plants for the larval and adult stages. Arachnids are restricted to rocky outcrops in a spruce-dominated forest.

Forest land snails are believed to graze on fungal mycelia, and may hibernate during winter. Butterflies and moths are herbivorous and may feed on only one or a narrowly defined group of plants. Arachnids are predatory, and feed on smaller invertebrates.

Nearly all terrestrial snails are hermaphrodites, though little is known about the reproduction of listed forest land snails. Some forest land moths and butterflies will brood twice in one year, with one set of eggs hatching during the active portion of the year, and the other overwintering. Little is known about the habits of the listed arachnid.

The habitat needs of forest land invertebrates include trees or adequate canopy cover, leaf litter, and forest undergrowth for shelter. The butterflies and moths rely on specific host plants.

Of the 10 forest land invertebrate species, 2 are endangered, 2 are threatened, and 6 are proposed endangered. Critical habitat has been designated for two species.

The following representative threats to forest land invertebrates have been synthesized from information available for several species:

- Habitat loss due to forest fires and activities such as slope clearing, pasturing, agriculture, ORVs, development, and road building;
- Alteration of flora due to intrusion of non-native species;

- Increased predation pressure due to creation of edge habitat creation from clearing activities; and
- Illegal collection and trade.

Table 4-8 lists all U.S. invertebrates, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-8: Threatened and Endangered Invertebrates in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Forested Wetland Invertebrates: Occur in the Action Area				
Oahu tree snails	<i>Achatinella spp.</i>	E	HI	No
Florida leafwing butterfly	<i>Anaea troglodyta florldalis</i>	E	FL	Yes
Painted snake coiled forest snail	<i>Anguispira picta</i>	T	TN	No
Salt Creek tiger beetle	<i>Cicindela nevadica lincolniiana</i>	E	NE	Yes
Miami blue butterfly	<i>Cyclargus (=Hemiargus) thomasi bethunebakeri</i>	E	FL	No
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	T	CA	Yes
Hawaiian picture-wing fly	<i>Drosophila digressa</i>	E	HI	No
Hawaiian picture-wing fly	<i>Drosophila sharpi</i>	E	HI	Yes
Schaus swallowtail butterfly	<i>Heracles aristodemus ponceanus</i>	E	FL	No
Lotis blue butterfly	<i>Lycaeides argyrognomon lotis</i>	E	CA	No
Flying earwig Hawaiian damselfly	<i>Megalagrion nesiotes</i>	E	HI	No
Saint Francis' satyr butterfly	<i>Neonympha mitchellii francisci</i>	E	NC	No
Mitchell's satyr butterfly	<i>Neonympha mitchellii</i>	E	AL, IN, MI, MS, OH, VA	No
Newcomb's tree snail	<i>Newcombia cumingi</i>	E	HI	No
Stock Island tree snail	<i>Orthalicus reses (not incl. nesodryas)</i>	T	FL	No
Lanai tree snail	<i>Partulina semicarinata</i>	E	HI	No
Lanai tree snail	<i>Partulina variabilis</i>	E	HI	No
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E	FL	Yes
Chittenango ovate amber snail	<i>Succinea chittenangoensis</i>	T	NY	No
Nonforested Wetland Invertebrates: Occur in the Action Area				
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	E	CA	Yes
Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>	E	CA	Yes
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	T	CA, OR	Yes
San Diego fairy shrimp	<i>Branchinecta sandiegonensis</i>	E	CA	Yes
Delta green ground beetle	<i>Elaphrus viridis</i>	T	CA	Yes
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	E	CA	Yes
Kanab ambersnail	<i>Oxyloma haydeni kanabensis</i>	E	AZ, UT	No
Virginia fringed mountain snail	<i>Polygyriscus virginianus</i>	E	VA	No
Hine's emerald dragonfly	<i>Somatochlora hineana</i>	E	IL, MI, MO, WI	Yes
Riverside fairy shrimp	<i>Streptocephalus woottoni</i>	E	CA	Yes
Freshwater Invertebrates: Occur in the Action Area				
Cumberland elktoe	<i>Alasmidonta atropurpurea</i>	E	KY, TN	Yes
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	E	CT, MA, MD, NC, NH, NJ, NY, PA, VA, VT	No
Appalachian elktoe	<i>Alasmidonta raveneliana</i>	E	NC, TN	Yes
Fat threeridge (mussel)	<i>Amblema neislerii</i>	E	FL, GA	Yes
Ash Meadows naucorid	<i>Ambrysus amargosus</i>	T	NV	Yes
Tumbling Creek cavenail	<i>Antrobia culveri</i>	E	MO	Yes
Ouachita rock pocketbook	<i>Arkansia wheeleri</i>	E	AR, OK	No
Pecos assiminea snail	<i>Assiminea pecos</i>	E	NM, TX	Yes
Hungerford's crawling water beetle	<i>Brychius hungerfordi</i>	E	MI	No
Big Sandy crayfish	<i>Cambarus callainus</i>	PE	KY, VA, WV	No
Big Sandy crayfish (or Guyandotte River crayfish)	<i>Cambarus veteranus</i>	PE	KY, VA, WV	No
Slender campeloma	<i>Campeloma decampi</i>	E	AL	No
Spectaclecase (mussel)	<i>Cumberlandia monodonta</i>	E	AL, AR, IA, IL, KS, KY, MN, MO,	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
			TN, VA, WI, WV	
Fanshell	<i>Cyprogenia stegaria</i>	E	AL, IL, IN, KY, OH, TN, VA, WV	No
Dromedary pearlymussel	<i>Dromus dromas</i>	E	AL, KY, TN, VA	No
Lacy elimia (snail)	<i>Elimia crenatella</i>	T	AL	No
Chipola slabshell	<i>Elliptio chipolaensis</i>	T	AL, FL	Yes
Altamaha Spiny mussel	<i>Elliptio spinosa</i>	E	GA	Yes
Tar River spiny mussel	<i>Elliptio steinstansana</i>	E	NC	No
Purple bankclimber (mussel)	<i>Elliptoideus sloatianus</i>	T	AL, FL, GA	Yes
Cumberlandian combshell	<i>Epioblasma brevidens</i>	E	AL, KY, MS, TN, VA	Yes
Oyster mussel	<i>Epioblasma capsaeformis</i>	E	AL, KY, TN, VA	Yes
Curtis pearlymussel	<i>Epioblasma florentina curtisii</i>	E	AR, MO	No
Yellow blossom (pearlymussel)	<i>Epioblasma florentina</i>	E	AL, TN	No
Tan riffleshell	<i>Epioblasma florentina walkeri</i> (=E. walkeri)	E	KY, TN, VA	No
Upland combshell	<i>Epioblasma metastrata</i>	E	AL, TN	Yes
Purple cat's paw (=Purple cat's paw pearlymussel)	<i>Epioblasma obliquata</i>	E	AL, KY, OH, TN	No
White catspaw (pearlymussel)	<i>Epioblasma obliquata perobliqua</i>	E	IN, OH	No
Southern acornshell	<i>Epioblasma othcaloognesis</i>	E	AL, TN	Yes
Southern combshell (penitent mussel)	<i>Epioblasma penita</i>	E	AL, MS	No
Green blossom (pearlymussel)	<i>Epioblasma torulosa gubernaculum</i>	E	TN, VA	No
Northern riffleshell	<i>Epioblasma torulosa rangiana</i>	E	IN, KY, MI, OH, PA, WV	No
Tubercled blossom (pearlymussel)	<i>Epioblasma torulosa</i>	E	KY, TN, WV	No
Snuffbox mussel	<i>Epioblasma triquetra</i>	E	AL, AR, IL, IN, KY, MI, MN, MO, MS, OH, PA, TN, VA, WI, WV	No
Turgid blossom (pearlymussel)	<i>Epioblasma turgidula</i>	E	AL, AR, TN	No
Newcomb's snail	<i>Erinna newcombi</i>	T	HI	Yes
Tapered pigtoe	<i>Fusconaia burkei</i>	T	AL, FL	Yes
Shiny pigtoe	<i>Fusconaia cor</i>	E	AL, TN, VA	No
Finerayed pigtoe	<i>Fusconaia cuneolus</i>	E	AL, TN, VA	No
Narrow pigtoe	<i>Fusconaia escambia</i>	T	AL, FL	Yes
Round ebonyshell	<i>Fusconaia rotulata</i>	E	AL, FL	Yes
Noel's amphipod	<i>Gammarus desperatus</i>	E	NM	Yes
Diminutive amphipod	<i>Gammarus hyalleloides</i>	E	TX	Yes
Pecos amphipod	<i>Gammarus pecos</i>	E	TX	Yes
Southern sandshell	<i>Hamiota australis</i>	T	AL, FL	Yes
Cracking pearlymussel	<i>Hemistena lata</i>	E	AL, KY, TN, VA	No
Rota blue damselfly	<i>Ischnura luta</i>	PE	NMI	No
Koster's springsnail	<i>Juturnia kosteri</i>	E	NM	Yes
Birdwing pearlymussel	<i>Lemiox rimosus</i>	E	TN, VA	No
Pink mucket (pearlymussel)	<i>Lampsilis abrupta</i>	E	AL, AR, IL, KY, LA, MO, OH, TN, VA, WV	No
Finelined pocketbook	<i>Lampsilis altilis</i>	T	AL, GA, TN	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Higgins eye (pearlymussel)	<i>Lampsilis higginsii</i>	E	IA, IL, MN, MO, SD, WI	No
Orangenacre mucket	<i>Lampsilis perovalis</i>	T	AL, MS	Yes
Arkansas fatmucket	<i>Lampsilis powellii</i>	T	AR	No
Neosho mucket	<i>Lampsilis rafinesqueana</i>	E	AR, KS, MO, OK	No
Speckled pocketbook	<i>Lampsilis streckeri</i>	E	AR	No
Shinyrayed pocketbook	<i>Lampsilis subangulata</i>	E	AL, FL, GA	Yes
Alabama lampmussel	<i>Lampsilis virescens</i>	E	AL, TN	No
Banbury Springs limpet	<i>Lanx sp.</i>	E	ID	No
Carolina heelsplitter	<i>Lasmigona decorata</i>	T	NC, SC	Yes
Scaleshell mussel	<i>Leptodea leptodon</i>	E	AR, MO, NE, OK, SD	No
Round rocksnail	<i>Leptoxis ampla</i>	T	AL	No
Interrupted (=Georgia) rocksnail	<i>Leptoxis forman</i>	E	AL, GA	Yes
Plicate rocksnail	<i>Leptoxis plicata</i>	E	AL	No
Painted rocksnail	<i>Leptoxis taeniata</i>	T	AL	No
Flat pebblesnail	<i>Lepyrium showalteri</i>	E	AL	No
Cylindrical lioplax (snail)	<i>Lioplax cyclostomaformis</i>	E	AL	No
Louisiana pearlshell	<i>Margaritifera hembeli</i>	T	LA	No
Alabama pearlshell	<i>Margaritifera marrianae</i>	E	AL	Yes
Alabama moccasinsnail	<i>Medionidus acutissimus</i>	T	AL, GA, MS	Yes
Coosa moccasinsnail	<i>Medionidus parvulus</i>	E	AL, GA, TN	Yes
Gulf moccasinsnail	<i>Medionidus penicillatus</i>	E	AL, FL, GA	Yes
Ochlockonee moccasinsnail	<i>Medionidus simpsonianus</i>	E	FL, GA	Yes
Crimson Hawaiian damselfly	<i>Megalagrion leptodemas</i>	E	HI	Yes
Blackline Hawaiian damselfly	<i>Megalagrion nigrohamatum nigrolineatum</i>	E	HI	Yes
Oceanic Hawaiian damselfly	<i>Megalagrion oceanicum</i>	E	HI	Yes
Pacific Hawaiian damselfly	<i>Megalagrion pacificum</i>	E	HI	No
Ring pink (mussel)	<i>Obovaria retusa</i>	E	AL, KY, TN	No
Nashville crayfish	<i>Orconectes shoupi</i>	E	TN	No
Shasta crayfish	<i>Pacifastacus fortis</i>	E	CA, OR	No
Squirrel Chimney Cave shrimp	<i>Palaemonetes cummingi</i>	T	FL	No
Littlewing pearlymussel	<i>Pegias fabula</i>	E	AL, KY, NC, TN, VA	No
Snake River physa snail	<i>Physa natricina</i>	E	ID	No
White wartyback (pearlymussel)	<i>Plethobasus cicatricosus</i>	E	AL, KY, TN	No
Orangefoot pimpleback (pearlymussel)	<i>Plethobasus cooperianus</i>	E	AL, IL, KY, TN	No
Sheepnose mussel	<i>Plethobasus cyphus</i>	E	AL, IA, IL, IN, KY, MN, MO, MS, OH, PA, TN, VA, WI, WV	No
Clubshell	<i>Pleurobema clava</i>	E	IL, IN, KY, MI, NY, OH, PA, TN, WV	No
James spinymussel	<i>Pleurobema collina</i>	E	NC, VA, WV	No
Black clubshell	<i>Pleurobema curtum</i>	E	MS	No
Southern clubshell	<i>Pleurobema decisum</i>	E	AL, GA, MS	Yes
Dark pigtoe	<i>Pleurobema furvum</i>	E	AL	Yes
Cumberland pigtoe	<i>Pleurobema gibberum</i>	E	TN	No
Southern pigtoe	<i>Pleurobema georgianum</i>	E	AL, GA, TN	Yes
Georgia pigtoe	<i>Pleurobema hanleyianum</i>	E	AL, GA, TN	Yes
Flat pigtoe (Marshall's pearly mussel)	<i>Pleurobema marshalli</i>	E	AL, MS	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Ovate clubshell	<i>Pleurobema perovatum</i>	E	AL, MS, TN	Yes
Rough pigtoe	<i>Pleurobema plenum</i>	E	AL, IN, KY, TN, VA	No
Oval pigtoe	<i>Pleurobema pyriforme</i>	E	AL, FL, GA	Yes
Fuzzy pigtoe	<i>Pleurobema strodeanum</i>	T	AL, FL	Yes
Heavy pigtoe (Judge Tait's mussel)	<i>Pleurobema taitianum</i>	E	AL	No
Rough hornsnail	<i>Pleurocera foreman</i>	E	AL	Yes
Slabside pearlymussel	<i>Pleuroanaia dolabelloides</i>	E	AL, KY, MS, TN, VA	Yes
Fat pocketbook	<i>Potamilus capax</i>	E	AR, IL, IN, KY, LA, MO, MS	No
Alabama (=inflated) heelsplitter	<i>Potamilus inflatus</i>	T	AL, LA, MS	No
Diamond tryonia	<i>Pseudotryonia adamantina</i>	E	TX	Yes
Triangular kidneyshell	<i>Ptychobranhus greenii</i>	E	AL, GA, TN	Yes
Southern kidneyshell	<i>Ptychobranhus jonesi</i>	E	AL, FL	Yes
Fluted kidneyshell	<i>Ptychobranhus subtentum</i>	E	KY, TN, VA	Yes
San Bernardino springsnail	<i>Pyrgulopsis bernardina</i>	T	AZ	Yes
Bruneau hot springsnail	<i>Pyrgulopsis bruneauensis</i>	E	ID	No
Chupadera springsnail	<i>Pyrgulopsis chupaderae</i>	E	NM	Yes
Socorro springsnail	<i>Pyrgulopsis neomexicana</i>	E	NM	No
Royal marstonia (snail)	<i>Pyrgulopsis ogmorhaphae</i>	E	TN	No
Armored snail	<i>Pyrgulopsis (=Marstonia) pachyta</i>	E	AL	No
Roswell springsnail	<i>Pyrgulopsis roswellensis</i>	E	NM	Yes
Phantom springsnail	<i>Pyrgulopsis texana</i>	E	TX	Yes
Three Forks springsnail	<i>Pyrgulopsis trivialis</i>	E	AZ	Yes
Rabbitsfoot	<i>Quadrula cylindrica</i>	T	AL, AR, IL, IN, KS, KY, LA, MO, MS, OH, OK, PA, TN	No
Rough rabbitsfoot	<i>Quadrula cylindrica strigillata</i>	E	TN, VA	Yes
Winged mapleleaf	<i>Quadrula fragosa</i>	E	AR, MN, MO, OK, WI	No
Cumberland monkeyface (pearlymussel)	<i>Quadrula intermedia</i>	E	AL, TN, VA	No
Appalachian monkeyface (pearlymussel)	<i>Quadrula sparsa</i>	E	TN, VA	No
Stirrupshell	<i>Quadrula stapes</i>	E	AL, MS	No
Hay's Spring amphipod	<i>Stygobromus hayi</i>	E	DC, MD	No
Peck's cave amphipod	<i>Stygobromus (=Stygonectes) pecki</i>	E	TX	Yes
California freshwater shrimp	<i>Syncaris pacifica</i>	E	CA	No
Bliss Rapids snail	<i>Taylorconcha serpenticola</i>	T	ID	No
Socorro isopod	<i>Thermosphaeroma thermophilus</i>	E	NM	No
Pale lilliput (pearlymussel)	<i>Toxolasma cylindrellus</i>	E	AL, TN	No
Gonzales tryonia	<i>Tryonia circumstriata (=stocktonensis)</i>	E	TX	Yes
Phantom Tryonia	<i>Tryonia cheatumi</i>	E	TX	Yes
Tulotoma snail	<i>Tulotoma magnifica</i>	T	AL	No
Rayed bean	<i>Villosa fabalis</i>	E	IN, MI, NY, OH, PA, VA	No
Purple bean	<i>Villosa perpurpurea</i>	E	TN, VA	Yes
Cumberland bean (pearlymussel)	<i>Villosa trabalis</i>	E	AL, KY, NC, TN, VA	No
Nearshore Marine Invertebrates: Occur in the Action Area				
Black abalone	<i>Haliotis cracherodii</i>	E	CA	Yes
White abalone	<i>Haliotis sorenseni</i>	E	CA	No
Coral [no common name]	<i>Acropora globiceps</i>	T	GU, NMI, AS	No
Coral [no common name]	<i>Acropora jacquelineae</i>	T	AS	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Coral [no common name]	<i>Acropora retusa</i>	T	GU, NMI, AS	No
Coral [no common name]	<i>Acropora rudis</i>	T	AS	No
Coral [no common name]	<i>Acropora speciosa</i>	T	AS	No
Coral [no common name]	<i>Acropora paravivida</i>	T	AS	No
Coral [no common name]	<i>Acropora crateriformis</i>	T	AS	No
Coral [no common name]	<i>Acropora aculeata</i>	T	GU, NMI	No
Boulder star coral	<i>Orbicella franksi</i>	T	FL, PR, VI	No
Elkhorn coral	<i>Acropora palmata</i>	T	FL, PR, VI	Yes
Lobed star coral	<i>Orbicella annularis</i>	T	FL, PR, VI	No
Mountainous star coral	<i>Orbicella faveolata</i>	T	FL, PR, VI	No
Pillar coral	<i>Dendrogyra cylindrus</i>	T	FL	No
Staghorn coral	<i>Acropora cervicornis</i>	T	FL, PR, VI	Yes
Beach Invertebrates: Occur in the Action Area				
Lange's metalmark butterfly	<i>Apodemia mormo langei</i>	E	CA	No
Northeastern beach tiger beetle	<i>Cicindela dorsalis</i>	T	MA, MD, NJ, VA	No
El Segundo blue butterfly	<i>Euphilotes battoides allyni</i>	E	CA	No
Morro shoulderband (=Banded dune) snail	<i>Helminthoglypta walkeriana</i>	E	CA	Yes
Delhi Sands flower-loving fly	<i>Rhaphiomidas terminatus abdominalis</i>	E	CA	No
Behren's silverspot butterfly	<i>Speyeria zerene behrensii</i>	E	CA	No
Oregon silverspot butterfly	<i>Speyeria zerene hippolyta</i>	T	CA, OR	Yes
Myrtle's silverspot butterfly	<i>Speyeria zerene myrtleae</i>	E	CA	No
Barren Land Invertebrates: Occur in the Action Area				
Uncompahgre fritillary butterfly	<i>Boloria acrocynema</i>	E	CO	No
Puritan tiger beetle	<i>Cicindela puritana</i>	T	CT, MA, MD	No
Casey's June beetle	<i>Dinacoma caseyi</i>	E	CA	Yes
Iowa Pleistocene snail	<i>Discus macclintocki</i>	E	IA, IL	No
[Unnamed] pomace fly	<i>Drosophila aglaia</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila differens</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila hemipeza</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila heteroneura</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila montgomeryi</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila mulli</i>	T	HI	Yes
[Unnamed] pomace fly	<i>Drosophila musaphilia</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila neoclavisetae</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila obatai</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila ochrobasis</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila substenoptera</i>	E	HI	Yes
[Unnamed] pomace fly	<i>Drosophila tarphytrichia</i>	E	HI	Yes
Mount Hermon June beetle	<i>Polyphylla barbata</i>	E	CA	No
Carson wandering skipper	<i>Pseudocopaodes eunus obscurus</i>	E	CA, NV	No
Zayante band-winged grasshopper	<i>Trimerotropis infantilis</i>	E	CA	Yes
Flat-spined three-toothed snail	<i>Triodopsis platysayoides</i>	T	WV	No
Cave Invertebrates: Occur in the Action Area				
Kauai cave wolf or pe'e maka 'ole spider	<i>Adelocosa anops</i>	E	HI	Yes
Madison Cave isopod	<i>Antrilana lira</i>	T	VA, WV	No
Coffin Cave mold beetle	<i>Batrissodes texanus</i>	E	TX	No
Helotes mold beetle	<i>Batrissodes venyivi</i>	E	TX	Yes
Cave crayfish	<i>Cambarus aculeabrum</i>	E	AR, MO	No
Cave crayfish	<i>Cambarus zophonastes</i>	E	AR	No
Robber Baron Cave meshweaver	<i>Cicurina baronia</i>	E	TX	Yes
Madla's Cave meshweaver	<i>Cicurina madla</i>	E	TX	Yes
Braken Bat Cave meshweaver	<i>Cicurina venii</i>	E	TX	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Government Canyon Bat Cave meshweaver	<i>Cicurina vespera</i>	E	TX	Yes
Illinois cave amphipod	<i>Gammarus acherondytes</i>	E	IL	No
Comal Springs riffle beetle	<i>Heterelmis comalensis</i>	E	TX	Yes
Tooth Cave spider	<i>Leptoneta myopica</i>	E	TX	No
Lee County cave isopod	<i>Lirceus usdagalun</i>	E	VA	No
Government Canyon Bat Cave spider	<i>Neoleptoneta microps</i>	E	TX	Yes
Alabama cave shrimp	<i>Palaemonias alabamiae</i>	E	AL	No
Kentucky cave shrimp	<i>Palaemonias ganteri</i>	E	KY	Yes
[no common name] beetle	<i>Rhadine exilis</i>	E	TX	Yes
[no common name] beetle	<i>Rhadine infernalis</i>	E	TX	Yes
Tooth Cave ground beetle	<i>Rhadine persephone</i>	E	TX	No
Kauai cave amphipod	<i>Spelaeorchestia koloana</i>	E	HI	Yes
Comal Springs dryopid beetle	<i>Stygoparnus comalensis</i>	E	TX	Yes
Tooth Cave pseudoscorpion	<i>Tartarocreagris texana</i>	E	TX	No
Cokendolpher Cave harvestman	<i>Texella cokendolpheri</i>	E	TX	Yes
Bee Creek Cave harvestman	<i>Texella reddelli</i>	E	TX	No
Bone Cave harvestman	<i>Texella reyesi</i>	E	TX	No
Kretschmarr Cave mold beetle	<i>Texamaurops reddelli</i>	E	TX	No
Rangeland Invertebrates: Occur in the Action Area				
San Bruno elfin butterfly	<i>Callophrys mossii bayensis</i>	E	CA	No
Ohlone tiger beetle	<i>Cicindela ohlone</i>	E	CA	No
Smith's blue butterfly	<i>Euphilotes enoptes smithi</i>	E	CA	No
bay checkerspot butterfly	<i>Euphydryas editha bayensis</i>	T	CA	Yes
Quino checkerspot butterfly	<i>Euphydryas editha quino</i> (=E. e. wrighti)	E	CA	Yes
Taylor's (=whulge) checkerspot	<i>Euphydryas editha taylori</i>	E	OR, WA	Yes
Kern primrose sphinx moth	<i>Euproserpinus euterpe</i>	T	CA	No
Palos Verdes blue butterfly	<i>Glaucopsyche lygdamus palosverdesensis</i>	E	CA	Yes
Fender's blue butterfly	<i>Icaricia icarioides fenderi</i>	E	OR	Yes
Mission blue butterfly	<i>Icaricia icarioides missionensis</i>	E	CA	No
Karner blue butterfly	<i>Lycaeides melissa samuelis</i>	E	IL, IN, MI, MN, NH, NY, OH, WI	No
American burying beetle	<i>Nicrophorus americanus</i>	E	AR, KS, MA, MO, NE, OH, OK, RI, SD, TX	No
Mount Charleston blue butterfly	<i>Plebejus shasta charlestonensis</i>	E	NA	No
Laguna Mountains skipper	<i>Pyrgus ruralis lagunae</i>	E	CA	Yes
callippe silverspot butterfly	<i>Speyeria callippe</i>	E	CA	No
Forest Land Invertebrates: Occur in the Action Area				
Pawnee montane skipper	<i>Hesperia leonardus montana</i>	T	CO	No
Mariana eight-spot butterfly	<i>Hypolimnas mariannensis</i>	PE	GU, NMI	No
Blackburn's sphinx moth	<i>Manduca blackburni</i>	E	HI	Yes
Spruce-fir moss spider	<i>Microhexura montivaga</i>	E	NC, TN, VA	Yes
Guam tree snail	<i>Partula radiolata</i>	PE	GU	No
Humped tree snail	<i>Partula gibba</i>	PE	NMI	No
Langford's tree snail	<i>Partula langfordi</i>	PE	NMI	No
Noonday globe	<i>Patera clarki nantahala</i>	T	NC	No
Fragile tree snail	<i>Samoana fragilis</i>	PE	GU, NMI	No
Mariana wandering butterfly	<i>Vagrans egistina</i>	PE	GU, NMI	No

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.11 Plants

Plants include any member of the kingdom Plantae, comprising multicellular organisms that typically produce their own food from inorganic matter by the process of photosynthesis and that have relatively rigid cell walls containing cellulose. Plants not only occupy specific habitats, they define the characteristics of those habitats. Plants have been placed into eight sub-groups: forested wetland plants, nonforested wetland plants, freshwater plants, nearshore marine plants, beach plants, inland sandy area plants, rangeland plants, and forest land plants. USFWS has jurisdiction over all threatened and endangered plants, with the exception of one marine species that is under the jurisdiction of NMFS.

The plant species group includes a wide array of taxa, including trees, shrubs, grasses, ferns, lichen, and flowering plants. While all plant species are capable of reproducing sexually, some species also can reproduce clonally through fragmentation, the production of spores, or through specialized structures such as rhizomes or bulbs. In conifers and flowering plants, sexual reproduction occurs through pollination, which can occur either via wind-borne pollen or with the assistance of pollinators, such as bees and other insects, hummingbirds, and bats. Plants disperse their seeds through a variety of means, including gravity, wind, animals (both through ingestion or external attachment), and water. The distribution of individual species within the sub-groups is defined by climate, soil types, elevation, aspect, and other physical parameters. Many of the species in this group are endemic to small and geographically isolated areas.

4.11.1 Forested Wetland Plants

Information on forested wetland plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, Region 3, 1983) (U.S. Fish and Wildlife Service, 1991c) (U.S. Fish and Wildlife Service, 1993f) (U.S. Fish and Wildlife Service, 1994f) (U.S. Fish and Wildlife Service, 1999c) (U.S. Fish and Wildlife Service, 2013k).

Forested wetlands have canopies of deciduous, evergreen, or coniferous trees above a variety of flowering annual and perennial plants, grasses, and flowering shrubs. Forested wetlands occur in areas that are seasonally flooded, as well as perennially wet areas. Riparian forests along the borders of waterways are typically included within this sub-group. Forested wetlands also occur along coastal margins (e.g., mangrove swamps). Forested wetland plants are generally tolerant of or require saturated soils and cannot tolerate drought conditions.

The habitat needs of forested wetland plants vary depending on the species, but may include access to standing water, near surface groundwater, or seasonally saturated waters; a suitable overstory of trees; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 85 forested wetland plants, 72 are endangered and 13 are threatened. Critical habitat has been designated for 39 listed species.

The following representative threats to forested wetland plants have been synthesized from information available for several species:

- Inundation of habitat through the construction of dams and other impoundments;
- Habitat modification due to diversion and channelization of waterways and groundwater extraction;
- Collection of plants for horticulture;
- Habitat loss as a result of urbanization, agricultural conversion, and mining;

- Erosion and sedimentation from nearby agricultural and construction activities;
- Introduction of invasive plant species which compete for resources;
- Introduction of plant-eating animals such as goats, pigs, slugs, and rats;
- Grazing practices that are incompatible with the persistence of native flora;
- Off-highway vehicle use; and
- Alteration of fire regime.

4.11.2 Nonforested Wetland Plants

Information on nonforested wetland plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1990e) (U.S. Fish and Wildlife Service, 1997e) (U.S. Fish and Wildlife Service, 1998a) (U.S. Fish and Wildlife Service, 1999a) (U.S. Fish and Wildlife Service, 2005a).

Nonforested wetlands are dominated by grasses, forbs, sedges, rushes, and other herbaceous vegetation. Nonforested wetlands occur along estuaries and the shorelines of lakes and waterways, and in upland areas with poor drainage. Nonforested wetland plants are generally tolerant of or require saturated soils; some species are adapted to perennially wet areas, tidal areas, or vernal pools and other seasonally wet areas.

The habitat needs of nonforested wetland plants vary depending on the species, but may include: access to standing water, near surface groundwater, or seasonally saturated waters; a level of inundation or disturbance regime that prevents the establishment of shrubs and trees; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 108 nonforested wetland plants, 81 are endangered and 27 are threatened. Critical habitat has been designated for 44 species.

The following representative threats have been synthesized from information available for several nonforested wetlands species.

- Habitat loss as a result of urbanization, agricultural conversion, and mining;
- Changes to hydrology resulting from flood control, groundwater withdrawal, and agricultural diversions;
- Diking of wetlands for water storage, agriculture, or salt production;
- Introduction of invasive plant species which compete for resources;
- Introduction of plant-eating animals such as goats, pigs, slugs, and rats;
- Grazing practices that are incompatible with the persistence of native flora;
- Off-highway vehicle use; and
- Sea-level rise and other climate change factors.

4.11.3 Freshwater Plants

Information on freshwater plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1990d) (U.S. Fish and Wildlife Service, 1996b) (U.S. Fish and Wildlife Service, Arizona Ecological Services Tucson Sub-Office, 2014).

Freshwater plants occur in streams, rivers, lakes, and estuaries and include both flowering and fern-like plants. Freshwater plants grow in gravel, sand, or rock areas at the borders of waterways, as well as in submerged or floating plant beds. Plants within this sub-group can also be described as submerged aquatic vegetation. The distribution of individual species is defined by climate, substrate types, depth, water quality, and other physical parameters.

The habitat needs of freshwater plants vary depending on the species, but may include access to standing or flowing water of suitable depth, turbidity levels, and water quality; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; protection from excessive erosion and sedimentation; and a flood regime that maintains suitable habitat.

Of the six water plants, five are endangered and three are threatened. Critical habitat has been designated for one species.

The following representative threats to freshwater plants have been synthesized from information available for several species:

- Alteration of hydrologic regime, siltation, and erosion resulting from nearby activities such as construction;
- Sand and gravel mining along waterways;
- Improper livestock grazing around aquatic habitats;
- Groundwater extraction and diversion of surface waters;
- Alteration of water quality from non-point sources resulting in increased turbidity, eutrophication, or alteration of pH; and
- Changes in precipitation patterns and other climate change factors.

4.11.4 Nearshore Marine Plants

Information on nearshore marine plants has been synthesized from a variety of sources: (National Marine Fisheries Service, 2007c) (National Marine Fisheries Service, 2002).

The single species in this sub-group, Johnson's seagrass, occurs primarily in nearshore marine waters, and may occur in estuarine areas along the coast as well. This plant forms seagrass beds in some coastal bays of the Atlantic shoreline of Florida and may occur within the intertidal range. Johnson's seagrass may occur interspersed with other seagrass species and is an important component of nearshore marine benthic habitats where it occurs.

The habitat needs of nearshore marine plants include access to nearshore marine water of suitable depth, turbidity levels, and water quality; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive sediment disturbance and wave action.

Johnson's seagrass is listed as threatened and critical habitat has been designated for it.

The following threats to nearshore marine plants have been synthesized from information available for Johnson's seagrass:

- Alteration of hydrologic regime, siltation, and erosion resulting from nearby activities such as construction;
- The placement of fill for waterfront development;
- Dredging or sand and gravel mining along waterways;

- Increased turbidity, sediment disturbance, and wave action from boat traffic;
- Alteration of water quality from non-point sources resulting in increased turbidity, eutrophication, or alteration of pH; and
- Sea-level rise and other climate change factors.

4.11.5 Beach Plants

Information on beach plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1996c) (U.S. Fish and Wildlife Service, 1998g) (U.S. Fish and Wildlife Service, 2013b) (U.S. Fish and Wildlife Service, Pacific Island, 2014b).

Beach plants include flowering annual and perennial plants that are intolerant of saturated soils and generally adapted to salt spray, drought, windy conditions and sandy, poor, well-drained soils. Beach plants may grow on or near the shoreline or on sandy coastal dunes.

The habitat needs of beach plants vary depending on the species, but may include Access to appropriate sandy soils along coastlines; a disturbance regime that prevents the establishment of dense shrubs or trees but maintains beach dunes; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 15 beach plants, 10 are endangered and 5 are threatened. Critical habitat has been designated for one species.

The following representative threats to beach plants have been synthesized from information available for several species:

- Beach armoring or stabilization;
- Coastal development;
- Intensive recreational use, such as foot paths;
- Off-highway vehicle use;
- Sand mining;
- Introduction of invasive, non-native plants; and
- Sea-level rise and other climate change factors.

4.11.6 Inland Sandy Areas Plants

Information on plants of inland sandy areas has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1987c) (U.S. Fish and Wildlife Service, 1989b) (U.S. Fish and Wildlife Service, 1991d) (U.S. Fish and Wildlife Service, 1993g) (U.S. Fish and Wildlife Service, 2003b) (U.S. Fish and Wildlife Service, Pacific Island, 2014a).

These plants include cacti, succulents, flowering annual and perennial plants, and grasses which are found on accumulations of sand transported by wind, typically found in deserts but which may also occur in mesic areas. These habitats are characterized as having vegetation on one-third or less of the habitat area. Vegetation in these areas is often widely scattered and of a small stature. Cacti and other succulents are prominent members of this group.

The habitat needs of plants of inland sandy areas vary depending on the species, but may include: access to appropriate sandy soils; a disturbance regime that prevents the establishment of dense shrubs or trees but maintains areas of shifting or semi-stabilized sand; protection from

overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 85 inland sandy area plants, 55 are endangered and 30 are threatened. Critical habitat has been designated for 33 species.

The following representative threats to plants of inland sandy areas have been synthesized from information available for several species:

- Off-highway vehicle use;
- Habitat loss as a result of urbanization, agricultural conversion, and mining;
- Collection of plants for horticultural use;
- Oil/gas development;
- Introduction of invasive, nonnative plants;
- Grazing practices that are incompatible with the persistence of native flora; and
- Introduction of plant-eating animals such as goats, pigs, slugs, and rats.

4.11.7 Rangeland Plants

Information on rangeland plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1999a) (U.S. Fish and Wildlife Service, 2000a) (U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 2009b) (U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2010b) (U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 2013).

Rangeland plants include flowering shrubs, grasses, and a variety of flowering perennial and annual plants found in upland herbaceous, shrub and brush, and mixed rangeland habitats. These habitats occur in many climate zones, including arid, semi-arid, temperate, and subtropical, where conditions such as thin soils, poor soils, or harsh weather prevent the establishment of trees. In some rangeland ecosystems, fire (either natural or human-caused) plays an important role in maintaining vegetation structure and prevents the establishment of trees.

The habitat needs of rangeland plants vary depending on the species, but may include access to appropriate soils; a disturbance or climate regime that prevents the establishment of trees but maintains shrubby or herbaceous vegetation; protection from overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 253 rangeland plants, 191 are endangered, 61 are threatened, and 1 is proposed endangered. Critical habitat has been designated for 88 listed species.

The following representative threats to rangeland plants have been synthesized from information available for several species:

- Collection of plants for horticultural use;
- Habitat loss as a result of urbanization, agricultural conversion, and mining;
- Off-highway vehicle use;
- Oil and gas development;
- Alteration of fire regime;
- Introduction of invasive plant species which compete for resources;

- Introduction of plant-eating animals such as goats, pigs, slugs, and rats; and
- Grazing practices that are incompatible with the persistence of native flora.

4.11.8 Forest Land Plants

Information on forest land plants has been synthesized from a variety of sources: (U.S. Fish and Wildlife Service, 1987b) (U.S. Fish and Wildlife Service, 1992a) (U.S. Fish and Wildlife Service, 1993e) (U.S. Fish and Wildlife Service, 1998f) (U.S. Fish and Wildlife Service, 1999c) (U.S. Fish and Wildlife Service, 2011b) (U.S. Fish and Wildlife Service, 2014p) (U.S. Fish and Wildlife Service, 2015n) (U.S. Fish and Wildlife Service, 2015o) (U.S. Fish and Wildlife Service, 2015p) (U.S. Fish and Wildlife Service, 2015q).

Forest land plants include deciduous trees, conifers, ferns, and a variety of flowering plants that occur in upland deciduous, evergreen, and mixed forests. Forest lands are present across a wide range of climates and rainfall patterns, from tropical and temperate rainforests to dry subtropical forests and semi-arid montane conditions. Forest land plants are generally intolerant of saturated soils, thin soils, and extremely poor soils. Forest plants include large canopy trees, smaller understory trees, groundcover, and other short plants. In some forest systems, epiphytes (plants that derive moisture and nutrients from the air and rain and grow non-parasitically on another plant) are common.

The habitat needs of forest plants vary depending on the species, but may include access to appropriate soils; a disturbance or climate regime that allows the establishment and maturation of trees; protection from lumbering and overgrazing by native and non-native species; freedom from competition with invasive, non-native plants; and protection from excessive trampling or ground disturbance.

Of the 335 forest land plants, 313 are endangered, 19 are threatened, 2 are proposed endangered, and 1 is proposed threatened. Critical habitat has been designated for 208 listed species.

The following representative threats to forest land plants have been synthesized from information available for several species:

- Deforestation and habitat loss due to lumbering, mining, agricultural conversion, and urban development;
- Introduction of invasive plant species which compete for resources;
- Introduction of plant-eating animals such as goats, pigs, slugs, and rats;
- Collection of plants for horticulture;
- Alteration of fire regime; and
- Oil and gas development.

Table 4-9 lists all U.S. plants, by sub-group, which are listed or proposed threatened or endangered, the State(s) in which they are found, and whether critical habitat has been designated for the species.

Table 4-9: Threatened and Endangered Plants in the U.S.

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Forested Wetland Plants: Occur in the Action Area				

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Northern wild monkshood	<i>Aconitum noveboracense</i>	T	IA, NY, OH, WI	No
Georgia rockcress	<i>Arabis georgiana</i>	T	AL, GA	Yes
Jesup's milk-vetch	<i>Astragalus robbinsii</i> var. <i>jesupi</i>	E	NH, VT	No
Palo de ramon	<i>Banara vanderbiltii</i>	E	PR, FL	No
Ko'oko'olau	<i>Bidens campylotheca pentamera</i>	E	HI	No
Ko'oko'olau	<i>Bidens campylotheca waihoiensis</i>	E	HI	No
Ko'oko'olau	<i>Bidens conjuncta</i>	E	HI	No
Decurrent false aster	<i>Boltonia decurrens</i>	T	IL, MO	No
Texas poppy-mallow	<i>Callirhoe scabriuscula</i>	E	TX	No
Palma de manaca	<i>Calyptronoma rivalis</i>	T	PR	No
Brooksville bellflower	<i>Campanula robbinsiae</i>	E	FL	No
Small-anthered bittercress	<i>Cardamine micranthera</i>	E	NC, VA	No
White sedge	<i>Carex albida</i>	E	CA	No
No common name	<i>Chamaecrista glandulosa</i> var. <i>mirabilis</i>	E	PR	No
`Akoko	<i>Chamaesyce remyi</i> var. <i>remyi</i>	E	HI	Yes
Papala	<i>Charpentiera densiflora</i>	E	HI	Yes
Cape Sable thoroughwort	<i>Chromolaena fruticosa</i>	E	FL	Yes
Sacramento Mountains thistle	<i>Cirsium vinaceum</i>	T	NM	No
Cumberland rosemary	<i>Conradina verticillata</i>	T	KY, TN	No
Higuero de sierra	<i>Crescentia portoricensis</i>	E	PR	No
Haha	<i>Cyanea asplenifolia</i>	E	HI	No
Haha	<i>Cyanea copelandii</i> ssp. <i>haleakalaensis</i>	E	HI	Yes
Haha	<i>Cyanea dunbarii</i>	E	HI	Yes
Haha	<i>Cyanea glabra</i>	E	HI	Yes
Haha	<i>Cyanea grimesiana</i> ssp. <i>Obatae</i>	E	HI	Yes
Haha	<i>Cyanea kuhiihewa</i>	E	HI	Yes
Haha	<i>Cyanea lanceolata</i>	E	HI	Yes
Haha	<i>Cyanea lobata</i>	E	HI	Yes
Haha	<i>Cyanea mauiensis</i>	E		No
Haha	<i>Cyanea obtusa</i>	E	HI	No
Haha	<i>Cyanea procera</i>	E	HI	Yes
Popolo	<i>Cyanea solanacea</i>	E	HI	No
Haha	<i>Cyanea undulata</i>	E	HI	Yes
Ha`iwale	<i>Cyrtandra crenata</i>	E	HI	No
Mapele	<i>Cyrtandra cyaneoides</i>	E	HI	Yes
Ha`iwale	<i>Cyrtandra dentata</i>	E	HI	Yes
Ha`iwale	<i>Cyrtandra filipes</i>	E	HI	No
Ha`iwale	<i>Cyrtandra kaulantha</i>	E	HI	Yes
Ha`iwale	<i>Cyrtandra limahuliensis</i>	T	HI	Yes
Haiwale	<i>Cyrtandra nanawaleensis</i>	E	HI	No
Ha`iwale	<i>Cyrtandra oenobarba</i>	E	HI	Yes
Ha`iwale	<i>Cyrtandra oxybapha</i>	E	HI	No
Ha`iwale	<i>Cyrtandra viridiflora</i>	E	HI	Yes
Oha	<i>Delissea rivularis</i>	E	HI	Yes
Palapalai aumakua	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	E	HI	Yes
Na`ena`e	<i>Dubautia pauciflora</i>	E	HI	Yes
Na`ena`e	<i>Dubautia waialealae</i>	E	HI	Yes
No common name	<i>Elaphoglossum serpens</i>	E	PR	No
Minnesota dwarf trout lily	<i>Erythronium propullans</i>	E	MN	No
Nohoanu	<i>Geranium hanaense</i>	E	HI	No
Nohoanu	<i>Geranium hillebrandii</i>	E	HI	No
Nohoanu	<i>Geranium kauaiense</i>	E	HI	Yes
Awiiwi	<i>Hedyotis cookiana</i>	E	HI	Yes
Virginia sneezeweed	<i>Helenium virginicum</i>	T	MO, VA	No

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Swamp pink	<i>Helonias bullata</i>	T	DE, GA, MD, NC, NJ, SC, VA, NY	No
Dwarf-flowered heartleaf	<i>Hexastylis naniflora</i>	T	NC, SC	No
Cooley's water-willow	<i>Justicia cooleyi</i>	E	FL	No
No common name	<i>Keysseria (=Lagenifera) erici</i>	E	HI	Yes
No common name	<i>Keysseria (=Lagenifera) helenae</i>	E	HI	Yes
Kamakahala	<i>Labordia cyrtandrae</i>	E	HI	Yes
Kamakahala	<i>Labordia pumila</i>	E	HI	Yes
Kamakahala	<i>Labordia tinifolia</i> var. <i>wahiawaensis</i>	E	HI	Yes
Pondberry	<i>Lindera melissifolia</i>	E	AL, AR, GA, MO, MS, NC, SC, LA, FL	No
Iehua makanoe	<i>Lysimachia daphnoides</i>	E	HI	Yes
No common name	<i>Lysimachia scopulensis</i>	E	HI	Yes
Alani	<i>Melicope ovalis</i>	E	HI	Yes
Alani	<i>Melicope puberula</i>	E	HI	Yes
sea bean	<i>Mucuna sloanei persericea</i>	E	HI	No
Kolea	<i>Myrsine knudsenii</i>	E	HI	Yes
Kolea	<i>Myrsine vaccinioides</i>	E	HI	No
No common name	<i>Phyllostegia renovans</i>	E	HI	Yes
No common name	<i>Phyllostegia waimeae</i>	E	HI	Yes
Short's bladderpod	<i>Physaria globosa</i>	E	IN, KY, TN	Yes
Godfrey's butterwort	<i>Pinguicula ionantha</i>	T	FL	No
No common name	<i>Platanthera holochila</i>	E	HI	Yes
Lo'ulu	<i>Pritchardia lanigera</i>	E	HI	No
Knieskern's Beaked-rush	<i>Rhynchospora knieskernii</i>	T	DE, NJ	No
Bunched arrowhead	<i>Sagittaria fasciculata</i>	E	NC, SC	No
Green pitcher-plant	<i>Sarracenia oreophila</i>	E	AL, GA, NC, TN	No
No common name	<i>Schiedea laui</i>	E	HI	No
Northeastern bulrush	<i>Scirpus ancistrochaetus</i>	E	MA, MD, NH, NY, PA, VA, VT, WV	No
Tobusch fishhook cactus	<i>Sclerocactus brevihamatus</i> ssp. <i>tobuschii</i>	E	TX	No
Cobana negra	<i>Stahliia monosperma</i>	T	PR	No
Cooley's meadowrue	<i>Thalictrum cooleyi</i>	E	FL, GA, NC	No
No common name	<i>Thelypteris inabonensis</i>	E	PR	No
Nonforested Wetland Plants: Occur in the Action Area				
Liliwai	<i>Acaena exigua</i>	E	HI	Yes
Sensitive joint-vetch	<i>Aeschynomene virginica</i>	T	MD, NC, NJ, VA, PA, DE	No
Sonoma alopecurus	<i>Alopecurus aequalis</i> var. <i>sonomensis</i>	E	CA	No
San Diego ambrosia	<i>Ambrosia pumila</i>	E	CA	Yes
Crenulate lead-plant	<i>Amorpha crenulata</i>	E	FL	No
Little amphianthus	<i>Amphianthus pusillus</i>	T	AL, GA, SC	No
Cumberland sandwort	<i>Arenaria cumberlandensis</i>	E	KY, TN	No
Marsh sandwort	<i>Arenaria paludicola</i>	E	CA, WA, OR	No
Sacramento prickly poppy	<i>Argemone pleiakantha</i> ssp. <i>pinnatisecta</i>	E	NM	No
Pa'iniu	<i>Astelia waialealae</i>	E	HI	Yes
Applegate's milk-vetch	<i>Astragalus applegatei</i>	E	CA, OR	No
Fish Slough milk-vetch	<i>Astragalus lentiginosus</i> var. <i>piscinensis</i>	T	CA	Yes
Ventura Marsh Milk-vetch	<i>Astragalus pycnostachyus</i> var. <i>lanosissimus</i>	E	CA	Yes
Coastal dunes milk-vetch	<i>Astragalus tener</i> var. <i>titi</i>	E	CA	No
San Jacinto Valley crownscale	<i>Atriplex coronata</i> var. <i>notator</i>	E	CA	Yes

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Sonoma sunshine	<i>Blennosperma bakeri</i>	E	CA	No
Chinese Camp brodiaea	<i>Brodiaea pallida</i>	T	CA	No
Hillebrand's reedgrass	<i>Calamagrostis hillebrandii</i>	E	HI	No
'Awikiwiki	<i>Canavalia napaliensis</i>	E	HI	Yes
Fleshy owl's-clover	<i>Castilleja campestris</i> ssp. <i>succulenta</i>	T	CA	Yes
Spring-loving centaury	<i>Centaureum namophilum</i>	T	CA, NV	Yes
Hoover's spurge	<i>Chamaesyce hooveri</i>	T	CA	Yes
Fountain thistle	<i>Cirsium fontinale</i> var. <i>fontinale</i>	E	CA	No
Chorro Creek bog thistle	<i>Cirsium fontinale</i> var. <i>obispoense</i>	E	CA	No
Suisun thistle	<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>	E	CA	Yes
La Graciosa thistle	<i>Cirsium loncholepis</i>	E	CA	Yes
Salt marsh bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>maritimus</i>	E	CA	No
Soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>Mollis</i>	E	CA	Yes
Palmate-bracted bird's beak	<i>Cordylanthus palmatus</i>	E	CA	No
Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp. <i>Okeechobeensis</i>	E	FL	No
Pu'uka'a	<i>Cyperus trachysanthos</i>	E	HI	Yes
Santa Ana River woolly-star	<i>Eriastrum densifolium</i> ssp. <i>sanctorum</i>	E	CA	No
San Diego button-celery	<i>Eryngium aristulatum</i> var. <i>parishii</i>	E	CA	No
Loch Lomond coyote thistle	<i>Eryngium constancei</i>	E	CA	No
Penland alpine fen mustard	<i>Eutrema penlandii</i>	T	CO	No
Colorado Butterfly plant	<i>Gaura neomexicana</i> var. <i>coloradensis</i>	T	CO, NE, WY	Yes
Hawaiian red-flowered geranium	<i>Geranium arboreum</i>	E	HI	Yes
Ash Meadows gumplant	<i>Grindelia fraxinipratensis</i>	T	CA, NV	Yes
Harper's beauty	<i>Harperocalis flava</i>	E	FL	No
Pecos (=puzzle, =paradox) sunflower	<i>Helianthus paradoxus</i>	T	NM, TX	Yes
Whorled sunflower	<i>Helianthus verticillatus</i>	E	AL, GA, TN	Yes
Neches River rose-mallow	<i>Hibiscus dasycalyx</i>	T	TX	Yes
Black spored quillwort	<i>Isoetes melanospora</i>	E	GA, SC	No
Mat-forming quillwort	<i>Isoetes tegetiformans</i>	E	GA	No
Ash Meadows ivesia	<i>Ivesia kingii</i> var. <i>eremica</i>	T	CA, NV	Yes
Burke's goldfields	<i>Lasthenia burkei</i>	E	CA	No
Contra Costa goldfields	<i>Lasthenia conjugens</i>	E	CA	Yes
Spring Creek bladderpod	<i>Lesquerella perforata</i>	E	TN	No
Western lily	<i>Lilium occidentale</i>	E	CA, OR	No
Pitkin Marsh lily	<i>Lilium pardalinum</i> ssp. <i>Pitkinense</i>	E	CA	No
Butte County meadowfoam	<i>Limnanthes floccosa</i> ssp. <i>californica</i>	E	CA	Yes
Large-flowered woolly meadowfoam	<i>Limnanthes floccosa</i> ssp. <i>grandiflora</i>	E	OR	Yes
Sebastopol meadowfoam	<i>Limnanthes vinculans</i>	E	CA	No
Bradshaw's desert-parsley	<i>Lomatium bradshawii</i>	E	OR, WA	No
Cook's lomatium	<i>Lomatium cookii</i>	E	OR	Yes
Rough-leaved loosestrife	<i>Lysimachia asperulaefolia</i>	E	NC, SC	No
No common name	<i>Lysimachia filifolia</i>	E	HI	Yes
Mohr's Barbara button	<i>Marshallia mohrii</i>	T	AL, GA	No
Ihi'ihii	<i>Marsilea villosa</i>	E	HI	Yes
Michigan monkey-flower	<i>Mimulus michiganensis</i>	E	MI	No
Willow monardella	<i>Monardella viminea</i>	E	CA	Yes
Spreading navarretia	<i>Navarretia fossalis</i>	T	CA	Yes
Few-flowered navarretia	<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i> (=N. <i>pauciflora</i>)	E	CA	No
Many-flowered navarretia	<i>Navarretia leucocephala</i> ssp. <i>plieantha</i>	E	CA	No
Colusa grass	<i>Neostapfia colusana</i>	T	CA	Yes
Amargosa niterwort	<i>Nitrophila mohavensis</i>	E	CA, NV	Yes
California orcutt grass	<i>Orcuttia californica</i>	E	CA	No
San Joaquin orcutt grass	<i>Orcuttia inaequalis</i>	T	CA	Yes
Hairy orcutt grass	<i>Orcuttia pilosa</i>	E	CA	Yes

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Slender orcutt grass	<i>Orcuttia tenuis</i>	T	CA, OR	Yes
Sacramento orcutt grass	<i>Orcuttia viscida</i>	E	CA	Yes
Canby's dropwort	<i>Oxypolis canbyi</i>	E	DE, GA, MD, NC, SC	No
Fassett's locoweed	<i>Oxytropis campestris</i> var. <i>chartacea</i>	T	WI	No
Lake County stonecrop	<i>Parvisedum leiocarpum</i>	E	CA	No
Furbish lousewort	<i>Pedicularis furbishiae</i>	E	ME	No
Ruth's golden aster	<i>Pityopsis ruthii</i>	E	TN	No
rough popcornflower	<i>Plagiobothrys hirtus</i>	E	OR	No
Calistoga allocarya	<i>Plagiobothrys strictus</i>	E	CA	No
Kuahiwi laukahi	<i>Plantago hawaiiensis</i>	E	HI	Yes
Kuahiwi laukahi	<i>Plantago princeps</i>	E	HI	Yes
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	T	IA, IL, IN, ME, MI, MO, OH, OK, VA, WI, PA, NY, NJ, NE, AR	No
Western prairie fringed orchid	<i>Platanthera praeclara</i>	T	IA, KS, MN, MO, ND, NE, OK, SD	No
Napa bluegrass	<i>Poa napensis</i>	E	CA	No
San Diego mesa-mint	<i>Pogogyne abramsii</i>	E	CA	No
Otay mesa-mint	<i>Pogogyne nudiuscula</i>	E	CA	No
Autumn Buttercup	<i>Ranunculus aestivalis</i> (= <i>acrifomis</i>)	E	UT	No
Chapman rhododendron	<i>Rhododendron chapmanii</i>	E	FL	No
Gambel's watercress	<i>Rorippa gambellii</i>	E	CA	No
No common name	<i>Sanicula purpurea</i>	E	HI	Yes
Alabama canebrake pitcher-plant	<i>Sarracenia rubra</i> ssp. <i>alabamensis</i>	E	AL	No
Mountain sweet pitcher-plant	<i>Sarracenia rubra</i> ssp. <i>Jonesii</i>	E	NC, SC	No
Florida skullcap	<i>Scutellaria floridana</i>	T	FL	No
Kenwood Marsh checker-mallow	<i>Sidalcea oregana</i> ssp. <i>Valida</i>	E	CA	No
Wenatchee Mountains checker-mallow	<i>Sidalcea oregana</i> var. <i>calva</i>	E	WA	Yes
Pedate checker-mallow	<i>Sidalcea pedata</i>	E	CA	No
Virginia spiraea	<i>Spiraea virginiana</i>	T	GA, KY, NC, OH, TN, VA, WV, PA	No
Canelo Hills ladies'-tresses	<i>Spiranthes delitescens</i>	E	AZ	No
California taraxacum	<i>Taraxacum californicum</i>	E	CA	Yes
Howell's spectacular thelypody	<i>Thelypodium howellii spectabilis</i>	T	OR	No
Slender-petaled mustard	<i>Thelypodium stenopetalum</i>	E	CA	No
Hidden Lake bluecurls	<i>Trichostema austromontanum</i> ssp. <i>Compactum</i>	T	CA	No
Greene's tuctoria	<i>Tuctoria greenei</i>	E	CA, OR	Yes
Solano grass	<i>Tuctoria mucronata</i>	E	CA	Yes
Red Hills vervain	<i>Verbena californica</i>	T	CA	No
Nani wai'ale'ale	<i>Viola kauaiensis</i> var. <i>wahiawaensis</i>	E	HI	Yes
Tennessee yellow-eyed grass	<i>Xyris tennesseensis</i>	E	AL, GA, TN	No
Texas wild-rice	<i>Zizania texana</i>	E	TX	Yes
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	T	CO, ID, MT, NE, NV, UT, WA, WY	No
Freshwater Plants: Occur in the Action Area				
Water howellia	<i>Howellia aquatilis</i>	T	CA, ID, MT, OR, WA	No
Louisiana quillwort	<i>Isoetes louisianensis</i>	E	AL, LA, MS	No
Huachuca water-umbel	<i>Lilaeopsis schaffneriana</i> var. <i>recurva</i>	E	AZ	Yes
Little Aguja (=Creek) pondweed	<i>Potamogeton clystocarpus</i>	E	TX	No

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Harperella	<i>Ptilimnium nodosum</i>	E	AL, AR, GA, MD, NC, OK, SC, VA, WV	No
Kral's water-plantain	<i>Sagittaria secundifolia</i>	T	AL, GA	No
Nearshore Marine Plants:		Occur in the Action Area		
Johnson's seagrass	<i>Halophila johnsonii</i>	T	FL	Yes
Beach Plants:		Occur in the Action Area		
Seabeach amaranth	<i>Amaranthus pumilus</i>	T	DE, NC, NJ, NY, SC, VA, RI, MD, MA	No
Howell's spineflower	<i>Chorizanthe howellii</i>	E	CA, FL	No
Monterey spineflower	<i>Chorizanthe pungens</i> var. <i>pungens</i>	T	CA	Yes
Robust spineflower	<i>Chorizanthe robusta</i> var. <i>robusta</i>	E	CA	No
Pitcher's thistle	<i>Cirsium pitcheri</i>	T	IL, IN, MI, WI	No
Menzies' wallflower	<i>Erysimum menziesii</i>	E	CA	No
Hoffmann's slender-flowered gilia	<i>Gilia tenuiflora</i> ssp. <i>Hoffmannii</i>	E	CA	No
Dwarf lake iris	<i>Iris lacustris</i>	T	MI, WI	No
Beach jacquemontia	<i>Jacquemontia reclinata</i>	E	FL	No
Beach layia	<i>Layia camosa</i>	E	CA	No
Clover lupine	<i>Lupinus tidestromii</i>	E	CA	No
No common name	<i>Pittosporum halophilum</i>	E	HI	No
Dwarf naupaka	<i>Scaevola coriacea</i>	E	HI	No
Houghton's goldenrod	<i>Solidago houghtonii</i>	T	MI, NY	No
California seablite	<i>Suaeda californica</i>	E	CA	No
Inland Sandy Area Plants:		Occur in the Action Area		
Round-leaved chaff-flower	<i>Achyranthes splendens</i> var. <i>rotundata</i>	E	HI	Yes
Sandplain gerardia	<i>Agalinis acuta</i>	E	CT, MA, MD, NY, RI	No
Kearney's blue-star	<i>Amsonia kearneyana</i>	E	AZ	No
Shale barren rock cress	<i>Arabis serotina</i>	E	VA, WV	No
Dwarf Bear-poppy	<i>Arctomecon humilis</i>	E	UT	No
'Ahinahina	<i>Argyroxiphium sandwicense</i> ssp. <i>Macrocephalum</i>	T	HI	Yes
'Ahinahina	<i>Argyroxiphium sandwicense</i> ssp. <i>Sandwicense</i>	E	HI	No
Welsh's milkweed	<i>Asclepias welshii</i>	T	AZ, UT	Yes
Cushenbury milk-vetch	<i>Astragalus albens</i>	E	CA	Yes
Shivwits milk-vetch	<i>Astragalus ampullarioides</i>	E	UT	Yes
Sentry milk-vetch	<i>Astragalus cremnophyllax</i> var. <i>cremnophyllax</i>	E	AZ	No
Holmgren milk-vetch	<i>Astragalus holmgreniorum</i>	E	AZ, UT	Yes
Mancos milk-vetch	<i>Astragalus humillimus</i>	E	CO, NM	No
Coachella Valley milk-vetch	<i>Astragalus lentiginosus</i> var. <i>coachellae</i>	E	CA	Yes
Peirson's milk-vetch	<i>Astragalus magdalenae</i> var. <i>peirsonii</i>	T	CA	Yes
Heliotrope milk-vetch	<i>Astragalus montii</i>	T	UT	Yes
Star cactus	<i>Astrophytum asterias</i>	E	TX	No
Texas ayenia	<i>Ayenia limitaris</i>	E	TX	No
Kookoolau	<i>Bidens hillebrandiana</i> ssp. <i>hillebrandiana</i>	E	HI	No
Ko'oko'olau	<i>Bidens micrantha ctenophylla</i>	E	HI	No
Ko'oko'olau	<i>Bidens micrantha</i> ssp. <i>Kalealaha</i>	E	HI	Yes
Olulu	<i>Brighamia insignis</i>	E	HI	Yes
Pua 'ala	<i>Brighamia rockii</i>	E	HI	Yes
Awiiwi	<i>Centaurium sebaeoides</i>	E	HI	Yes
Deltoid spurge	<i>Chamaesyce deltoidea</i> ssp. <i>deltoidea</i>	E	FL	No
Garber's spurge	<i>Chamaesyce garberi</i>	T	FL	No
Nellie cory cactus	<i>Coryphantha minima</i>	E	TX	No
Bunched cory cactus	<i>Coryphantha ramillosa</i>	T	TX	No

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Cochise pincushion cactus	<i>Coryphantha robbinsiorum</i>	T	AZ	No
Pima pineapple cactus	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	E	AZ	No
Avon Park harebells	<i>Crotalaria avonensis</i>	E	FL	No
Terlingua Creek cat's-eye	<i>Cryptantha crassipes</i>	E	TX	No
Jones cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	T	AZ, UT	No
Haiwale	<i>Cyrtandra paliku</i>	E	HI	Yes
Leafy prairie-clover	<i>Dalea foliosa</i>	E	AL, IL, TN	No
Na'ena'e	<i>Dubautia plantaginea</i> ssp. <i>humilis</i>	E	HI	Yes
Marcescent dudleya	<i>Dudleya cymosa</i> ssp. <i>marcescens</i>	T	CA	No
Santa Clara Valley dudleya	<i>Dudleya setchellii</i>	E	CA	No
Laguna Beach liveforever	<i>Dudleya stolonifera</i>	T	CA	No
Santa Barbara Island liveforever	<i>Dudleya traskiae</i>	E	CA	No
Nichol's Turk's head cactus	<i>Echinocactus horzonthalonius</i> var. <i>nicholii</i>	E	AZ	No
Chisos Mountain hedgehog cactus	<i>Echinocereus chisoensis</i> var. <i>chisoensis</i>	T	TX	No
Kuenzler hedgehog cactus	<i>Echinocereus fendleri</i> var. <i>kuenzleri</i>	E	NM	No
Arizona hedgehog cactus	<i>Echinocereus triglochidiatus</i> var. <i>arizonicus</i>	E	AZ	No
Davis' green pitaya	<i>Echinocereus viridiflorus</i> var. <i>davisii</i>	E	TX	No
Acuna Cactus	<i>Echinomastus erectocentrus</i> var. <i>acunensis</i>	E	AZ	No
Lloyd's Mariposa cactus	<i>Echinomastus mariposensis</i>	T	TX	No
Zuni fleabane	<i>Erigeron rhizomatus</i>	T	AZ, NM	No
Umtanum Desert buckwheat	<i>Eriogonum codium</i>	T	WA	Yes
Gypsum wild-buckwheat	<i>Eriogonum gypsophilum</i>	T	NM	Yes
Steamboat buckwheat	<i>Eriogonum ovalifolium</i> var. <i>williamsiae</i>	E	NV	No
Clay-Loving wild buckwheat	<i>Eriogonum pelinophilum</i>	E	CO	Yes
Johnston's frankenia	<i>Frankenia johnstonii</i>	E	TX	No
Texas prairie dawn-flower	<i>Hymenoxys texana</i>	E	TX	No
'Anaunau	<i>Lepidium arbuscula</i>	E	HI	Yes
Barneby ridge-cress	<i>Lepidium barnebyanum</i>	E	UT	No
No common name	<i>Leptocereus grantianus</i>	E	PR	No
Dudley Bluffs bladderpod	<i>Lesquerella congesta</i>	T	CO	No
Zapata bladderpod	<i>Lesquerella thamnophila</i>	E	TX	Yes
Kodachrome bladderpod	<i>Lesquerella tumulosa</i>	E	UT	No
Heller's blazingstar	<i>Liatris helleri</i>	T	NC	No
No common name	<i>Lobelia niihauensis</i>	E	HI	Yes
Ash Meadows blazingstar	<i>Mentzelia leucophylla</i>	T	NV	Yes
Kulu'i	<i>Nototrichium humile</i>	E	HI	Yes
Eureka Valley evening-primrose	<i>Oenothera avita</i> ssp. <i>Eurekensis</i>	E	CA	No
San Francisco Peaks ragwort	<i>Packera franciscana</i>	T	AZ	Yes
Parachute beardtongue	<i>Penstemon debilis</i>	T	CO	Yes
Makou	<i>Peucedanum sandwicense</i>	T	HI	Yes
Clay phacelia	<i>Phacelia argillacea</i>	E	UT	No
North Park phacelia	<i>Phacelia formosula</i>	E	CO	No
DeBeque phacelia	<i>Phacelia submutica</i>	T	CO	Yes
White Bluffs bladderpod	<i>Physaria douglasii</i> ssp. <i>tuplashensis</i>	T	WA	Yes
Dudley Bluffs twinpod	<i>Physaria obcordata</i>	T	CO	No
Wahane	<i>Pritchardia aylmer-robinsonii</i>	E	HI	No
Leedy's roseroot	<i>Rhodiola integrifolia</i> ssp. <i>Leedyi</i>	T	MN, NY	No
No common name	<i>Schiedea haleakalensis</i>	E	HI	Yes
No common name	<i>Schiedea verticillata</i>	E	HI	Yes
Pariette cactus	<i>Sclerocactus brevispinus</i>	T	UT	No
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	T	CO, NM	No
Eureka Dune grass	<i>Swallenia alexandrae</i>	E	CA	No
No common name	<i>Tetramolopium filiforme</i>	E	HI	Yes
No common name	<i>Tetramolopium rockii</i>	T	HI	Yes
Alabama streak-sorus fern	<i>Thelypteris pilosa</i> var. <i>alabamensis</i>	T	AL	No
Santa Cruz Island fringe-pod	<i>Thysanocarpus conchuliferus</i>	E	CA	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Desert yellowhead	<i>Yermo xanthocephalus</i>	T	WY	Yes
Rangeland Plants:	Occur in the Action Area			
Ko'olua'ula	<i>Abutilon menziesii</i>	E	HI	No
San Diego thornmint	<i>Acanthomintha ilicifolia</i>	T	CA	Yes
San Mateo thornmint	<i>Acanthomintha obovata ssp. duttonii</i>	E	CA	No
San Clemente Island lotus (=broom)	<i>Acmispon dendroideus var. traskiae (=Lotus d. ssp. traskiae)</i>	T	CA	No
No common name	<i>Agave eggersiana</i>	E	VI	Yes
Munz's onion	<i>Allium munzii</i>	E	CA	Yes
No common name	<i>Amaranthus brownii</i>	E	HI	Yes
South Texas ambrosia	<i>Ambrosia cheiranthifolia</i>	E	TX	No
Large-flowered fiddleneck	<i>Amsinckia grandiflora</i>	E	CA	Yes
Hoffmann's rock-cress	<i>Arabis hoffmannii</i>	E	CA	No
San Francisco manzanita	<i>Arctostaphylos franciscana</i>	E	CA	Yes
Del Mar manzanita	<i>Arctostaphylos glandulosa ssp. crassifolia</i>	E	CA	No
Presidio manzanita	<i>Arctostaphylos hookeri var. ravenii</i>	E	CA	No
Morro manzanita	<i>Arctostaphylos morroensis</i>	T	CA	No
lone manzanita	<i>Arctostaphylos myrtifolia</i>	T	CA	No
Pallid manzanita	<i>Arctostaphylos pallida</i>	T	CA	No
Bear Valley sandwort	<i>Arenaria ursina</i>	T	CA	Yes
No common name	<i>Aristida chaseae</i>	E	PR	No
Pelos del diablo	<i>Aristida portoricensis</i>	E	PR	No
Mead's milkweed	<i>Asclepias meadii</i>	T	IA, IL, IN, KS, MO, WI	No
Four-petal pawpaw	<i>Asimina tetramera</i>	E	FL	No
Braunton's milk-vetch	<i>Astragalus brauntonii</i>	E	CA	Yes
Clara Hunt's milk-vetch	<i>Astragalus clarianus</i>	E	CA	No
Deseret milk-vetch	<i>Astragalus desereticus</i>	T	UT	No
Lane Mountain milk-vetch	<i>Astragalus jaegerianus</i>	E	CA	Yes
Osterhout milkvetch	<i>Astragalus osterhoutii</i>	E	CO	No
Ash meadows milk-vetch	<i>Astragalus phoenix</i>	T	CA, NV	Yes
Triple-ribbed milk-vetch	<i>Astragalus tricarlinatus</i>	E	CA	No
Encinitas baccharis	<i>Baccharis vanessae</i>	T	CA	No
Nevin's barberry	<i>Berberis nevinii</i>	E	CA	Yes
Island barberry	<i>Berberis pinnata ssp. Insularis</i>	E	CA	No
Ko'oko'olau	<i>Bidens wiebkei</i>	E	HI	Yes
Florida bonamia	<i>Bonamia grandiflora</i>	T	FL	No
Thread-leaved brodiaea	<i>Brodiaea filifolia</i>	T	CA	Yes
Tiburon mariposa lily	<i>Calochortus tiburonensis</i>	T	CA	No
Mariposa pussypaws	<i>Calyptidium pulchellum</i>	T	CA	No
Stebbins' morning-glory	<i>Calystegia stebbinsii</i>	E	CA	No
San Benito evening-primrose	<i>Camissonia benitensis</i>	T	CA	No
'Awikiwiki	<i>Canavalia molokaiensis</i>	E	HI	Yes
'Awikiwiki	<i>Canavalia pubescens</i>	E	HI	No
Golden sedge	<i>Carex lutea</i>	E	NC	Yes
Navajo sedge	<i>Carex specuicola</i>	T	AZ, UT	Yes
Tiburon paintbrush	<i>Castilleja affinis ssp. Neglecta</i>	E	CA	No
Ash-grey paintbrush	<i>Castilleja cinerea</i>	T	CA	Yes
San Clemente Island indian paintbrush	<i>Castilleja grisea</i>	T	CA	No
Golden paintbrush	<i>Castilleja levisecta</i>	T	OR, WA	No
Soft-leaved paintbrush	<i>Castilleja mollis</i>	E	CA	No
California jewelflower	<i>Caulanthus californicus</i>	E	CA	No
Coyote ceanothus	<i>Ceanothus ferrisae</i>	E	CA	No
Vail Lake ceanothus	<i>Ceanothus ophiophilus</i>	T	CA	Yes
Pine Hill ceanothus	<i>Ceanothus roderickii</i>	E	CA	No
Catalina Island mountain-mahogany	<i>Cercocarpus traskiae</i>	E	CA	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Fragrant prickly-apple	<i>Cereus eriophorus</i> var. <i>fragrans</i>	E	FL	No
`Akoko	<i>Chamaesyce celastroides</i> var. <i>kaenana</i>	E	HI	Yes
`Akoko	<i>Chamaesyce deppeana</i>	E	HI	Yes
`Akoko	<i>Chamaesyce kuwaleana</i>	E	HI	Yes
Ewa Plains `akoko	<i>Chamaesyce skottsbergii</i> var. <i>skottsbergii</i>	E	HI	Yes
Pygmy fringe-tree	<i>Chionanthus pygmaeus</i>	E	FL	No
Purple amole	<i>Chlorogalum purpureum</i>	T	CA, FL	Yes
Orcutt's spineflower	<i>Chorizanthe orcuttiana</i>	E	CA	No
Ben Lomond spineflower	<i>Chorizanthe pungens</i> var. <i>hartwegiana</i>	E	CA	No
Scotts Valley spineflower	<i>Chorizanthe robusta</i> var. <i>hartwegii</i>	E	CA	Yes
Sonoma spineflower	<i>Chorizanthe valida</i>	E	CA	No
Florida golden aster	<i>Chrysopsis floridana</i>	E	FL	No
Florida perforate cladonia	<i>Cladonia perforata</i>	E	FL	No
Presidio clarkia	<i>Clarkia franciscana</i>	E	CA	No
Vine Hill clarkia	<i>Clarkia imbricata</i>	E	CA	No
Pismo clarkia	<i>Clarkia speciosa</i> ssp. <i>immaculata</i>	E	CA	No
Alabama leather flower	<i>Clematis socialis</i>	E	AL, GA	No
Pigeon wings	<i>Clitoria fragrans</i>	T	FL	No
Short-leaved rosemary	<i>Conradina brevifolia</i>	E	FL	No
Etonia rosemary	<i>Conradina etonia</i>	E	FL	No
Apalachicola rosemary	<i>Conradina glabra</i>	E	FL	No
Florida semaphore cactus	<i>Consolea corallicola</i>	E	FL	No
Pennell's bird's-beak	<i>Cordylanthus tenuis</i> ssp. <i>capillaris</i>	E	CA	No
Lee pincushion cactus	<i>Coryphantha sneedii</i> var. <i>leei</i>	T	NM	No
Sneed pincushion cactus	<i>Coryphantha sneedii</i> var. <i>sneedii</i>	E	NM, TX	No
Haha	<i>Cyanea humboldtiana</i>	E	HI	Yes
Haha	<i>Cyanea st-johnii</i>	E	HI	Yes
Rugel's pawpaw	<i>Deeringothamnus rugelii</i>	E	FL	No
Otay tarplant	<i>Deinandra (=Hemizonia) conjugens</i>	T	CA	Yes
Gaviota tarplant	<i>Deinandra increscens</i> ssp. <i>villosa</i>	E	CA	Yes
Yellow larkspur	<i>Delphinium luteum</i>	E	CA	Yes
San Clemente Island larkspur	<i>Delphinium variegatum</i> ssp. <i>kinkiense</i>	E	CA	No
Garrett's mint	<i>Dicerandra christmanii</i>	E	FL	No
Longspurred mint	<i>Dicerandra cornutissima</i>	E	FL	No
Scrub mint	<i>Dicerandra frutescens</i>	E	FL	No
Lakela's mint	<i>Dicerandra immaculata</i>	E	FL	No
Slender-horned spineflower	<i>Dodecahema leptoceras</i>	E	CA	No
No common name	<i>Doryopteris takeuchii</i>	E	HI	Yes
Na'ena'e	<i>Dubautia herbstobatae</i>	E	HI	Yes
Conejo dudleya	<i>Dudleya abramsii</i> ssp. <i>Parva</i>	T	CA	No
Santa Monica Mountains dudleya	<i>Dudleya cymosa</i> ssp. <i>Ovatifolia</i>	T	CA	No
Santa Cruz Island dudleya	<i>Dudleya nesiotica</i>	T	CA	No
Verity's dudleya	<i>Dudleya verityi</i>	T	CA	No
Smooth coneflower	<i>Echinacea laevigata</i>	E	GA, NC, SC, VA, PA, MD	No
Black lace cactus	<i>Echinocereus reichenbachii</i> var. <i>albertii</i>	E	TX	No
Ash Meadows sunray	<i>Enceliopsis nudicaulis</i> var. <i>corrugata</i>	T	CA, NV	Yes
Kern mallow	<i>Eremalche kernensis</i>	E	CA	No
Willamette daisy	<i>Erigeron decumbens</i> var. <i>decumbens</i>	E	OR	Yes
Parish's daisy	<i>Erigeron parishii</i>	T	CA	Yes
Indian Knob mountain balm	<i>Eriodictyon altissimum</i>	E	CA	No
Lompoc yerba santa	<i>Eriodictyon capitatum</i>	E	CA	Yes
lone (incl. Irish Hill) buckwheat	<i>Eriogonum apricum</i> (incl. var. <i>prostratum</i>)	E	CA	No
Southern mountain wild-buckwheat	<i>Eriogonum kennedyi</i> var. <i>austromontanum</i>	T	CA	Yes
Scrub buckwheat	<i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i>	T	FL	No
Cushenbury buckwheat	<i>Eriogonum ovalifolium</i> var. <i>vineum</i>	E	CA	Yes

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Snakeroot	<i>Eryngium cuneifolium</i>	E	FL	No
Contra Costa wallflower	<i>Erysimum capitatum</i> var. <i>angustatum</i>	E	CA	Yes
Ben Lomond wallflower	<i>Erysimum teretifolium</i>	E	CA	No
Telephus spurge	<i>Euphorbia telephoides</i>	T	FL	No
Pine Hill flannelbush	<i>Fremontodendron californicum</i> ssp. <i>Decumbens</i>	E	CA	No
Small's milkpea	<i>Galactia smallii</i>	E	FL	No
Island bedstraw	<i>Galium buxifolium</i>	E	CA	No
No common name	<i>Geocarpon minimum</i>	T	AR, LA, MO, TX	No
Monterey gilia	<i>Gilia tenuiflora</i> ssp. <i>Arenaria</i>	E	CA	No
No common name	<i>Gouania hillebrandii</i>	E	HI	Yes
No common name	<i>Gouania meyenii</i>	E	HI	Yes
No common name	<i>Gouania vitifolia</i>	E	HI	Yes
Showy stickseed	<i>Hackelia venusta</i>	E	WA	No
Honohono	<i>Haplostachys haplostachya</i>	E	HI	No
Aboriginal prickly-apple	<i>Harrisia</i> (= <i>Cereus</i>) <i>aboriginum</i> (= <i>gracilis</i>)	E	FL	No
Todsen's pennyroyal	<i>Hedeoma todsenii</i>	E	NM	Yes
Kopa	<i>Hedyotis schlechtendahlana</i> var. <i>remyi</i>	E	HI	No
Na Pali beach hedyotis	<i>Hedyotis st.-johnii</i>	E	HI	Yes
Island rush-rose	<i>Helianthemum greenei</i>	T	CA	No
Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E	NC, SC	No
Marin dwarf-flax	<i>Hesperolinon congestum</i>	T	CA	No
Slender rush-pea	<i>Hoffmannseggia tenella</i>	E	TX	No
Santa Cruz tarplant	<i>Holocarpha macradenia</i>	T	CA	Yes
Lakeside daisy	<i>Hymenoxys herbacea</i>	T	IL, MI, OH	No
Highlands scrub hypericum	<i>Hypericum cumulicola</i>	E	FL	No
Peter's Mountain mallow	<i>Iliamna corei</i>	E	VA	No
Hilo ischaemum	<i>Ischaemum byrone</i>	E	HI	Yes
Aupaka	<i>Isodendron hosakae</i>	E	HI	Yes
Kohe malama o kanaloa	<i>Kanaloa kahoowawensis</i>	E	HI	Yes
[Unnamed] gladdress	<i>Leavenworthia crassa</i>	E	AL	Yes
Kentucky glade cress	<i>Leavenworthia exigua laciniata</i>	T	KY	Yes
Slickspot peppergrass	<i>Lepidium papilliferum</i>	PE	ID	No
Prairie bush-clover	<i>Lespedeza leptostachya</i>	T	IA, IL, MN, WI	No
Lyrate bladderpod	<i>Lesquerella lyrata</i>	T	AL	No
White bladderpod	<i>Lesquerella pallida</i>	E	TX	No
San Francisco lessingia	<i>Lessingia germanorum</i> (= <i>L.g.</i> var. <i>germanorum</i>)	E	CA	No
Scrub blazingstar	<i>Liatris ohlingerae</i>	E	FL	No
Carter's small-flowered flax	<i>Linum carteri</i>	E	FL	No
Nehe	<i>Lipochaeta kamolensis</i>	E	HI	Yes
Nehe	<i>Lipochaeta lobata</i> var. <i>leptophylla</i>	E	HI	Yes
No common name	<i>Lipochaeta venosa</i>	E	HI	No
Nehe	<i>Lipochaeta waimeaensis</i>	E	HI	Yes
No common name	<i>Lobelia gaudichaudii</i> ssp. <i>koolauensis</i>	E	HI	Yes
No common name	<i>Lobelia monostachya</i>	E	HI	Yes
No common name	<i>Lobelia oahuensis</i>	E	HI	Yes
Scrub lupine	<i>Lupinus aridorum</i>	E	FL	No
Nipomo Mesa lupine	<i>Lupinus nipomensis</i>	E	CA	No
Kincaid's Lupine	<i>Lupinus sulphureus</i> ssp. <i>Kincaidii</i>	T	OR, WA	Yes
No common name	<i>Lyonia truncata</i> var. <i>proctorii</i>	E	PR	No
No common name	<i>Lysimachia iniki</i>	E	HI	Yes
No common name	<i>Lysimachia lydgatei</i>	E	HI	Yes
No common name	<i>Lysimachia pendens</i>	E	HI	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
White birds-in-a-nest	<i>Macbridea alba</i>	T	FL	No
San Clemente Island bush-mallow	<i>Malacothamnus clementinus</i>	E	CA	No
Santa Cruz Island bush-mallow	<i>Malacothamnus fasciculatus</i> var. <i>nesioticus</i>	E	CA	No
Santa Cruz Island malacothrix	<i>Malacothrix indecora</i>	E	CA	No
Island malacothrix	<i>Malacothrix squalida</i>	E	CA	No
Walker's manioc	<i>Manihot walkerae</i>	E	TX	No
Alani	<i>Melicope munroi</i>	E	HI	No
Vandenberg monkeyflower	<i>Mimulus fremontii</i> var. <i>vandenbergensis</i>	E	CA	No
MacFarlane's four-o'clock	<i>Mirabilis macfarlanei</i>	T	ID, OR	No
San Joaquin wooly-threads	<i>Monolopia</i> (= <i>Lembertia</i>) <i>congdonii</i>	E	CA	No
No common name	<i>Neraudia sericea</i>	E	HI	Yes
No common name	<i>Nesogenes rotensis</i>	E	NMI	No
Britton's beargrass	<i>Nolina brittoniana</i>	E	FL	No
Antioch Dunes evening-primrose	<i>Oenothera deltoides</i> ssp. <i>howellii</i>	E	CA	Yes
Bakersfield cactus	<i>Opuntia treleasei</i>	E	CA	No
Cushenbury oxytheca	<i>Oxytheca parishii</i> var. <i>goodmaniana</i>	E	CA	Yes
Carter's panicgrass	<i>Panicum fauriei</i> var. <i>carteri</i>	E	HI	Yes
Lau 'ehu	<i>Panicum niihauense</i>	E	HI	Yes
Papery whitlow-wort	<i>Paronychia chartacea</i>	T	FL	No
Siler pincushion cactus	<i>Pediocactus</i> (= <i>Echinocactus</i> , = <i>Utahia</i>) <i>sileri</i>	T	AZ, UT	No
Brady pincushion cactus	<i>Pediocactus bradyi</i>	E	AZ	No
San Rafael cactus	<i>Pediocactus despainii</i>	E	UT	No
Knowlton's cactus	<i>Pediocactus knowltonii</i>	E	CO, NM	No
Fickeisen plains cactus	<i>Pediocactus peeblesianus</i> <i>fickeiseniae</i>	E	AZ	No
Peebles Navajo cactus	<i>Pediocactus peeblesianus</i> var. <i>peeblesianus</i>	E	AZ	No
Winkler cactus	<i>Pediocactus winkleri</i>	T	UT	No
Blowout penstemon	<i>Penstemon haydenii</i>	E	NE, WY	No
Penland beardtongue	<i>Penstemon penlandii</i>	E	CO	No
White-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	E	CA	No
Lyon's pentachaeta	<i>Pentachaeta lyonii</i>	E	CA	Yes
Island phacelia	<i>Phacelia insularis</i> ssp. <i>insularis</i>	E	CA	No
Texas trailing phlox	<i>Phlox nivalis</i> ssp. <i>texensis</i>	E	TX	No
Missouri bladderpod	<i>Physaria filiformis</i>	T	AR, MO	No
San Bernardino bluegrass	<i>Poa atropurpurea</i>	E	CA	Yes
Wireweed	<i>Polygonella basiramia</i>	E	FL	No
Sandlace	<i>Polygonella myriophylla</i>	E	FL	No
Scotts Valley polygonum	<i>Polygonum hickmanii</i>	E	CA	Yes
Aleutian shield fern	<i>Polystichum aleuticum</i>	E	AK	No
Po'e	<i>Portulaca sclerocarpa</i>	E	HI	Yes
Hickman's potentilla	<i>Potentilla hickmanii</i>	E	CA	No
Maguire primrose	<i>Primula maguirei</i>	T	UT	No
Scrub plum	<i>Prunus geniculata</i>	E	FL	No
Hartweg's golden sunburst	<i>Pseudobahia bahiifolia</i>	E	CA	No
San Joaquin adobe sunburst	<i>Pseudobahia peirsonii</i>	T	CA	No
Arizona Cliff-rose	<i>Purshia</i> (= <i>Cowania</i>) <i>subintegra</i>	E	AZ	No
Hinckley oak	<i>Quercus hinckleyi</i>	T	TX	No
No common name	<i>Remya montgomeryi</i>	E	HI	Yes
Michaux's sumac	<i>Rhus michauxii</i>	E	GA, NC, SC, VA	No
No common name	<i>Sanicula mariversa</i>	E	HI	Yes
Diamond Head schiedea	<i>Schiedea adamantis</i>	E	HI	No
Ma'oli'oli	<i>Schiedea apokremnos</i>	E	HI	Yes
No common name	<i>Schiedea lydgatei</i>	E	HI	Yes
No common name	<i>Schiedea salicaria</i>	E	HI	No
No common name	<i>Schiedea sarmentosa</i>	E	HI	Yes
Clay reed-mustard	<i>Schoenocrambe argillacea</i>	T	UT	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Barneby reed-mustard	<i>Schoenocrambe barnebyi</i>	E	UT	No
Shrubby reed-mustard	<i>Schoenocrambe suffrutescens</i>	E	UT	No
American chaffseed	<i>Schwalbea americana</i>	E	AL, FL, GA, LA, MS, NC, NJ, SC, VA, TN, NY, MI, MD, MA, DE, CT	No
Colorado hookless cactus	<i>Sclerocactus glaucus</i>	T	CO	No
Uinta Basin hookless cactus	<i>Sclerocactus wetlandicus</i>	T	UT	No
Wright fishhook cactus	<i>Sclerocactus wrightiae</i>	E	UT	No
Layne's butterweed	<i>Senecio layneae</i>	T	CA	No
Ohai	<i>Sesbania tomentosa</i>	E	HI	Yes
Santa Cruz Island rockcress	<i>Sibara filifolia</i>	E	CA	No
Keck's Checker-mallow	<i>Sidalcea keckii</i>	E	CA	Yes
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	T	OR, WA	No
No common name	<i>Silene hawaiiensis</i>	T	HI	Yes
No common name	<i>Silene lanceolata</i>	E	HI	Yes
Spalding's catchfly	<i>Silene spaldingii</i>	T	ID, MT, OR, WA	No
Short's goldenrod	<i>Solidago shortii</i>	E	IN, KY	No
Blue Ridge goldenrod	<i>Solidago spithamea</i>	T	NC, TN	No
Gierisch mallow	<i>Sphaeralcea gierischii</i>	E	AZ, UT	Yes
Navasota ladies'-tresses	<i>Spiranthes parksii</i>	E	TX	No
No common name	<i>Stenogyne angustifolia</i>	E	HI	No
Malheur wire-lettuce	<i>Stephanomeria malheurensis</i>	E	OR	Yes
Metcalf Canyon jewelflower	<i>Streptanthus albidus</i> ssp. <i>albidus</i>	E	CA	No
Tiburon jewelflower	<i>Streptanthus niger</i>	E	CA	No
Texas snowbells	<i>Styrax texanus</i>	E	TX	No
No common name	<i>Tetramolopium arenarium</i>	E	HI	No
Pamakani	<i>Tetramolopium capillare</i>	E	HI	Yes
No common name	<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i>	E	HI	Yes
No common name	<i>Tetramolopium remyi</i>	E	HI	Yes
Kneeland Prairie penny-cress	<i>Thlaspi californicum</i>	E	CA	Yes
Ashy dogweed	<i>Thymophylla tephroleuca</i>	E	TX	No
Last Chance townsendia	<i>Townsendia aprica</i>	T	UT	No
No common name	<i>Trematolobelia singularis</i>	E	HI	Yes
Showy Indian clover	<i>Trifolium amoenum</i>	E	CA	No
Big-leaved crownbeard	<i>Verbesina dissita</i>	T	CA	No
No common name	<i>Vernonia proctorii</i>	E	PR	No
No common name	<i>Vigna o-wahuensis</i>	E	HI	Yes
Pamakani	<i>Viola chamissoniana</i> ssp. <i>chamissoniana</i>	E	HI	Yes
No common name	<i>Viola lanaiensis</i>	E	HI	No
No common name	<i>Viola oahuensis</i>	E	HI	Yes
Dwarf iliau	<i>Wilkesia hobydi</i>	E	HI	Yes
Forest Land Plants Occur in the Action Area				
Large-fruited sand-verbena	<i>Abronia macrocarpa</i>	E	TX	No
No common name	<i>Abutilon eremitopetalum</i>	E	HI	Yes
No common name	<i>Abutilon sandwicense</i>	E	HI	Yes
No common name	<i>Achyranthes mutica</i>	E	HI	Yes
Pendant kihi fern	<i>Adenophorus peris</i>	E	HI	Yes
No common name	<i>Adiantum vivesii</i>	E	PR	No
Mahoe	<i>Alectryon macrococcus</i>	E	HI	Yes
Kuawawaenuhu	<i>Alsinidendron lychnoides</i>	E	HI	Yes
No common name	<i>Alsinidendron viscosum</i>	E	HI	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Price's potato-bean	<i>Apios priceana</i>	T	AL, IL, KY, MS, TN	No
McDonald's rock-cress	<i>Arabis macdonaldiana</i>	E	CA, OR	No
Braun's rock-cress	<i>Arabis perstellata</i>	E	KY, TN	Yes
Santa Rosa Island manzanita	<i>Arctostaphylos confertiflora</i>	E	CA	No
Mauna Loa (=Ka'u) silversword	<i>Argyroxiphium kauense</i>	E	HI	Yes
No common name	<i>Asplenium fragile insulare</i>	E	HI	Yes
American hart's-tongue fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	T	AL, MI, NY, TN	No
Guthrie's (=Pyne's) ground-plum	<i>Astragalus bibullatus</i>	E	TN	No
No common name	<i>Auerodendron pauciflorum</i>	E	PR	No
Hairy rattlesnake	<i>Baptisia arachnifera</i>	E	GA	No
Virginia round-leaf birch	<i>Betula uber</i>	T	VA	No
Ko'oko'olau	<i>Bidens amplexans</i>	E	HI	Yes
No common name	<i>Bonamia menziesii</i>	E	HI	Yes
Florida brickell-bush	<i>Brickellia mosieri</i>	E	FL	No
Vahl's boxwood	<i>Buxus vahlii</i>	E	PR, VI	No
Uhiuhi	<i>Caesalpinia kavaense</i>	E	HI	No
Capa rosa	<i>Callicarpa ampla</i>	E	PR	No
No common name	<i>Calyptanthus thomasi</i>	E	VI	No
No common name	<i>Catesbaea melanocarpa</i>	E	PR, VI	Yes
Kamanomano	<i>Cenchrus agrimonoides</i>	E	HI	Yes
'Akoko	<i>Chamaesyce eleanoriae</i>	E	HI	Yes
No common name	<i>Chamaesyce halemanui</i>	E	HI	Yes
'Akoko	<i>Chamaesyce herbsteri</i>	E	HI	Yes
'Akoko	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	E	HI	Yes
'Akoko	<i>Chamaesyce rockii</i>	E	HI	Yes
Springville clarkia	<i>Clarkia springvillensis</i>	T	CA	No
Morefield's leather flower	<i>Clematis morefieldii</i>	E	AL, TN	No
'Oha wai	<i>Clermontia drepanomorpha</i>	E	HI	Yes
'Oha wai	<i>Clermontia lindseyana</i>	E	HI	Yes
'Oha wai	<i>Clermontia oblongifolia</i> ssp. <i>brevipes</i>	E	HI	Yes
'Oha wai	<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i>	E	HI	Yes
'Oha wai	<i>Clermontia peleana</i>	E	HI	Yes
'Oha wai	<i>Clermontia pyrularia</i>	E	HI	Yes
'Oha wai	<i>Clermontia samuelii</i>	E	HI	Yes
Kauila	<i>Colubrina oppositifolia</i>	E	HI	Yes
No common name	<i>Cordia bellonis</i>	E	PR	No
Palo de nigua	<i>Cornutia obovata</i>	E	PR	No
No common name	<i>Cranichis ricartii</i>	E	PR	No
Pauoa	<i>Ctenitis squamigera</i>	E	HI	Yes
Santa Cruz cypress	<i>Cupressus abramsiana</i>	E	CA	No
Gowen cypress	<i>Cupressus goveniana</i> ssp. <i>goveniana</i>	T	CA	No
No common name	<i>Cyanea</i> (=Rollandia) <i>crispa</i>	E	HI	Yes
Haha	<i>Cyanea acuminata</i>	E	HI	Yes
Haha	<i>Cyanea asarifolia</i>	E	HI	Yes
Haha	<i>Cyanea calycina</i>	E	HI	Yes
Haha	<i>Cyanea copelandii</i> ssp. <i>copelandii</i>	E	HI	No
Haha	<i>Cyanea dolichopoda</i>	E	HI	Yes
Haha	<i>Cyanea duvalliorum</i>	E	HI	No
Haha	<i>Cyanea eleeeensis</i>	E	HI	Yes
Haiwale	<i>Cyrtandra ferrifolia</i>	E	HI	No
Haha	<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i>	E	HI	Yes
Haha	<i>Cyanea hamatiflora</i> ssp. <i>carlsonii</i>	E	HI	Yes
Haha	<i>Cyanea hamatiflora</i> ssp. <i>hamatiflora</i>	E	HI	Yes
haha nui	<i>Cyanea horrida</i>	E	HI	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
Haha	<i>Cyanea kolekoleensis</i>	E	HI	Yes
Haha	<i>Cyanea koolauensis</i>	E	HI	Yes
Haha	<i>Cyanea kunthiana</i>	E	HI	No
Haha	<i>Cyanea longiflora</i>	E	HI	Yes
Haha	<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i>	E	HI	No
Haha	<i>Cyanea magnicalyx</i>	E	HI	No
Haha	<i>Cyanea mannii</i>	E	HI	Yes
Haha	<i>Cyanea maritae</i>	E	HI	No
Haha	<i>Cyanea marksii</i>	E	HI	No
Haha	<i>Cyanea munroi</i>	E	HI	No
Haha	<i>Cyanea pinnatifida</i>	E	HI	Yes
Haha	<i>Cyanea platyphylla</i>	E	HI	Yes
No common name	<i>Cyanea profuga</i>	E	HI; Believed to be extinct	No
No common name	<i>Cyanea purpurellifolia</i>	E	HI; Believed to be extinct	Yes
Haha	<i>Cyanea recta</i>	T	HI	Yes
Haha	<i>Cyanea remyi</i>	E	HI	Yes
Haha	<i>Cyanea shipmanii</i>	E	HI	Yes
Haha	<i>Cyanea stictophylla</i>	E	HI	Yes
Haha	<i>Cyanea superba</i>	E	HI	Yes
aku	<i>Cyanea tritomantha</i>	E	HI	No
Haha	<i>Cyanea truncata</i>	E	HI	Yes
Elfin tree fern	<i>Cyathea dryopteroides</i>	E	PR	No
No common name	<i>Cyperus pennatifolius</i>	E	HI	Yes
Ha'iwale	<i>Cyrtandra giffardii</i>	E	HI	Yes
No common name	<i>Cyrtandra gracilis</i>	E	HI; Believed to be extinct	Yes
Ha'iwale	<i>Cyrtandra munroi</i>	E	HI	Yes
Ha'iwale	<i>Cyrtandra polyantha</i>	E	HI	Yes
Ha'iwale	<i>Cyrtandra sessilis</i>	E	HI	Yes
Ha'iwale	<i>Cyrtandra subumbellata</i>	E	HI	Yes
Ha'iwale	<i>Cyrtandra tintinnabula</i>	E	HI	Yes
Haiwale	<i>Cyrtandra wagneri</i>	E	HI	No
No common name	<i>Cyrtandra waiolani</i>	E	HI; Believed to be extinct	Yes
No common name	<i>Daphnopsis hellerana</i>	E	PR	No
Beautiful pawpaw	<i>Deeringothamnus pulchellus</i>	E	FL	No
No common name	<i>Delissea rhytidosperra</i>	E	HI	Yes
Oha	<i>Delissea subcordata</i>	E	HI	Yes
No common name	<i>Delissea undulata</i>	E	HI	Yes
Baker's larkspur	<i>Delphinium bakeri</i>	E	CA	Yes
Asplenium-leaved diellia	<i>Diellia erecta</i>	E	HI	Yes
No common name	<i>Diellia falcata</i>	E	HI	Yes
No common name	<i>Diellia mannii</i>	E	HI	Yes
No common name	<i>Diellia pallida</i>	E	HI	Yes
No common name	<i>Diellia unisora</i>	E	HI	Yes
No common name	<i>Diplazium molokaiense</i>	E	HI	Yes
No common name	<i>Doryopteris angelica</i>	E	HI	Yes
Na'ena'e	<i>Dubautia imbricata</i>	E	HI	Yes
Naenae	<i>Dubautia kalalauensis</i>	E	HI	Yes
Naenae	<i>Dubautia kenwoodii</i>	E	HI	Yes
Na'ena'e	<i>Dubautia latifolia</i>	E	HI	Yes
Na'ena'e	<i>Dubautia plantaginea magnifolia</i>	E	HI	Yes
Fosberg's love grass	<i>Eragrostis fosbergii</i>	E	HI	Yes
San Mateo woolly sunflower	<i>Eriophyllum latilobum</i>	E	CA	No

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Uvillo	<i>Eugenia haematocarpa</i>	E	PR	No
Nioi	<i>Eugenia koolauensis</i>	E	HI	Yes
No common name	<i>Eugenia woodburyana</i>	E	PR	No
'Akoko	<i>Euphorbia haelealeana</i>	E	HI	Yes
Heau	<i>Exocarpos luteolus</i>	E	HI	Yes
No common name	<i>Festuca molokaiensis</i>	E	HI	No
Mehamehame	<i>Flueggea neowawraea</i>	E	HI	Yes
Mexican flannelbush	<i>Fremontodendron mexicanum</i>	E	CA	Yes
Gentner's fritillary	<i>Fritillaria gentneri</i>	E	CA, OR	No
El Dorado bedstraw	<i>Galium californicum</i> ssp. <i>sierrae</i>	E	CA	No
Hawaiian gardenia (=Na'u)	<i>Gardenia brighamii</i>	E	HI	No
Nanu	<i>Gardenia mannii</i>	E	HI	Yes
Nohoanu	<i>Geranium multiflorum</i>	E	HI	Yes
No common name	<i>Gesneria pauciflora</i>	T	PR	No
Spreading avens	<i>Geum radiatum</i>	E	NC, TN	No
Beautiful goetzea	<i>Goetzea elegans</i>	E	PR	No
No common name	<i>Gonocalyx concolor</i>	E	PR	Yes
Rock gnome lichen	<i>Gymnoderma lineare</i>	E	NC, SC, TN, VA	No
Higo chumbo	<i>Harrisia portoricensis</i>	T	PR	No
Pilo	<i>Hedyotis mannii</i>	E	HI	Yes
Roan Mountain bluet	<i>Hedyotis purpurea</i> var. <i>montana</i>	E	NC, TN, VA	No
Ufa-halomtano	<i>Heritiera longipetiolata</i>	PE	GU, NMI	No
No common name	<i>Hesperomannia arborescens</i>	E	HI	Yes
No common name	<i>Hesperomannia arbuscula</i>	E	HI	Yes
No common name	<i>Hesperomannia lydgatei</i>	E	HI	Yes
Kauai hau kuahiwi	<i>Hibiscadelphus distans</i>	E	HI	No
Hau kuahiwi	<i>Hibiscadelphus giffardianus</i>	E	HI	Yes
Hau kuahiwi	<i>Hibiscadelphus hualalaiensis</i>	E	HI	Yes
Hau kuahiwi	<i>Hibiscadelphus woodii</i>	E	HI	Yes
Koki'o ke'oke'o	<i>Hibiscus arnotianus</i> ssp. <i>immaculatus</i>	E	HI	Yes
(=Native yellow hibiscus) ma'o hau hele	<i>Hibiscus brackenridgei</i>	E	HI	Yes
Clay's hibiscus	<i>Hibiscus clayi</i>	E	HI	Yes
Koki'o ke'oke'o	<i>Hibiscus waimeae</i> ssp. <i>hannerae</i>	E	HI	Yes
Mountain golden heather	<i>Hudsonia montana</i>	T	NC	Yes
Wawae'iole	<i>Huperzia mannii</i>	E	HI	Yes
Wawae'iole	<i>Huperzia nutans</i>	E	HI	Yes
Cook's holly	<i>Ilex cookii</i>	E	PR	No
No common name	<i>Ilex sintenisii</i>	E	PR	No
Pagosa skyrocket	<i>Ipomopsis polyantha</i>	E	CO	Yes
Holy Ghost ipomopsis	<i>Ipomopsis sancti-spiritus</i>	E	NM	No
Aupaka	<i>Isodendron laurifolium</i>	E	HI	Yes
Aupaka	<i>Isodendron longifolium</i>	T	HI	Yes
Kula wahine noho	<i>Isodendron pyrifolium</i>	E	HI	Yes
Small-whorled pogonia	<i>Isotria medeoloides</i>	T	CT, DE, GA, IL, MA, ME, MI, MO, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, WV, VT, MD, DC	No
Webber ivesia	<i>Ivesia webberi</i>	T	CA, NV	Yes
West Indian walnut (=Nogal)	<i>Juglans jamaicensis</i>	E	PR	No
Kio'ele	<i>Kadua coriacea</i>	E	HI	Yes
No common name	<i>Kadua degeneri</i>	E	HI	Yes

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
No common name	<i>Kadua parvula</i>	E	HI	Yes
Cooke's koki'o	<i>Kokia cookei</i>	E	HI	No
Koki'o	<i>Kokia kauaiensis</i>	E	HI	Yes
Hulumoa	<i>Korthalsella degeneri</i>	E	HI	Yes
Kamakahala	<i>Labordia helleri</i>	E	HI	Yes
Kamakahala	<i>Labordia lydgatei</i>	E	HI	Yes
Kamakahala	<i>Labordia tinifolia</i> var. <i>lanaiensis</i>	E	HI	No
Kamakahala	<i>Labordia triflora</i>	E	HI	Yes
Texas golden gladeceess	<i>Leavenworthia texana</i>	E	TX	Yes
No common name	<i>Lepanthes eltoroensis</i>	E	PR	No
San Bernardino Mountains bladderpod	<i>Lesquerella kingii</i> ssp. <i>bernardina</i>	E	CA	Yes
Nehe	<i>Lipochaeta fauriei</i>	E	HI	Yes
Nehe	<i>Lipochaeta micrantha</i>	E	HI	Yes
San Clemente Island woodland-star	<i>Lithophragma maximum</i>	E	CA	No
No common name	<i>Lysimachia maxima</i>	E	HI	Yes
No common name	<i>Lysimachia venosa</i>	E	HI	Yes
No common name	<i>Mariscus fauriei</i>	E	HI	Yes
Nehe	<i>Melanthera tenuifolia</i>	E	HI	Yes
Alani	<i>Melicope adscendens</i>	E	HI	Yes
Alani	<i>Melicope balloui</i>	E	HI	Yes
Alani	<i>Melicope christophersenii</i>	E	HI	Yes
Alani	<i>Melicope degeneri</i>	E	HI	Yes
Alani	<i>Melicope haupuensis</i>	E	HI	Yes
Alani	<i>Melicope hiiakae</i>	E	HI	Yes
Alani	<i>Melicope knudsenii</i>	E	HI	Yes
Alani	<i>Melicope lydgatei</i>	E	HI	Yes
Alani	<i>Melicope makahae</i>	E	HI	Yes
Alani	<i>Melicope mucronulata</i>	E	HI	Yes
Alani	<i>Melicope pallida</i>	E	HI	Yes
Alani	<i>Melicope paniculata</i>	E	HI	Yes
Alani	<i>Melicope quadrangularis</i>	E	HI	No
Alani	<i>Melicope reflexa</i>	E	HI	Yes
Alani	<i>Melicope saint-johnii</i>	E	HI	Yes
Alani	<i>Melicope zahlbruckneri</i>	E	HI	Yes
No common name	<i>Mitracarpus maxwelliae</i>	E	PR	No
No common name	<i>Mitracarpus polycladus</i>	E	PR	No
No common name	<i>Munroidendron racemosum</i>	E	HI	Yes
No common name	<i>Myrcia paganii</i>	E	PR	No
Kolea	<i>Myrsine juddii</i>	E	HI	Yes
Kolea	<i>Myrsine linearifolia</i>	T	HI	Yes
Kolea	<i>Myrsine mezii</i>	E	HI; Believed to be extinct	Yes
No common name	<i>Neraudia angulata</i>	E	HI	Yes
No common name	<i>Neraudia ovata</i>	E	HI	Yes
`Aiea	<i>Nothocestrum breviflorum</i>	E	HI	Yes
`Aiea	<i>Nothocestrum peltatum</i>	E	HI	Yes
Holei	<i>Ochrosia kilaueaensis</i>	E	HI	No
No common name	<i>Osmoxylon mariannense</i>	E	NMI	No
Palo de rosa	<i>Ottoschulzia rhodoxylon</i>	E	PR	No
`Ala `ala wai nui	<i>Peperomia subpetiolata</i>	E	HI	No
Wheeler's peperomia	<i>Peperomia wheeleri</i>	E	PR	No
Yreka phlox	<i>Phlox hirsuta</i>	E	CA	No
No common name	<i>Phyllostegia bracteata</i>	E	HI	No
No common name	<i>Phyllostegia floribunda</i>	E	HI	No
No common name	<i>Phyllostegia glabra</i> var. <i>lanaiensis</i>	E	HI	No
No common name	<i>Phyllostegia haliakalae</i>	E	HI	No

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No common name	<i>Phyllostegia hirsuta</i>	E	HI	Yes
No common name	<i>Phyllostegia hispida</i>	E	HI	No
No common name	<i>Phyllostegia kaalaensis</i>	E	HI	Yes
No common name	<i>Phyllostegia knudsenii</i>	E	HI	Yes
No common name	<i>Phyllostegia mannii</i>	E	HI	Yes
No common name	<i>Phyllostegia mollis</i>	E	HI	Yes
No common name	<i>Phyllostegia parviflora</i>	E	HI	Yes
No common name	<i>Phyllostegia pilosa</i>	E	HI	No
Kiponapona	<i>Phyllostegia racemosa</i>	E	HI	Yes
No common name	<i>Phyllostegia velutina</i>	E	HI	Yes
No common name	<i>Phyllostegia warshaueri</i>	E	HI	Yes
No common name	<i>Phyllostegia wawrana</i>	E	HI	Yes
Key tree cactus	<i>Pilosocereus robinii</i>	E	FL	No
Yadon's piperia	<i>Piperia yadonii</i>	E	CA	Yes
No common name	<i>Pittosporum hawaiiense</i>	E	HI	No
Ho`awa	<i>Pittosporum napaliense</i>	E	HI	Yes
No common name	<i>Platydesma comuta</i>	E	HI	Yes
No common name	<i>Platydesma comuta decurrens</i>	E	HI	Yes
No common name	<i>Platydesma remyi</i>	E	HI	No
Pilo kea lau li`i	<i>Platydesma rostrata</i>	E	HI	Yes
Chupacallos	<i>Pleodendron macranthum</i>	E	PR	No
Hala pepe	<i>Pleomele fernaldii</i>	E	HI	No
Hala pepe	<i>Pleomele forbesii</i>	E	HI	Yes
Hala pepe	<i>Pleomele hawaiiensis</i>	E	HI	Yes
Mann's bluegrass	<i>Poa mannii</i>	E	HI	Yes
Hawaiian bluegrass	<i>Poa sandwicensis</i>	E	HI	Yes
No common name	<i>Poa siphonoglossa</i>	E	HI	Yes
Lewton's polygala	<i>Polygala lewtonii</i>	E	FL	No
Tiny polygala	<i>Polygala smallii</i>	E	FL	No
No common name	<i>Polystichum calderonense</i>	E	PR	No
Lo`ulu	<i>Pritchardia affinis</i>	E	HI	No
(=Na`ena`e) lo`ulu	<i>Pritchardia hardyi</i>	E	HI	No
Lo`ulu	<i>Pritchardia kaalae</i>	E	HI	No
Lo`ulu	<i>Pritchardia munroi</i>	E	HI	Yes
Lo`ulu	<i>Pritchardia napaliensis</i>	E	HI	No
Lo`ulu	<i>Pritchardia remota</i>	E	HI	Yes
Lo`ulu	<i>Pritchardia schattaueri</i>	E	HI	No
Lo`ulu	<i>Pritchardia viscosa</i>	E	HI	No
Kopiko	<i>Psychotria grandiflora</i>	E	HI	Yes
Oahu wild coffee (=kopiko)	<i>Psychotria hexandra</i> ssp. <i>oahuensis</i>	E	HI	Yes
Kopiko	<i>Psychotria hobdyi</i>	E	HI	Yes
Kaulu	<i>Pteralyxia kauaiensis</i>	E	HI	Yes
Kaulu	<i>Pteralyxia macrocarpa</i>	E	HI	Yes
No common name	<i>Pteris lidgatei</i>	E	HI, PR	Yes
No common name	<i>Remya kauaiensis</i>	E	HI	Yes
Maui remya	<i>Remya mauiensis</i>	E	HI	Yes
Miccosukee gooseberry	<i>Ribes echinellum</i>	T	FL, SC	No
Lanai sandalwood (=`iliahi)	<i>Santalum freycinetianum</i> var. <i>lanaiense</i>	E	HI	No
No common name	<i>Schiedea attenuata</i>	E	HI	Yes
No common name	<i>Schiedea diffusa</i> ssp. <i>macraei</i>	E	HI	No
Ma`oli`oli	<i>Schiedea hawaiiensis</i>	E	HI	No
No common name	<i>Schiedea helleri</i>	E	HI	Yes
No common name	<i>Schiedea hookeri</i>	E	HI	Yes
No common name	<i>Schiedea jacobii</i>	E	HI	No
No common name	<i>Schiedea kaalae</i>	E	HI	Yes
No common name	<i>Schiedea kauaiensis</i>	E	HI	Yes

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Ma'oli'oli	<i>Schiedea kealiae</i>	E	HI	Yes
No common name	<i>Schiedea membranacea</i>	E	HI	Yes
No common name	<i>Schiedea nuttallii</i>	E	HI	Yes
No common name	<i>Schiedea obovata</i>	E	HI	Yes
No common name	<i>Schiedea spargulina</i> var. <i>leiopoda</i>	E	HI	Yes
No common name	<i>Schiedea spargulina</i> var. <i>spargulina</i>	T	HI	Yes
Lauhilihi	<i>Schiedea stellarioides</i>	E	HI	Yes
No common name	<i>Schiedea trinervis</i>	E	HI	Yes
No common name	<i>Schoepfia arenaria</i>	T	PR	No
Large-flowered skullcap	<i>Scutellaria montana</i>	T	GA, TN	No
Hayun lagu (=Guam), Tronkon guafi (Rota))	<i>Serianthes nelsonii</i>	E	GU, NMI	No
'Anunu	<i>Sicyos alba</i>	E	HI	Yes
No common name	<i>Silene alexandri</i>	E	HI	Yes
No common name	<i>Silene perlmanni</i>	E	HI	Yes
Fringed campion	<i>Silene polypetala</i>	E	FL, GA	No
White irisette	<i>Sisyrinchium dichotomum</i>	E	NC, SC	No
Erubia	<i>Solanum drymophilum</i>	E	PR	No
Popolo ku mai	<i>Solanum incompletum</i>	E	HI	Yes
'Aiakeakua, popolo	<i>Solanum sandwicense</i>	E	HI	Yes
White-haired goldenrod	<i>Solidago albopilosa</i>	T	KY	No
No common name	<i>Spermolepis hawaiiensis</i>	E	HI	Yes
Gentian pinkroot	<i>Spigelia gentianoides</i>	E	AL, FL	No
No common name	<i>Stenogyne bifida</i>	E	HI	Yes
No common name	<i>Stenogyne campanulata</i>	E	HI	Yes
No common name	<i>Stenogyne cranwelliae</i>	E	HI	No
No common name	<i>Stenogyne kanehoana</i>	E	HI	Yes
No common name	<i>Stenogyne kauaulaensis</i>	E	HI	No
No common name	<i>Stenogyne kealiae</i>	E	HI	Yes
Palo de jazmin	<i>Styrax portoricensis</i>	E	PR	No
No common name	<i>Tabernaemontana rotensis</i>	PT	GU, NMI	No
No common name	<i>Tectaria estremarana</i>	E	PR	No
Palo Colorado	<i>Ternstroemia luquillensis</i>	E	PR	No
No common name	<i>Ternstroemia subsessilis</i>	E	PR	No
No common name	<i>Tetraplasandra bisattenuata</i>	E	HI	Yes
No common name	<i>Tetraplasandra flynnii</i>	E	HI	Yes
'Ohe'ohe	<i>Tetraplasandra gymnocarpa</i>	E	HI	Yes
No common name	<i>Tetraplasandra lydgatei</i>	E	HI	Yes
No common name	<i>Thelypteris verucunda</i>	E	PR	No
No common name	<i>Thelypteris yaucoensis</i>	E	PR	No
Florida torreyia	<i>Torreya taxifolia</i>	E	FL, GA	No
Bariaco	<i>Trichilia triacantha</i>	E	PR	No
Florida bristle fern	<i>Trichomanes punctatum</i> ssp. <i>floridanum</i>	PE	FL	No
Running buffalo clover	<i>Trifolium stoloniferum</i>	E	AR, IN, KY, MO, OH, WV, KS, IL	No
Monterey clover	<i>Trifolium trichocalyx</i>	E	CA	No
Persistent trillium	<i>Trillium persistens</i>	E	GA, SC	No
Relict trillium	<i>Trillium reliquum</i>	E	AL, GA, SC	No
Opuhe	<i>Urera kaalae</i>	E	HI	Yes
No common name	<i>Varronia rupicola</i>	T	PR	Yes
Hawaiian vetch	<i>Vicia menziesii</i>	E	HI	No
No common name	<i>Viola helenae</i>	E	HI	Yes
Wide-leaf warea	<i>Warea amplexifolia</i>	E	FL	No
Carter's mustard	<i>Warea carteri</i>	E	FL	No
No common name	<i>Wikstroemia villosa</i>	E	HI	No

Common Name	Scientific Name	Status	State(s) Found	Critical Habitat Designated?
No common name	<i>Xylosma crenatum</i>	E	HI	Yes
A'e	<i>Zanthoxylum dipetalum</i> var. <i>tomentosum</i>	E	HI	Yes
A'e	<i>Zanthoxylum hawaiiense</i>	E	HI	Yes
A'e	<i>Zanthoxylum oahuense</i>	E	HI	Yes
St. Thomas prickly-ash	<i>Zanthoxylum thomasianum</i>	E	PR, VI	No
Florida ziziphus	<i>Ziziphus celata</i>	E	FL	No
Haha	<i>Cyanea mceldowneyi</i>	E	HI	Yes
Koki'o	<i>Kokia drynarioides</i>	E	HI	Yes

Source: (U.S. Fish and Wildlife Service, 2014m)

E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened

4.12 Species Sub-Group Habitats within Action Area

Table 4-10 lists species groups and habitat classifications (sub-groups) and whether those habitats occur within the Action Area (see discussion in Section 4.3 for the process used to determine whether a habitat occurs in the Action Area).

Table 4-10: Species Sub-Group Habitats within Action Area

Species Group/Sub-Group	Habitat is in Action Area?
Mammals	
Wetland Mammals	Yes
Nearshore Marine Mammals	Yes
Offshore Marine Mammals	No
Beach Mammals	Yes
Barren Land Mammals	Yes
Rangeland Mammals	Yes
Forest Land Mammals	Yes
Perennial Snow or Ice Mammals	No ¹
Birds	
Forested Wetland Birds	Yes
Nonforested Wetland Birds	Yes
Freshwater Birds	Yes
Nearshore Marine Birds	Yes
Offshore Marine Birds	No ²
Beach Birds	Yes
Rangeland Birds	Yes
Forest Land Birds	Yes
Reptiles	
Wetland Reptiles	Yes
Offshore Marine Reptiles	No ³
Inland Sandy Area Reptiles	Yes
Rangeland Reptiles	Yes
Evergreen Forest Reptiles	Yes
Amphibians	
Wetland Amphibians	Yes
Freshwater Amphibians	Yes
Cave Amphibians	Yes
Forest Land Amphibians	Yes
Fish	
Freshwater Resident Fish	Yes
Nearshore Marine Fish	Yes
Anadromous Fish	Yes
Cave Fish	Yes
Invertebrates	

Species Group/Sub-Group	Habitat is in Action Area?
Forested Wetland Invertebrates	Yes
Nonforested Wetland Invertebrates	Yes
Freshwater Invertebrates	Yes
Nearshore Marine Invertebrates	Yes
Beach Invertebrates	Yes
Barren Land Invertebrates	Yes
Cave Invertebrates	Yes
Rangeland Invertebrates	Yes
Forest Land Invertebrates	Yes
Plants	
Forested Wetland Plants	Yes
Nonforested Wetland Plants	Yes
Freshwater Plants	Yes
Nearshore Marine Plants	Yes
Beach Plants	Yes
Inland Sandy Area Plants	Yes
Rangeland Plants	Yes
Forest Land Plants	Yes

5 ESSENTIAL FISH HABITAT ASSESSMENT

5.1 Introduction

In this document, primarily to improve readability, EFH is defined as designated essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act.

Productive commercial and recreational fisheries in the U.S. are linked to healthy marine habitats, which in turn support local fishing communities. Pursuant to Section 303(a)(7) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; P. Law 94-265) (National Marine Fisheries Service, 2007b), as amended by the Sustainable Fisheries Act of 1996 (P. Law 104-267), regional Fishery Management Councils (FMCs) must prepare Fishery Management Plans (FMPs) which include the identification of Essential Fish Habitat (EFH) used by all life history stages of each managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity... 'Waters' includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle." (National Marine Fisheries Service, 2004).

To provide additional focus for conservation efforts, a HAPC is identified for those EFHs judged to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation. HAPCs may be a general habitat type in a particular region (e.g., all escarpments and slopes between 40-280 meters deep), or may be a specific location (e.g., the Ten-Fathom Ledge in Key West, Florida) (National Marine Fisheries Service, 2001).

Under the MSA, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance these habitats. NOAA Fisheries and the eight regional FMCs, under the authority of the Secretary of Commerce, are mandated to describe and identify EFH in each FMP; minimize to the extent practicable the adverse effects of commercial fishing on EFH; and identify other actions to encourage the conservation and enhancement of EFH (50 C.F.R. § 600.805-930). NOAA Fisheries and the regional FMCs also identify HAPCs (National Marine Fisheries Service, 2015b). The MSA requires cooperation among NOAA Fisheries, the regional FMCs, and Federal and State agencies to protect, conserve, and enhance EFH.

Pursuant to Section 305(b)(2) of the MSA, a Federal agency must consult with NOAA Fisheries on all activities, or proposed activities, authorized, funded, or undertaken that might adversely affect EFH. As part of the EFH consultation process, Federal agencies must prepare a written EFH Assessment describing the effects of that action on EFH. An EFH Assessment is a necessary component for efficient and effective consultations between a Federal action agency and NOAA Fisheries. NOAA Fisheries recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA, Section 7 of the ESA, or the Fish and Wildlife Coordination Act. NOAA Fisheries must provide the Federal agency with EFH consultation recommendations for any action that may adversely affect EFH (50 C.F.R. § 600.805-930).

5.2 National Distribution of EFH

Eight regional FMCs have jurisdiction within the Action Area, defined in this BE as the jurisdiction of the NFIP participating communities, including those areas in the United States and its territories designated as SFHAs on a FIRM under the NFIP and the nearshore marine waters²⁰ that may be affected by the Proposed Action within the mapped SFHA. Secretarial FMPs have been developed by NOAA Fisheries for highly migratory species that may occupy waters under the jurisdiction of multiple FMCs. The geographic regions within the Action Area over which these regional FMCs have jurisdiction are shown in Figure 5-1 and described below.

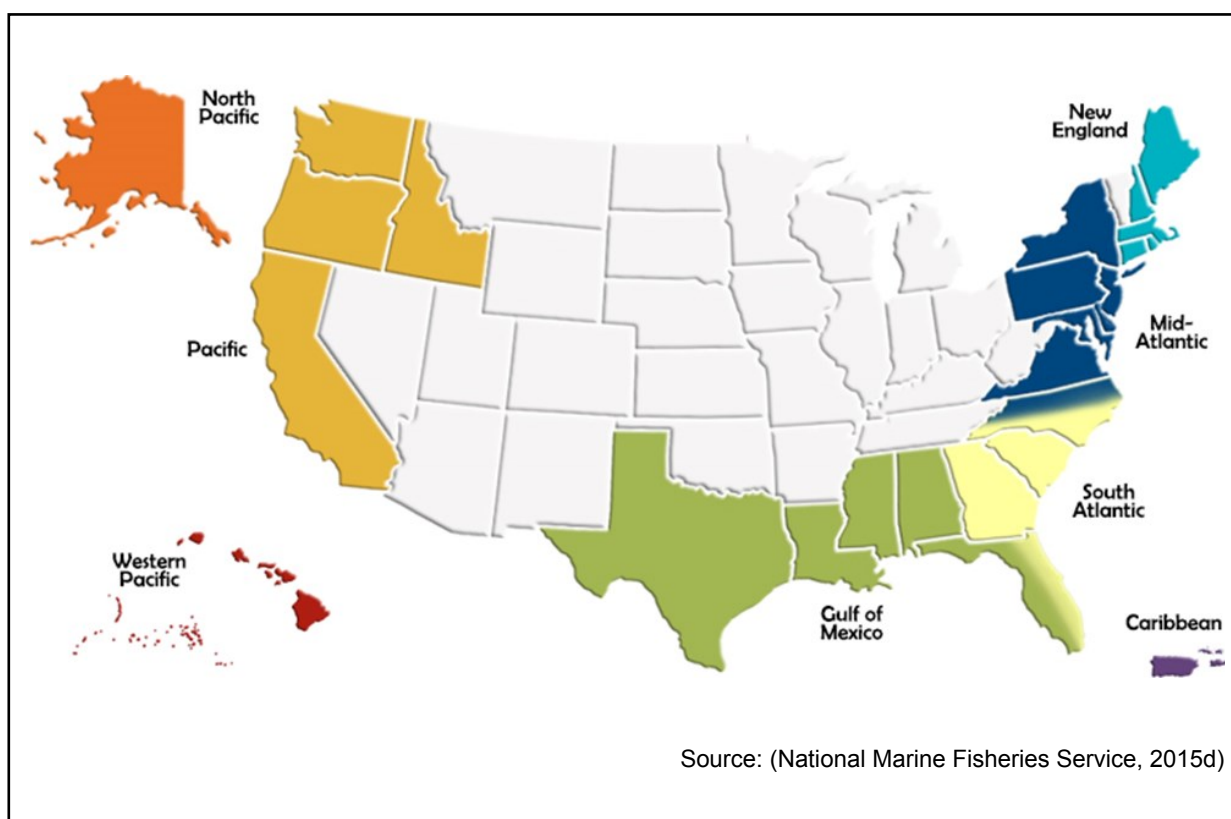
- **Pacific FMC:** The Pacific FMC regulates the anadromous and marine fish resources of California, Oregon, Washington, and Idaho. The Pacific FMC has designated marine and estuarine waters as EFH for federally managed groundfish (Pacific Fishery Management Council, 2014a), coastal pelagic species (Pacific Fishery Management Council, 2011), and Pacific salmon (Pacific Fishery Management Council, 2014b) along and to the west of the California, Oregon, and Washington coasts. EFH for Pacific salmon extends into freshwater streams and rivers within the region, including waters used by anadromous fish in Idaho.
- **Western Pacific FMC:** The Western Pacific FMC has responsibility for the marine fish resources of Samoa, Guam, Hawaii, and the Mariana Islands. EFH designated marine and estuarine waters in the FMC include federally managed groundfish, precious corals, and coral reef fish (National Marine Fisheries Service, 2015c).
- **North Pacific FMC:** The anadromous and marine fish resources of Alaska are under the jurisdiction of the North Pacific FMC. The North Pacific FMC has established EFH in the marine and estuarine waters along and offshore of the Alaska coast, including the Aleutian Islands and includes EFH in marine and estuarine waters for federally managed weathervane scallops, salmon, crabs, and groundfish (National Marine Fisheries Service, 2015c). EFH for North Pacific salmon extends into freshwater streams and rivers within the region.
- **New England FMC:** The New England FMC regulates the anadromous and marine fish resources of Maine, Massachusetts, New Hampshire, Rhode Island, and Connecticut. The New England FMC has designated marine and estuarine waters as EFH for federally managed groundfish, whiting, Atlantic herring, Atlantic salmon, sea scallop, skates, red crab, spiny dogfish, and monkfish along and to the east of the New England coast. EFH for Atlantic salmon extends into freshwater stream and rivers within the region; several rivers in Maine are of particular importance for these fish (New England Fishery Management Council, 2015).
- **Mid-Atlantic FMC:** Marine fish resources of New York, New Jersey, Delaware, Pennsylvania, Virginia, and North Carolina are under the jurisdiction of the Mid-Atlantic FMC. The Mid-Atlantic FMC has designated marine and estuarine waters as EFH for federally managed summer flounder, scup, black sea bass, Atlantic mackerel, squid, butterfish, bluefish, ocean quahog, surf clam, monkfish, golden tilefish, and spiny dogfish along and to the east of the New York, New Jersey, Delaware, Virginia, and North Carolina coasts. The monkfish and spiny dogfish fisheries are jointly managed with the New England FMC (Mid-Atlantic Fishery Management Council, 2015).
- **South Atlantic FMC:** The South Atlantic FMC is responsible for the marine fish resources along and offshore of the eastern coasts of Florida, Georgia, and South Carolina. The

²⁰ Nearshore marine waters are defined here as waters within a few hundred feet of the shoreline.

South Atlantic FMC has designated marine and estuarine waters as EFH for federally managed coastal migratory pelagic species, corals, golden crab, snapper grouper, and spiny lobster (South Atlantic Fishery Management Council, 2015).

- **Gulf of Mexico FMC:** The Gulf of Mexico FMC regulates marine fish resources along and offshore of the coasts of Texas, Louisiana, Mississippi, Alabama, and western Florida. EFH has been designated in marine and estuarine waters for federally managed coastal migratory pelagic species, corals, red drum, shrimp, spiny lobster, and several reef fish (National Marine Fisheries Service, 2015c). The five States within this FMC have Federal Coastal Zone Management (CZM) programs designed to protect, restore, and responsibly develop coastal communities (National Oceanic and Atmospheric Administration, 1999). Puerto Rico and the U.S. Virgin Islands are managed by the Caribbean FMC (National Oceanic and Atmospheric Administration Southeast Regional Office, 2010). The Caribbean FMC has designated marine and estuarine waters as EFH for federally managed queen conch, pelagic and benthic fish species, several reef fish, spiny lobster, and coral (National Marine Fisheries Service, 1999c).

Figure 5-1: Regional Fishery Management Councils



Secretarial FMPs have been developed by NOAA Fisheries for highly migratory species and include Amendment 1 to the Atlantic Billfish Fishery Management Plan and the Final Fishery Management Plan for Atlantic Tuna, Swordfish, and Sharks (National Marine Fisheries Service, 1999a) (National Marine Fisheries Service, 1999b). Highly migratory species are managed by the Highly Migratory Species Division, NOAA Fisheries (Pacific Fishery Management Council, 2003).

5.3 EFH Designations, Categories, and Descriptions

The information available for almost all EFH designations consists primarily of broad geographic distributions based on specific survey samples, which have not been linked with habitat characteristics. It is difficult to precisely define the habitat type (and its location) for each life stage of each managed species in terms of oceanographic (temperature, salinity, nutrient, current), trophic (presence of food, absence of predators), and physical (depth, substrate, latitude, and longitude) characteristics. Consequently, EFH designations are often defined by the species' position in the water column (e.g., demersal or pelagic), broad biogeographic and bathymetric areas (e.g., 100-200 meter zone), and occasional references to known bottom type associations (e.g., sand or rocky shelf) (National Marine Fisheries Service, 2007b).

In general, marine and estuarine habitats for EFH species are any ocean or estuarine waters or substrate necessary for the fish to spawn, breed, feed, or mature; these habitats include nearshore and offshore waters and extend from the shoreline to the Exclusive Economic Zone (EEZ), which is the area between 3 nautical miles (or 9 nautical miles, in the case of Texas, western Florida, and Puerto Rico) and 200 nautical miles of ocean that extend from the U.S. coast, or the coast of any territory over which the U.S. exercises sovereignty. Within the EEZ, the U.S. has the right to conserve and manage the natural resources of those waters and substrates, including implementation of the MSA (National Oceanic and Atmospheric Administration, 2015a). Exceptions to the EEZ boundary include continental shelf resources that may extend beyond the 200 nautical miles and any freshwater resources throughout an anadromous species' migratory range, except when that species is found in the freshwater resources of a foreign nation.

The information used to help determine the EFH categories described here was developed from a review of governmental, academic, and private sources, as well as best professional judgment by a team of biologists and ecologists. Species and populations were assigned to EFH categories based on the primary habitat used, even though some species may use other habitats at various times. Primary habitat is defined here as the habitat classification that meets most or all of a species' physical and biological needs for most or all of its life cycle.

To concisely describe the EFH designations at a national level, they have been grouped into the six categories (Table 5-1) and described in the following sections. Table 5-1 also notes which habitat classifications (described in Section 4.1) are components of each EFH category, whether a category supports ESA species, and if the habitats designated as a component of an EFH category occur in the Action Area (see Sections 4.2 and 4.3 for a discussion of how these determinations were made).

5.3.1 Anadromous EFH

EFH is designated for several species of anadromous fish that migrate into freshwater systems to spawn but spend the majority of their life cycle in the marine environment. EFH for anadromous species includes freshwater areas (e.g. rivers, streams, and forested wetlands); bays and estuaries; and nearshore and offshore marine waters.

The Pacific FMC manages the fisheries for coho, chinook, and Puget Sound pink salmon and has defined EFH for these three species. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers, and longstanding, naturally impassable barriers such as large waterfalls (Pacific States Marine Fisheries Commission, 1999).

Table 5-1: EFH Categories and Component Habitat Classifications within the Action Area

EFH Category and Component Habitat Classifications ^a	Supports Listed/ Proposed Species or Designated/Proposed Critical Habitat or EFH? ^b	Occurs within the Action Area?
Anadromous EFH		
Forested Wetland	Likely	Yes
Nonforested Wetland	Likely	Yes
Streams and Rivers	Likely	Yes
Lakes	Likely	Yes
Estuaries	Likely	Yes
Nearshore Marine Waters	Likely	Yes
Offshore Marine Waters	Likely	No
Nearshore Marine/Estuarine EFH		
Forested Wetland	Likely	Yes
Nonforested Wetland	Likely	Yes
Estuaries	Likely	Yes
Nearshore Marine Waters	Likely	Yes
Nearshore Marine/Estuarine Benthic EFH		
Estuaries	Likely	Yes
Nearshore Marine Waters	Likely	Yes
Offshore Marine Benthic EFH		
Offshore Marine Waters	Unlikely	No
Pelagic EFH		
Offshore Marine Waters	Unlikely	No
Coral Reef EFH		
Estuaries	Likely	Yes
Nearshore Marine Waters	Likely	Yes

^a Classifications are adapted from the Anderson Land Use Classification System (Anderson, Hardy, Roach, & Witmer, 1976), with minor modifications.

^b The determination that a habitat supports ESA species is based on whether a habitat is the primary habitat used by any ESA species for most of its life cycle and meets most or all of that species' physical and biological needs.

The North Pacific FMC manages the fisheries for chinook, chum, coho, pink, and sockeye salmon and has defined EFH for these five species. In bays, estuaries, and marine waters, North Pacific salmon EFH extends from the Alaska to the EEZ limit. In freshwater, salmon EFH includes all the lakes, streams, ponds, rivers, wetlands, and other bodies of water that have been historically accessible to salmon in Alaska. The description of EFH also includes areas above artificial barriers, except for certain barriers and dams that fish cannot pass. However, activities that occur above these barriers, and that are likely to affect salmon below the barriers, may be affected by EFH rulings. Table 5-2 summarizes information regarding the FMPs with EFH designations included within the anadromous category.

Table 5-2: Anadromous EFH

Anadromous EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Atlantic Salmon	New England	1
Alaska Salmon	North Pacific	5
West Coast Salmon	Pacific	3

Source: (National Oceanic and Atmospheric Administration, 2015e)

The EFH for Atlantic salmon, managed by the New England FMC, is described as all waters currently or historically accessible to Atlantic salmon within the streams, rivers, lakes, ponds, wetlands, and other water bodies of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Oceanic adult Atlantic salmon are primarily pelagic and range from the waters of the continental shelf off southern New England north throughout the Gulf of Maine (New England Fishery Management Council, 1998a).

Some examples of freshwater Habitat Areas of Particular Concern (HAPC) include streams, rivers, lakes, tributaries, and any other freshwater areas that are used by Anadromous species, such as 11 rivers in Maine which the Atlantic salmon is known to use for spawning (New England Fishery Management Council, 1998b) (National Marine Fisheries Service, 2001).

All of the anadromous salmon species mentioned above, with the exception of the pink and Puget Sound pink, have populations that are listed or proposed ESA species. The listed or proposed populations of coho, sockeye, chinook, and chum salmon species are separated into a total of 18 different populations. Of these 18 populations, 4 are endangered and 14 are threatened. The Atlantic salmon has one endangered population. Critical habitat is designated for all ESA listed or proposed populations except for the North Pacific Basin population of coho salmon.

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered to be representative for EFH that serves Anadromous fish (Pacific Fishery Management Council, 2014c) (North Pacific Fishery Management Council, 2012) (National Oceanic and Atmospheric Administration, 2014b) (National Marine Fisheries Service Alaska Region, 2011).

- Fishing activities threaten anadromous EFH through the introduction of fishing equipment, removal of salmon prey, and reduction of nutrients due to fewer salmon carcasses in spawning grounds. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.
- Commercial fishing methods such as dredging and trawling threaten anadromous EFH by smoothing or suspension of sediments, moving bottom substrate, and removing aquatic plants and organisms. FMCs limit where and how often these disturbances can occur to address these threats.
- Hydropower and flood control dams threaten anadromous EFH by preventing access to spawning grounds. NMFS consults on the construction and maintenance of such structures and may recommend the construction of fish-friendly dams or ancillary structures that allow fish passage.
- Pesticides and other contaminants entering anadromous EFH can threaten the water quality and organism abundance of spawning locations. NMFS may suggest best management practices and consult on the use of pesticides within and near anadromous spawning EFH.

- Urban and suburban development causing a diverse set of effects to Anadromous EFH including increased runoff, loss of riparian zones, and channelization of rivers and streams used for spawning. NMFS may suggest best management practices and encourage comprehensive land-use management plans, removal of unused impervious surfaces, or protecting/restoring riparian zones in EFH areas.
- Mining, both in and out of the water, may threaten anadromous EFH by altering groundwater hydrology, increasing sedimentation, acid mine drainage, and changing the water temperature and oxygen composition. To address this threat NMFS may consult on such activities and request the reclamation of mine waste, restoration of EFH affected by mining, and avoidance of mining in and near EFH.
- Organic and inorganic human waste may affect anadromous EFH by entangling species and introducing toxic substances into the EFH. NMFS may encourage proper trash disposal and refuse plans, including structural controls that collect debris, and educating the public on reducing the amount of trash generated and disposing of trash properly.

5.3.2 Nearshore Marine/Estuarine EFH

Nearshore marine/estuarine EFH is designated for a number of fish, sharks, and invertebrate species that use estuaries, bays, and nearshore marine waters. Some examples of nearshore marine/estuarine species with EFH include herring, sardines, sandbar shark, red drum, bull shark, bluefish, and surf clam (National Marine Fisheries Service, 2015c). These species generally spend all or most of their life (egg-larvae-juvenile-adult-spawning) within the estuarine or nearshore marine water column. Nearshore marine/estuarine habitat includes the open waters of estuaries and bays, and nearshore marine waters along the surf zone and shoreline. Estuarine habitats also include intertidal habits associated with bays and estuaries such as nonforested wetlands (e.g. salt marsh and mud flats), forested wetlands (e.g. mangrove forest), and estuarine and aquatic plant and algal beds (seagrass, kelp, etc.). EFH for nearshore marine/estuarine species is managed by the Gulf of Mexico, Mid-Atlantic, New England, North Pacific, and South Atlantic FMCs. Table 5-3 summarizes information regarding the FMPs with EFH designations included within the nearshore marine/estuarine category.

Table 5-3: Nearshore Marine/Estuarine EFH

Nearshore Marine/Estuarine EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Coastal Migratory Pelagics of the Gulf of Mexico	Gulf of Mexico	3
Gulf of Mexico Red Drum	Gulf of Mexico	1
Consolidated Atlantic Highly Migratory Species—Nearshore Pelagic Sharks	Highly Migratory Species	16
Atlantic Bluefish	Mid-Atlantic	1
Atlantic Mackerel, Squid, and Butterfish	Mid-Atlantic	4
Atlantic Herring	New England	1
Fish Resources of the Arctic Management Area	North Pacific	3

Sources: (National Oceanic and Atmospheric Administration, 2015e) (National Marine Fisheries Service, 2008a)

Nearshore marine/estuarine HAPCs include, but are not limited to, coastal inlets, high salinity surf zones, mangrove and seagrass habitat, kelp beds, Biscayne Bay (Florida), and entire estuaries such as San Francisco Bay (South Atlantic Fishery Management Council, 2014a) (South Atlantic Fishery Management Council, 2014b) (Pacific Fishery Management Council, 2005) (National Marine Fisheries Service, 2001).

Of the species that have nearshore marine/estuarine EFH, one is an ESA species, the scalloped hammerhead shark. This highly migratory species is endangered (U.S. Fish and Wildlife Service, 2014j); critical habitat has not been designated for this species (U.S. Fish and Wildlife Service, 2015c).

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered to be representative for EFH that supports nearshore marine/estuarine fish and invertebrates (Pacific Fishery Management Council, 1998).

- Fishing activities threaten nearshore marine/estuarine EFH through over-harvesting and the introduction of fishing equipment. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.
- Wastewater discharge threatens nearshore marine/estuarine EFH by introducing nutrients and contaminants which leads to a degradation of water quality. To address this threat, NMFS may consult on wastewater management programs and request outfalls be placed offshore.
- Water intake structures can threaten nearshore marine/estuarine EFH by entrapment of fish and loss of prey species. To mitigate these threats, NMFS may request facilities be placed away from productive areas, restricting fish and prey species that are entrapped, and regulating the temperature of discharge.
- Urban development in coastal areas can threaten nearshore marine/estuarine EFH by increasing contaminant and sediment runoff and filling in aquatic areas. To address these threats, NMFS may consult on shoreline construction or fill placement in EFH, and encourage development of spill response plans, training, and prevention.

5.3.3 Nearshore Marine/Estuarine Benthic EFH

Nearshore marine/estuarine benthic fish and invertebrates live on, in, or near the bottom of shallow waters of bays and estuaries and nearshore marine waters, often in areas shallow enough to support photosynthesis. Some examples of nearshore marine/estuarine benthic species with EFH include yelloweye rockfish, Guam and Hawaii bottomfish, sea scallop, thorny skate, and summer flounder. Nearshore marine/estuarine benthic EFH includes many types of bottom habitats, such as submerged banks, benthic algae, kelp beds, seagrass beds, sand/shell bottoms, soft and hard bottoms, and gravel/cobble substrate. Nearshore marine/estuarine benthic EFH also includes rocky reefs (submerged rock outcrops and boulder fields) found at a range of relief and depths that provide shelter, and sometimes a food source with the colonization of algae, for small and juvenile fish as well as invertebrates and fish species.

Nearshore marine/estuarine benthic habitats also include the water-sediment interface used primarily by juvenile and adult invertebrates. The water-sediment interface is generally composed of the areas from the seafloor into the sediment to a depth of one meter.

Nearshore marine/estuarine benthic species generally spend all or most of their life cycle (egg-larvae-juvenile-adult-spawning) at the seafloor, although some species have a planktonic egg or larval stage in the water column that allows dispersal. EFH for nearshore marine/estuarine benthic species within the EEZ is managed by all eight FMCs. Table 5-4 summarizes information regarding the FMPs with EFH designations included within the nearshore marine/estuarine benthic category.

Nearshore marine/estuarine benthic HAPCs include, but are not limited to, benthic areas with gravel/cobble substrate, nearshore hard bottom areas, kelp beds, seagrass beds, live bottom

habitats such as soft coral or sponge beds, and living substrates in shallow waters (National Marine Fisheries Service, 2001).

Three nearshore marine/estuarine benthic fish with EFH are ESA listed or proposed; one is endangered and two are threatened. Critical habitat has been designated for all three species.

Table 5-4: Nearshore Marine/Estuarine Benthic EFH

Nearshore Marine/Estuarine Benthic EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Stone Crab	Gulf of Mexico	2
Gulf of Mexico Shrimp	Gulf of Mexico	6
Consolidated Atlantic Highly Migratory Species—Nearshore Benthic Sharks	Highly Migratory Species	2
Atlantic Surfclam and Ocean Quahog	Mid-Atlantic	2
Gulf of Alaska Groundfish	North Pacific	28
Pacific Coast Groundfish	Pacific	89
South Atlantic Shrimp	South Atlantic	5

Sources: (National Oceanic and Atmospheric Administration, 2015e) (Pacific Fishery Management Council, 2003) (National Oceanic and Atmospheric Administration Office of Sustainable Fisheries, 2015) (National Marine Fisheries Service, 2008a)

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered to be representative for EFH occupied by nearshore marine/estuarine benthic fish and invertebrates (Pacific Fishery Management Council, 1998).

- Fishing activities threaten nearshore benthic EFH through over-harvesting and the introduction of fishing equipment. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.
- Commercial fishing methods such as dredging and trawling threaten nearshore benthic EFH by disturbing and changing the bottom habitat, smoothing or suspension of sediments, increase in turbidity, removing bottom substrate and benthic biological characteristics, and changing the direction or velocity of water flow. FMCs limit where and how often these disturbances can occur to address these threats.
- Urban development in coastal areas can threaten nearshore benthic EFH by increasing contaminant and sediment runoff and the placement of fill in aquatic areas. To address these threats, NMFS may consult on shoreline construction in EFH, encourage development of spill response plans, training, and prevention, and restrict fills.

5.3.4 Offshore Marine Benthic EFH

Offshore marine benthic fish and invertebrates live on, in, or near the bottom of deeper, offshore marine waters that are typically too deep to support photosynthetic organisms. Some examples of offshore marine benthic species with EFH include spiny dogfish, Arctic cod, ocean quahog, and snow crab. Offshore benthic EFH occurs in all oceans which border the U.S. and its territories, and includes many types of bottom habitats, including submerged canyons, and the continental shelf and slope. Seamounts (submerged mountains) in offshore marine waters are a particularly important type of rocky reef and provide a productive and nutrient-rich environment in otherwise nutrient-deprived deep open ocean waters (National Oceanic and Atmospheric Administration

West Coast Region, 2015). Offshore marine benthic habitats also include the water-sediment interface used primarily by juvenile and adult invertebrates, such as clams, marine worms, and burrowing crustaceans. The water-sediment interface is generally composed of the areas from the seafloor into the sediment to a depth of one meter (North Pacific Fishery Management Council, 2014). Offshore marine benthic species generally spend all or most of their life cycles (egg-larvae-juvenile-adult-spawning) at or near the sea floor, although some species have a planktonic egg or larval stage in the water column that provides a means of dispersal. All eight FMCs manage EFH for offshore marine benthic species within the EEZ. The U.S. has the right to conserve and manage offshore marine benthic habitats within the EEZ and, in accordance with MSA Section 101, continental shelf resources that may be located beyond the EEZ. Table 5-5 summarizes information regarding the FMPs with EFH designations included within the offshore benthic category.

Offshore marine benthic HAPCs include, but are not limited to, benthic areas with gravel/cobble substrate, benthic Sargassum beds, offshore hard bottom areas, and living substrates in deep waters (National Marine Fisheries Service, 2001).

There are no offshore marine benthic fish with EFH that are also ESA species.

Table 5-5: Offshore Marine Benthic EFH

Offshore Marine Benthic EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Consolidated Atlantic Highly Migratory Species – Offshore Benthic Sharks	Highly Migratory Species	4
Spiny Dogfish	Mid-Atlantic	1
Summer Flounder, Scup, and Black Sea Bass	Mid-Atlantic	3
Tilefish	Mid-Atlantic	1
Atlantic Sea Scallop	New England	1
Monkfish	New England	1
New England Multispecies	New England	25
New England Skate	New England	7
Red Crab	New England	1
Alaska Scallops	North Pacific	1
Bering Sea/Aleutian Island Groundfish	North Pacific	24
Bering Sea/Aleutian Island King and Tanner Crabs	North Pacific	5
Calico Scallop	South Atlantic	1
South Atlantic Golden Crab	South Atlantic	3
Bottomfish and Seamount Groundfish of the Western Pacific Region	Western Pacific	22

Sources: (National Marine Fisheries Service, 2008a) (National Oceanic and Atmospheric Administration, 2015e) (National Oceanic and Atmospheric Administration Office of Sustainable Fisheries, 2015)

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered representative for EFH used by offshore marine benthic fish and invertebrates (Pacific Fishery Management Council, 1998).

- Improperly managed commercial or recreational fishing activities threaten offshore marine benthic EFH through over-harvesting and the entanglement of wildlife with fishing

equipment. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.

- Commercial fishing methods such as dredging and trawling threaten offshore marine benthic EFH by disturbing and changing the bottom habitat, smoothing or suspension of sediments, increasing turbidity, removing bottom substrate and benthic biological characteristics, and changing the direction or velocity of water flow. FMCs limit where and how often these disturbances can occur to address these threats.
- Oil and gas exploration threatens offshore marine benthic EFH through the seismic surveys used to identify oil and gas deposits, the installation and use of anchors, pipes, platform legs, etc., and the discharge of drilling muds. These activities cause the fish inhabiting the area to disperse, suspend sediments, increase turbidity, deplete oxygen, and introduce toxins and contaminants to the environment. To address these threats NMFS may encourage development of spill response plans, training, and prevention and request avoidance of highly productive fishing areas to the extent possible.

5.3.5 Pelagic EFH

Pelagic EFH consists of offshore marine waters and is designated for a number of pelagic species (those that primarily live in the water column away from the bottom). Some examples of pelagic species with EFH include tuna, pelagic sharks, billfish, and wahoo (National Marine Fisheries Service, 2015c). Pelagic EFH in the EEZ includes offshore marine waters associated with features such as seamounts, submerged banks and canyons, floating algal beds (Sargassum), and the continental shelf. Locations of pelagic species populations within the water column are highly dependent on and shift seasonally in response to water temperatures. In addition, many pelagic species migrate vertically within the water column on a daily basis to feed or avoid predation (Pacific Fishery Management Council, 2011). Pelagic species generally spend all or most of their life cycle (egg-larvae-juvenile-adult-spawning) within the marine water column. The Mid-Atlantic, New England, Pacific, and South Atlantic FMCs manage EFH for pelagic species within the EEZ. Table 5-6 summarizes information regarding the FMPs with EFH designations included within the pelagic category.

Table 5-6: Pelagic EFH

Pelagic EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Consolidated Atlantic Highly Migratory Species – Tuna	Highly Migratory Species	5
Consolidated Atlantic Highly Migratory Species – Swordfish	Highly Migratory Species	1
Consolidated Atlantic Highly Migratory Species – Offshore Pelagic Sharks	Highly Migratory Species	13
Consolidated Atlantic Highly Migratory Species – Billfish	Highly Migratory Species	4
U.S. West Coast Fisheries for Highly Migratory Species	Pacific	13
Dolphin and Wahoo	South Atlantic	2
Pelagic Sargassum Habitat	South Atlantic	1
Pelagic Fisheries of the Western Pacific Region	Western Pacific	18

Sources: (National Marine Fisheries Service, 2008a) (National Oceanic and Atmospheric Administration, 2015e) (National Oceanic and Atmospheric Administration Office of Sustainable Fisheries, 2015)

Pelagic HAPCs include, but are not limited to, pelagic Sargassum beds, banks in the EEZ that are shallower than 2,000 meters, and the water column to a depth of 1,000 meters that is above

seamounts (Western Pacific Regional Fishery Management Council, 2004) (South Atlantic Fishery Management Council, 2014a) (National Marine Fisheries Service, 2001).

No pelagic species that have EFH are ESA species.

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered to be representative for EFH used by pelagic fish (Pacific Fishery Management Council, 1998) (South Atlantic Fishery Management Council, 2014a).

- Fishing activities threaten pelagic EFH through over-harvesting and the introduction of fishing equipment. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.
- Oil and gas exploration threatens pelagic EFH through the seismic surveys that identify oil and gas deposits, the installation and use of anchors, pipes, platform legs, etc., and the discharge of drilling muds. These effects will cause the fish inhabiting the area to disperse, suspend sediments, increase turbidity, deplete oxygen, and introduce toxics and contaminants. To address these threats NMFS may encourage development of spill response plans, training, and prevention, and request avoidance of highly productive fishing areas to the extent possible.
- The discharge or spill of oil or other hazardous substances into the marine environment affects pelagic EFH by removing or degrading fish resources and prey. To minimize these effects, NMFS may encourage the development of spill response plans, training, and prevention.
- The harvest and collection of Sargassum disturbs pelagic EFH and threatens the habitat composition and availability of resources. To address this threat, FMCs restrict harvesting areas and times or require an official observer be present during harvesting.

5.3.6 Coral Reef EFH

EFH is designated for coral reef ecosystems and several fish and invertebrates that reside in coral or artificial reefs in marine nearshore waters and nearshore waters of bays and estuaries. Some examples of reef species with EFH include the spiny lobster, queen conch, rainbow parrotfish, reef sharks, and sand tilefish. Note that artificial reefs are placed in places where coral reefs used to be.

Characteristics of coral reefs are the presence of living and dead coral, calcium carbonate deposits, and high biodiversity (National Marine Fisheries Service, 1999c). Coral reefs can be found in nearshore tropical or temperate marine waters in a wide range of latitudes and depths, although they are most common in tropical, shallower waters (National Oceanic and Atmospheric Administration, 2015b). Because of their high biodiversity, coral reefs provide food, shelter, and breeding opportunities for a number of fish and invertebrate species. Reef corals represent a unique situation since in most cases they comprise the main component of their own habitat, the coral reef. Therefore, the condition of the coral species reflects the condition of their habitat. If corals are dead or dying, the coral reef is likely to degenerate. Many other organisms, including commercially important species (e.g., spiny lobster, rockfish, and grouper), rely on corals, directly or indirectly, for shelter, food and as spawning sites (Goenaga & Boulon, Jr., 1992).

Artificial reefs include human-made structures that provide three-dimensional relief above the seafloor. Artificial reefs are physical enhancements of the seafloor by purposeful or incidental deposition of various types of materials; such as shipwrecks and concrete structures placed on the seafloor. Artificial reefs provide shelter and feeding opportunities for a variety of fish species, as well as surface area for settlement, attachment, and colonization by benthic organisms, and are often used to enhance habitat in areas where natural reefs have been degraded. The value of artificial or structured habitat generally increases over time as epibenthic plants and animals, and finfish such as reef-dwelling demersal species, planktivores, and piscivores, colonize the reef.

Juvenile and adult life stages of fish use these reefs for protection, orientation, and as feeding areas. Adult fishes may also use the habitat as a spawning site.

Reef inhabitants generally spend all or most of their life (egg-larvae-juvenile-adult-spawning) within the reef environment. The South Atlantic, Gulf of Mexico, Western Pacific, and Caribbean FMCs have FMPs in place for all of the coral reef ecosystems; these ecosystems provide habitat for a variety of coral species and several hundred fish and invertebrate species. Some examples of reef habitats managed by these FMCs include soft and hard coral reefs, live/hard bottoms, and aquacultured live rock (National Oceanic and Atmospheric Administration Southeast Regional Office, 2015a). Table 5-7 summarizes information regarding the FMPs with EFH designations included within the reef category.

Reef HAPCs include, but are not limited to, coral reefs off the central east coast of Florida, artificial reefs in the south Atlantic, the Dry Tortugas coral reef in Florida, and some coral reefs in California and the Hawaiian Islands (National Oceanic and Atmospheric Administration West Coast Region, 2015) (National Marine Fisheries Service, 2001).

Table 5-7: Reef EFH

Reef EFH (by FMP)	Geographic Region (by FMC)	Number of Species in FMP
Corals and Reef-Associated Invertebrates of Puerto Rico and the U.S. Virgin Islands	Caribbean	unknown *
Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands	Caribbean	9
Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands	Caribbean	84
Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands	Caribbean	1
Coral and Coral reefs of the Gulf of Mexico	Gulf of Mexico	unknown *
Gulf of Mexico Spiny Lobster	Gulf of Mexico	2
Reef Fish Resources of the Gulf of Mexico	Gulf of Mexico	32
Consolidated Atlantic Highly Migratory Species—Reef Sharks	Highly Migratory Species	2
Coral, Coral Reefs, and Live/hard Bottom Habitats of the South Atlantic Region	South Atlantic	unknown *
South Atlantic Spiny Lobster	South Atlantic	2
South Atlantic Snapper-Grouper	South Atlantic	70
Coral Reef Ecosystems of the Western Pacific Region	Western Pacific	unknown *
Crustaceans Fisheries of the Western Pacific Region	Western Pacific	2
Precious Corals Fisheries of the Western Pacific Region	Western Pacific	12

* Number of species is very large, but unknown because the FMP covers entire coral reef ecosystems.

Sources: (National Oceanic and Atmospheric Administration, 2015e) (National Oceanic and Atmospheric Administration Southeast Regional Office, 2010) (National Oceanic and Atmospheric Administration Office of Sustainable Fisheries, 2015) (Western Pacific Regional Fishery Management Council, 1979) (National Marine Fisheries Service, 2008a)

Within the reef EFH, 22 coral species are ESA listed or proposed as threatened. Critical habitat has been designated for two of these species. Most of the 22 species were listed or proposed on September 10, 2014, when NOAA Fisheries published a final rule listing 20 coral species as threatened under the ESA (National Oceanic and Atmospheric Administration Southeast Regional Office, 2015b). No reef fish or crustacean species that have EFH are ESA listed or proposed.

The following threats and conservation measures have been synthesized from information available for several listed or proposed EFH; these threats are considered to be representative for EFH that includes reefs and reef fish and invertebrates (National Oceanic and Atmospheric Administration Office of Protected Resources, 2015a) (National Oceanic and Atmospheric Administration, 2015c) (South Atlantic Fishery Management Council, 2014a) (National Oceanic and Atmospheric Administration, 2015d).

- The fishing and overharvesting of reef fish and invertebrates for use as fishing bait or for human consumption. FMCs place restrictions on gear, time and area closures, and limits on harvesting times to address these threats.
- The collection and trade, both domestic and international, of live reef fish as pets, reef invertebrate shells as jewelry or decorative items, and reef coral as aquarium or display organisms. The harvest and collection of these species disturbs reef EFH and threatens the habitat composition and availability of resources. To address this threat, FMCs restrict harvesting areas and times or require an official observer be present during harvesting.
- Commercial fishing methods such as dredging and trawling threaten reef EFH by disturbing and changing the reef habitat, removing coral and sponges, increasing turbidity, and changing the direction or velocity of water flow. To address these threats, FMCs limit where and how often these disturbances can occur.
- Oil and gas exploration threatens reef EFH through the seismic surveys that identify oil and gas deposits; the installation and use of anchors, pipes, platform legs, etc.; and the discharge of drilling muds. These effects will cause the fish in the area to disperse, suspend sediments, and increase turbidity resulting in a smothering of corals from the drilling muds and introducing toxics and contaminants. To address these threats, NMFS may encourage development of spill response plans, training, and prevention, and request avoidance of highly productive fishing areas to the extent possible.
- The introduction of invasive species into the reef ecosystem from the incidental transport of non-indigenous marine species on ship ballasts and hulls and the accidental or intentional release of exotic species from commercial or home aquariums. Invasive species in a reef ecosystem compete with native reef species for food and habitat resources and can decrease the biodiversity of the reef. To address this threat, NMFS may help create eradication programs or management measures to prevent introduction of invasive species.
- Changes in water temperatures, flow, and tides, which may be influenced by climate change, can threaten reef EFH.

6 EFFECTS ANALYSIS

The extent of the Action Area for this BE is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as SFHAs on a FIRM. The FEMA-mapped SFHA is the area where the NFIP's floodplain management regulations must be enforced (Federal Emergency Management Agency, 2014b). Although FEMA's regulatory jurisdiction is limited to the mapped SFHAs, the Action Area assesses all of the areas that may be affected by the Proposed Action.

As described in more detail in Section 4.2, the classification of habitats in this document uses SFHA boundaries as the demarcation line for a basic segregation of habitat types needed to analyze the effects for some parts of the Proposed Action, which may occur outside of SFHAs. The 12 habitat classifications were divided into lowland/aquatic habitats and upland habitats. Lowland/aquatic habitats are generally associated with inland waterways or coastlines and typically overlap partially or completely with SFHAs. These habitats (wetlands, fresh waters, nearshore marine waters, and beaches) are anticipated to have a high prevalence in SFHAs nationwide. Offshore marine waters and upland habitats (barren lands, caves, rangeland, forest land, and perennial snow or ice) are geographically separated from waterways and coastlines and generally have little to no overlap with SFHAs. While upland habitats may sometimes occur within SFHAs, their prevalence in SFHAs nationwide is anticipated to be minimal. Although the effects determination separates effects of the Proposed Action as occurring either within or outside of SFHAs, all effects of the Proposed Action within the Action Area are addressed.

This chapter assesses the potential indirect effects of the Proposed Action on ESA species, designated critical habitats, and EFH. Section 6.1 describes the effects determinations for actions under each element of the Proposed Action (flood insurance, floodplain management (including the CRS), and flood hazard mapping) and includes all existing elements/actions under the NFIP, recent legislative modifications, and proposed program changes to the NFIP.

Although the effects of non-discretionary program components are addressed as part of the Proposed Action, FEMA does not have the ability to modify those components. From its creation and through subsequent amendments, the NFIP has included a mix of direct mandates (providing little or no flexibility) and discretionary actions. Under the ESA Section 7(a)(2), Federal agencies are required to consult only if there is discretionary Federal involvement or control: "...where the Federal agency lacks the discretion to influence the private action ... the agency simply does not possess the ability to implement measures that inure to the benefit to the protected species" (50 C.F.R. § 402.03). Therefore, although FEMA has no legal obligation to evaluate non-discretionary actions and their potential indirect effects on ESA-listed species and designated critical habitat, FEMA has consented to assess the effects of all actions under each element, regardless of whether they are discretionary, to provide a comprehensive analysis of the Program.

The Services describe effects determinations (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998) as follows.

For listed species/designated critical habitat, the possible effects determinations are as follows:

- No effect (NE) – If the Proposed Action will not affect listed species or designated critical habitat.
- Not likely to adversely affect (NLAA) – If effects on listed species are expected to be discountable, insignificant, or completely beneficial.
- Likely to adversely affect (LAA) – If any adverse effect to a listed species or designated critical habitat may occur as a direct or indirect result of the Proposed Action, or an

interrelated or interdependent action, and the effect is not discountable, insignificant, or beneficial.

For proposed species/proposed critical habitat, the possible effects determinations are:

- No effect (NE).
- Likely to jeopardize the proposed species/adversely modify proposed critical habitat.
- Not likely to jeopardize the proposed species/adversely modify proposed critical habitat.

For EFH consultations, adverse effects are defined as any physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide effects, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. § 600.810). For EFH consultations, adverse effects may or may not be considered substantial, which helps determine the level of effect.

The effects analysis in this Chapter is structured as follows:

- Section 6.1: The Effects Determination for the Proposed Action on ESA species, designated critical habitats, and EFH;
- Section 6.2: Interdependent and Interrelated Actions; and
- Section 6.3: Cumulative Effects.

6.1 Effects Determination for the Proposed Action

It is important to emphasize that because FEMA does not authorize, fund, or carry out floodplain development, any potential effects of the Proposed Action would necessarily be indirect. Floodplain development itself is not an action under the NFIP, and FEMA does not control the rate or quantity of development in floodplains or the effects those development activities may have on ESA species, designated critical habitats, or EFH. The ESA-implementing regulations define indirect effects as those that are "caused by the Proposed Action and are later in time, but are still reasonably certain to occur" (50 C.F.R. § 402.02). The Proposed Action does not cause development to occur, nor does it play a significant role in facilitating or encouraging floodplain development.

The available research and studies – discussed in Sections 3.5 and 3.6 – suggest that the NFIP is not a significant factor in the determination of whether or not to develop in the floodplain. Research by AIR evaluating the NFIP indicated that the rate at which new buildings are constructed in the floodplain has, if anything, decreased in recent years due to a combination of the NFIP's building elevation requirements, cost of construction in the floodplain, restrictions on floodway development, and the requirement to purchase flood insurance. Studies have also found that NFIP performance standards require participating communities to only allow encroachment in its riverine floodway that would not cause an increase in flood heights (subject to certain regulatory exceptions) (44 C.F.R. § 60.3d and e), have prevented a great deal of development in coastal floodplains and mapped floodways (Wetmore, et al., 2006).

However, certain actions taken under the NFIP—specifically the issuance of certain letters of map change, mapping a levee system as meeting the requirements for accreditation, or designating a levee system in an AR or A99 Zone—are perceived by some to offer some encouragement to

develop in the floodplain, and FEMA seeks to undertake program changes to address any potential effects of this action. While the issuance of LOMRs and LOMR-Fs is a non-discretionary action for which FEMA has no obligation to consult, FEMA proposes to take measures within its discretion to demonstrate that its action in issuing LOMRs and LOMR-Fs is ESA-compliant. FEMA is not responsible for private floodplain development, or for ensuring that such development is compliant with the ESA. However, FEMA does require written assurance of compliance with appropriate sections of 44 C.F.R. § 60.3 be provided by the participating community prior to processing a LOMR or a LOMR-F request.

Currently, FEMA's minimum floodplain management criteria at 44 C.F.R. § 60.3(a)(2) requires communities to, for all floodplain development permits, "review [the] proposed development to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law" FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, communities are required to obtain and maintain documentation of compliance with the ESA. Furthermore, FEMA will make program changes in its area of discretionary authority to require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests. By documenting that the associated private floodplain development is ESA-compliant, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). Notably, the LOMC documentation requirement would also cover LOMCs associated with the mapping of levee accreditations, as well as AR zone and A99 zone determinations.

Table 6-1 summarizes FEMA's formal determination of effects on ESA species, designated critical habitats, and EFH, by individual components of the Proposed Action.

Table 6-1: Effects Determination for the Proposed Action's Indirect Effects on ESA-Listed/Proposed Species, Designated/Proposed Critical Habitat, and Designated EFH within the Action Area

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
Floodplain Management	Implementing Minimum Floodplain Management Criteria	Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal and State laws, including the ESA, as a condition of issuing floodplain development permits.	Discretion	NE
	Enroll Communities in the NFIP	No change	No discretion	NE
	Monitor Communities' Compliance with NFIP via Community Assistance Visits (CAVs)/Community Assistance Contacts (CACs)	No change	Discretion	NE
	Enforcement (e.g., probation, suspension, Community Rating System (CRS) retrogrades)	No change	Discretion	NE
	Administer the Map Adoption Process	No change	No discretion	NE
	Administer CRS (includes awarding points for CRS Class ratings)	No change	Discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
Floodplain Management	CRS Activity Changes / Updates	No change	Discretion	NE
	Training / General Technical Assistance on Minimum Floodplain Management Criteria	No change	Discretion	NE
	Removal of Insurance Eligibility (pursuant to Section 1316)	No change	No discretion	NE
Flood Hazard Mapping	Decision to publish Flood Insurance Rate Maps (FIRMs)– decision on level of study performed	No change	Discretion	NE
	Development of New or Revised Flood Insurance Studies (FIS) and SFHA Maps – making an FIS, engineering analysis	No change	No discretion	NE
	Non-regulatory Products and Features	No change	Discretion	NE
	Map Sequencing	No change	Discretion	NE
	Letter of Map Amendment (LOMA) and Letter of Determination Review (LODR)	No change	No discretion	NE
	Letter of Map Revision (LOMR) and Letter of Map Revision Based on Fill (LOMR-F)	Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted documentation of compliance with the ESA.	No discretion	NE
	Conditional Letter of Map Revision (CLOMR)	No change	Discretion	NE
	Conditional Letter of Map Revision Based on Fill (CLOMR-F)	No change	Discretion	NE
	Conditional Letter of Map Amendment (CLOMA)	No change	Discretion	NE
	Data Development and Dissemination	No change	Discretion	NE
	Community Outreach, Training, and General Technical Assistance	No change	Discretion	NE
	Implementing Mapping Standards, Policies, and Regulations	No change	Discretion	NE
	Levee Accreditation Process	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE

NFIP Element	Proposed Action Existing Component	Proposed Action Modification	Discretion / No Discretion	Effects Determination
	AR Zone-A99 Determinations	Associated levee construction, maintenance, repair, etc. would be covered by the new LOMR/LOMR-F requirements.	No discretion	NE
Flood Insurance	Administering the Provision of Flood Insurance	No change	No discretion	NE
	Administer Write Your Own (WYO) Programs	No change	No discretion	NE
	Develop and Publish Insurance Rate Tables	<ul style="list-style-type: none"> Subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) would be phased out at a rate of 25% premium rate increases per year.¹ Subsidies on all other pre-FIRM properties would be phased out through annual premium rate increases of at least 5%, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase.¹ 	No discretion	NE
	Insurance Policy Management (Issue / Sell / Renew / Refund / Appeal)	A monthly installment plan payment option for non-escrowed flood insurance premiums would be developed. ¹	No discretion	NE
	Educate Insurance Agents	No change	Discretion	NE
	Educate and Certify Claims Adjusters	No change	Discretion	NE
	Adjust Loss Claims	No change	No discretion	NE
	Pay Valid Claims	No change	No discretion	NE
	Provide General Technical Assistance	No change	Discretion	NE
	Marketing	No change	Discretion	NE
	NE No effect ¹ Modifications required by statute			

6.1.1 Floodplain Management

Under the floodplain management element, FEMA's role is limited to enrolling communities into the NFIP, establishing the minimum floodplain management criteria, programmatic compliance monitoring and oversight, and providing technical assistance to help ensure that communities are complying with NFIP program requirements. FEMA has discretion over most of the floodplain management activities.

A description of the actions and proposed modifications under the floodplain management program element is provided below.

Enroll Communities in the NFIP

Any community meeting the statutory requirements for participation in the NFIP will be allowed to participate; FEMA has no discretion over this action. Communities join the NFIP both before and after the identification of SFHAs, and many communities have SFHA and non-SFHA areas within their jurisdictions.

NE	Because enrolling a community in the NFIP is a non-discretionary, administrative action, it will have "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Administer the Map Adoption Process

Community map adoption is the process of incorporating flood hazard data provided by FEMA into new or existing community floodplain management regulations. The map adoption process ensures that NFIP participating communities have floodplain management ordinances in place that reflect the most updated flood map. The community has six months to incorporate the new data or it will be immediately suspended from the NFIP (44 C.F.R. § 59.24(a)). If a new map incorporates better data, such as a floodway, that could trigger new associated floodplain management requirements. Map adoption is a non-discretionary action and administrative in nature.

NE	Because the adoption of maps is a non-discretionary, administrative process designed to ensure that the minimum floodplain management requirements reflect the updated flood map, the map adoption process has "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Implementing Minimum Floodplain Management Criteria

FEMA has some discretion over the minimum floodplain management criteria, which participating communities must adopt into their local ordinances and enforce as a condition of participation in the NFIP. Floodplain management standards may reduce economic risk through improved building and construction standards. In a study of the NFIP's building standards, AIR found that the NFIP floodplain management regulations and insurance rates tend to promote sound construction practices and reduce potential flood damages (Jones, Coulbourne, Marshall, & Rogers, 2006).

These requirements can act as a disincentive to development because of the increased regulations and restrictions. In its 2006 report on the NFIP's impact on floodplain development, AIR found that implementation of the minimum floodplain management criteria has restrained development in flood hazard areas (American Institutes for Research - Rosenbaum, W. and Boulware, G., 2006).

As stated above, private floodplain development is not a FEMA action. FEMA is not responsible for private floodplain development, or for ensuring that such development is compliant with the ESA. Moreover, the impacts of private floodplain development on ESA listed species are already

addressed through Sections 9 and 10 of the ESA. However, FEMA does require written assurance of compliance with appropriate sections of 44 C.F.R. § 60.3 be provided by the participating community prior to processing a LOMR or a LOMR-F request. Accordingly, as discussed in the preceding section, as part of the program changes to demonstrate that FEMA's action in issuing LOMRs and LOMR-Fs is ESA-compliant, FEMA will clarify its compliance requirements under 44 C.F.R. § 60.3(a)(2). FEMA proposes to clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must require documentation of compliance with the appropriate Federal and state laws, including the ESA, as a condition of issuing floodplain development permits.

NE	While there is strong evidence to suggest that the minimum floodplain criteria act to restrain floodplain development, FEMA has no data or studies to support when and where that floodplain development is being restrained, or whether the floodplain development in question would have otherwise adversely impacted ESA-listed species or designated critical habitat. As such, FEMA can claim no beneficial effects as a result of the implementation of the floodplain management criteria. Additionally, because the proposed change to the minimum floodplain management criteria does not change the existing ESA-related compliance requirements associated with floodplain development permits, but merely documents that such compliance is occurring, the proposed change will have "No Effect" on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH.
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Administer CRS and CRS Activity Changes/Updates

Under the CRS, NFIP-participating communities can receive credit for implementing measures beyond the NFIP minimum floodplain management to further reduce flood damages or protect the natural and beneficial functions of floodplains. The CRS is largely discretionary, but Section 1315(b) of the NFIA requires that all activities included in the CRS must reduce the risk of flood damage. An explanation of the CRS can be found in Section 3.6 and Appendix A. Some examples of CRS activities that would result in a beneficial effect to ESA species and their habitats are provided below. The effects of each of these CRS activities are described below:

- *Map Information Service (Activity 320)*: Credit is available for activities that would advise the public about areas that should be protected because of their natural floodplain functions.
- *Outreach projects (Activity 330)*: Credit is available for outreach projects that include descriptions of the natural functions of the community's floodplains.
- *Flood Protection Information (Activity 350)*: Credit is available for a website that provides detailed information about local areas that should be protected for their natural floodplain functions and how they can be protected.
- *Open Space Preservation (Activity 420)*: Promoting the preservation of lands within SFHAs in coastal ecosystems has the following beneficial effects on ESA species by (1) preserving habitat within or adjacent to the beach/dune and estuarine ecosystem, (2) preserving native vegetation on undisturbed sites, (3) preventing the negative consequences of placing fill materials within or adjacent to the beach/dune and estuarine systems, and (4) reducing the amount of urban runoff that negatively affects aquatic ecosystems. Additionally, in the 2013 CRS update, credits have been increased for open space with bonus credits for open space that has natural and beneficial functions, open space located in areas identified as habitat for listed species, or open space that has been preserved through a restoration plan. The increase in open space credit should also incentivize communities to provide levee setbacks and create additional open space around levees.

- *Higher Regulatory Standards (Activity 430)*: Since communities that adopt higher floodplain management standards receive higher credits in the CRS, the elements within this credit will beneficially affect ESA species, designated critical habitat, and EFH by decreasing the amount of and intensity of development in the coastal SFHA, protecting shoreline habitat, and improving water quality by limiting development within the floodplain.
- *Flood Data Maintenance (Activity 440)*: Adding layers to the community's geographic information system with natural floodplain functions (e.g. wetlands, designated riparian habitat, and flood water storage areas) is credited.
- *Stormwater Management (Activity 450)*: These criteria beneficially affect ESA species by reducing the amount of sediment and potentially toxic runoff deposited into the waterway thus improving water quality. These criteria are especially beneficial to fragile estuarine ecosystems that are dependent on good water quality for proper maintenance of function. Additionally, in the 2013 CRS update, credits have been added to include an incentive for low impact development techniques.
- *Floodplain Management Planning (Activity 520)*: The floodplain management plan may reduce the amount of floodplain development within a community through recognition of flood hazards and methods to mitigate those hazards. The preparation of a floodplain management plan does not necessarily reduce the amount of floodplain development allowed within a community. However, there is an opportunity through the planning effort to recognize the importance of maintenance of natural resources as an important component of floodplain management. Additionally, in the 2013 CRS update, new credit has been added for creating and adopting a plan that includes components such as a habitat conservation plan, riparian habitat preservation and/or restoration plan, green infrastructure plan or an inventory of ecological attributes.
- *Acquisition and Relocation (Activity 530)*: A credit bonus is available for buildings that are removed from Zone V and Coastal A Zones and for new environmental review criteria conducted before acquisition or relocation have been implemented to ensure that projects will not have a negative effect on environmental, historical, and cultural resources. Certifications are required for projects initiated after April 1, 2013 to document that communities or project funding agencies are communicating and coordinating with the regulatory agencies responsible for environmental and historic preservation.
- *Flood Protection and Drainage System Maintenance (Activity 540)*: These activities credit flood loss reduction measures such as capital improvement systems and drainage improvement projects provided that a thorough environmental review is conducted and documented.
- *Global Changes*: There are nine activities that provide points for natural and beneficial functions and a prerequisite number of points are required in these nine activities for communities to advance to a Class 4 with an additional number of points to advance to a Class 1.

The CRS promotes higher standards for floodplain management and rewards activities that protect the natural and beneficial functions of floodplain. Moreover, through the CRS, FEMA provides incentives to communities, in the form of insurance premium discounts, for implementing good floodplain management practices that protect the habitat of ESA species (Federal Emergency Management Agency, 2010).

NE	While there is strong evidence to suggest that CRS incentivizes communities to undertake actions that benefit ESA species and designated critical habitat, as well as the natural and beneficial floodplain functions that support such species and habitat, FEMA has no data or studies to support when and where potentially beneficial actions will take place or which CRS activities the community will undertake of the 19 categories of possible creditable activities. Moreover, even actions that are generally considered to benefit species – such as the creation of open space – may not be beneficial if there are no species or habitat in the area to benefit. As such, FEMA can claim no beneficial effects as a result of the implementation of the CRS. Accordingly, FEMA's implementation of the CRS program will have "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Training/General Technical Assistance on Minimum Floodplain Management Criteria

FEMA offers technical assistance to communities in complying with the NFIP's floodplain management criteria. A technical assistance contact, which may be done in person or by phone, may require addressing one or more NFIP floodplain management issues in the community. Hundreds of these general technical assistance interactions occur each year; these requests are typically generated through phone calls or e-mails from community officials, complaints from property owners, inquiries from building contractors, and inquiries from insurance agents. Based on the experience of FEMA floodplain managers, most violations result from a community's lack of understanding about the program requirements and/or how to comply with the program requirements. As such, technical assistance is very effective in addressing community non-compliance, and most issues of non-compliance are addressed at this level.

In 2006, an AIR study found that the cooperative approach employed by FEMA, whereby FEMA works with the community to provide technical assistance and remedy the violation and/or correct program deficiencies, is cost-effective and successful in most communities (American Institutes for Research - Monday et al., 2006).

NE	While technical assistance is used by FEMA to assist communities in better complying with the minimum floodplain management criteria, there are, as discussed above, no effects on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH as a result of the implementation of the minimum floodplain management criteria. As such, there are likewise no effects to ESA-listed species, designated critical habitat, and EFH as a result of FEMA's provision of technical assistance to help communities better comply with those criteria.
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Compliance Enforcement

If an NFIP community is in violation of the minimum floodplain management criteria, including the new ESA-related requirements, FEMA has some discretion over the type of enforcement action that it can take. Enforcement generally takes place when a pattern or practice of non-compliance by the community is identified. FEMA uses an enforcement hierarchy. FEMA starts with offering the community technical assistance to resolve the issues, and most non-compliance issues are resolved in this manner. However, if technical assistance is not effective, FEMA can take other actions, such as a CRS retrograde, in which a community's CRS status and the associated insurance premium discounts are removed, or issuing a warning letter. Typically, these consequences resolve the non-compliance issue for the community without further action by FEMA. If the violation still has not been resolved, FEMA will place the community on probation for one year. If the violation still has not been resolved after the community has been placed on probation for a year, FEMA will suspend the community from the NFIP.

In 2006, an AIR study estimated the nationwide rate of community compliance with NFIP requirements of 70 to 85 percent by making a series of assumptions about the representation of visited communities, the length of time that is reasonable for a community to take to remedy noncompliance, and the accuracy of community visit data entered into the Community Information System over a 5-year period. In this study, a community was considered to be compliant if it had no program deficiencies or violations or if it addressed them satisfactorily within two years. This study also found that the cooperative approach employed by FEMA, whereby FEMA works with the community to provide technical assistance and remedy the violation and/or correct program deficiencies, is cost-effective and successful in most communities (American Institutes for Research - Monday et al., 2006).

NE	While FEMA's compliance and enforcement measures are shown to improve community enforcement of the floodplain management criteria, there are, as discussed above, no effects on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH as a result of the implementation of the minimum floodplain management criteria. As such, there are likewise no effects to ESA-listed species, designated critical habitat, and EFH as a result of enforcement of those criteria.
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Removal of Insurance Eligibility (pursuant to Section 1316)

There is an additional enforcement mechanism that is available to enforce the floodplain management regulations on specific non-compliant properties. Properties in an SFHA that are in violation of, or non-compliant with, State or local laws, regulations, or ordinances related to floodplain management can be denied flood insurance coverage, pursuant to Section 1316 of the NFIA, if a community requests that FEMA do so. FEMA does not have discretion over this action and cannot initiate a Section 1316 action without a request from the local community. This removal of insurance eligibility can act as a local enforcement tool within the community to encourage a property owner of a non-compliant property within the community to rectify the compliance issue(s). This enforcement tool is particularly effective in communities where the community regulations are not sufficient to enable the community to address the non-compliance issues through its existing laws.

NE	While this action may improve community enforcement of the floodplain management criteria, there are, as discussed above, no effects to ESA-listed species, designated critical habitat, and EFH as a result of the implementation of the minimum floodplain management criteria. As such, there are likewise no effects on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH as a result of enforcement of those criteria.
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Monitor Community Compliance with NFIP via CAVs and CACs

As discussed above, FEMA conducts CACs and CAVs to monitor community floodplain management programs. A CAC is a telephone call or brief visit to an NFIP community to determine if any program-related problems exist and to offer assistance. A CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program.

Once enrolled in the NFIP, communities generally receive CACs at regular intervals. During CAVs and CACs, FEMA assesses whether communities are adequately enforcing floodplain management criteria and provides technical assistance regarding any programmatic compliance issues.

FEMA's responsibility is to monitor and enforce a community's programmatic compliance with the ESA-related requirements as part of its general monitoring and enforcement of the minimum

floodplain management criteria. FEMA will monitor and enforce the new ESA-related requirements through the CAC and CAV process, just as it does with respect to all other floodplain management requirements.

At a CAC, FEMA will review the community's floodplain management ordinances, procedures, and enforcement provisions to determine whether the community has compliant ordinances and adequate enforcement provisions within those ordinances. FEMA may also offer technical assistance on any programmatic compliance issues.

NE	While FEMA's compliance monitoring actions are shown to improve community compliance with the floodplain management criteria, there are, as discussed above, no effects to ESA-listed species, designated critical habitat, and EFH as a result of the implementation of the minimum floodplain management criteria. As such, there are likewise no effects to on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH as a result of FEMA's monitoring of compliance with those criteria.
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6.1.2 Flood Hazard Mapping

The flood hazard mapping program element allows FEMA to identify flood hazards, assess flood risks, and collaborate with States and communities on flood hazard and risk data to guide them to mitigation measures. FEMA has some discretion over most of the flood hazard mapping activities. The actions and proposed modifications under the flood hazard mapping program element are discussed below.

Decision to Publish FIRMs

FEMA has discretion regarding the level of study performed for the FIRM. The level of study performed is dependent on a number of factors, such as the level of community involvement, the level of flood risk, funding, and watershed characteristics. Community officials use flood hazard maps to establish zoning, land use, and building standards, including the development of higher regulatory standards than the minimum standards required as a condition of participation in the NFIP.

FEMA flood hazard maps provide a number of benefits that can positively affect ESA-listed species and designated critical habitat as well. By promoting broad based awareness of the risks associated with living in a floodplain, FEMA's flood hazard maps provide information that can help guide development away from flood hazard areas. FEMA also provides best available data, and upon request by the community, future conditions maps. This information may then be used by the communities and individuals to guide future decision-making regarding floodplain development and can discourage continued development in flood hazard areas.

NE	Although identification of flood hazard areas on a flood map could be used to guide floodplain development away from flood hazard areas, FEMA has no data or studies to support when and where such actions have taken place or will take place. As such, FEMA can claim no beneficial effects as a result of the publication of FIRMs. Accordingly, FEMA's decision whether to publish a FIRM, and the level of study performed for that FIRM, will have "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Non-Regulatory Products and Features

As discussed above, FEMA provides other data layers and information to facilitate improved flood risk management and communication at the local level. Unlike regulatory flood hazard products

(FIRM, FIS Report, FIRM Database), Flood Risk Products are not intended to be used as the basis for official actions required under the NFIP, such as determining the insurance rate for a property or enforcing minimum building standards for construction in a floodplain. These products work alongside regulatory products to provide additional flood risk information and to support a community's overall floodplain management and hazard mitigation strategies and plans. There are also two key non-regulatory features that the NFIP offers, LiMWA and a future conditions layer on existing FIRMs. Although these do not exist as separate products because they are placed on the actual FIRM, they are non-regulatory features because they are not associated with any regulatory requirements under the NFIP (although communities may, and do, choose to regulate based on these non-regulatory features).

By promoting broad based awareness of the risks associated with living in a floodplain beyond those provided in the regulatory flood map, these non-regulatory products and features can provide even more information to inform land use planning and floodplain development decisions. Similar to FEMA's regulatory maps, non-regulatory products and features provide information that can help guide development away from flood hazard areas. Nevertheless, since use of these products in such a manner is entirely voluntary, and FEMA has no data to track the use of such non-regulatory products in this manner, FEMA cannot attribute any specific benefit to ESA-listed species or designated critical habitat as a result of this action.

NE	Although FEMA's non-regulatory products and features could be used to guide floodplain development away from flood hazard areas, FEMA has no data or studies to support when and where such actions have taken place or will take place. As such, FEMA can claim no beneficial effects as a result of the use of non-regulatory products. Accordingly, FEMA's non-regulatory products will have "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Letter of Map Change (LOMC): LOMR and LOMR-F

As discussed above, there are a number of LOMCs that FEMA issues including the LOMA, the LOMR, and the LOMR-F. As a general rule, FEMA does not have discretion over whether to issue a LOMC. A property owner can submit a Letter of Map Change (LOMC) request if they believe that their property, which is shown in the SFHA on the FEMA map, is not actually located in an SFHA based upon submitted technical data. There are limitations imposed by the scale at which the maps are prepared, which may result in individual properties being inadvertently included in SFHAs. FEMA has developed a process, referred to as a LOMA, to correct these inadvertent inclusions. A LOMA is issued pursuant to an administrative procedure that involves the review of technical data submitted by the owner of property who believes the property has incorrectly been included in a designated SFHA. A LOMA establishes whether a specific property, or a specific structure on the property, is or is not located in an SFHA. LOMA applications typically involve the provision of additional information such as better and more precise elevation information. FEMA issues a letter stating that the property is in or out of the SFHA. These letters are not related to the floodplain development or for the physical structure, and there is no associated floodplain development involved. In fact, a LOMA cannot be issued if fill has been added to the lot or parcel. A property owner who submits a LOMA request generally only receives the map change if the structure(s) is on an area of natural high ground that is only in the SFHA due to the limitation of mapping scales. Accordingly, a LOMA will have no effect on ESA species, critical habitat, or EFH.

FEMA has also established administrative procedures for revising effective maps based on new or revised scientific or technical data that reflect other changes to the floodplain. This map action is referred to as Letter of Map Revision (LOMR). The LOMR process is an administrative process

by which a community can submit technical data to revise the FIS and FIRM. The result is a letter from FEMA to the Chief Executive Officer of the community officially revising the current effective FIRM and FIS.

A LOMR-F is submitted for properties on which fill has been placed to raise the structure or lot to or above, the 1-percent-annual-chance flood elevation. A LOMR-F is an administrative process by which a property owner can submit technical data to establish that a specific property is or is not located in an SFHA. The result is a letter from FEMA to the Chief Executive Officer of the community officially designating if the structure or lot is located in an SFHA.

As discussed above, the Proposed Action does not cause floodplain development to occur. The available research and studies suggest that the NFIP is not a significant factor in the determination of whether or not to develop in the floodplain. However, to the extent that certain actions taken under the NFIP – specifically the issuance of certain letters of map change—are perceived to offer some encouragement to develop in the floodplain, FEMA seeks to undertake program changes to demonstrate that any floodplain development for which such a letter of map change is issued is ESA-compliant. FEMA is not responsible for private floodplain development, or for ensuring that such development is compliant with the ESA. However, FEMA does require written assurance of compliance with appropriate sections of 44 C.F.R. § 60.3 be provided by the participating community prior to issuing LOMR and LOMR-F determinations. Furthermore, FEMA will make program changes to require, per the floodplain management clarification regarding ESA compliance documentation, the community or the project proponent on the community's behalf produce documentation of compliance with the ESA prior to FEMA's processing of LOMR and LOMR-F requests. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought is ESA-compliant, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). Notably, this will include LOMCs issued to map levee accreditations, as well as AR Zone and A99 zone designations.

NE	Because issuance of these letters is a non-discretionary action that takes place after any floodplain development has occurred that may affect ESA-listed species, designated critical habitat, or EFH, these actions will have no effect on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH. Additionally, because the proposed change to require ESA compliance documentation as a condition of processing LOMRs and LOMR-Fs does not change the existing ESA-related compliance requirements associated with private floodplain development, but merely documents that such compliance is occurring, the proposed change will have "No Effect" on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH.
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Conditional Letter of Map Change (CLOMC): CLOMR, CLOMR-F, and CLOMA

Unlike LOMCs, FEMA does have some discretion over Conditional Letter of Map Changes (CLOMCs) that are issued prior to any floodplain development has occurred, which generally focus on proposed projects in SFHAs, as opposed to pre-existing structures. FEMA may issue a Conditional Letter of Map Amendment (CLOMA), Conditional Letter of Map Revision based on Fill (CLOMR-F), or Conditional Letter of Map Revision (CLOMR), which are FEMA's comments on whether a project, if built as proposed, would justify a map revision or amendment. Because there are no practical consequences of FEMA's issuance of a CLOMC, the effects determination would typically be a "no effect." For areas outside the SFHA, where the minimum floodplain management criteria do not apply, this action has "no effect."

NE	Because there are no practical consequences of FEMA's issuance of a CLOMC on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH, the effects determination for this action is "no effect."
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Community Outreach, Training, and General Technical Assistance

Community outreach, training FEMA personnel, and offering general technical assistance to communities on are discretionary actions.

NE	Community outreach, training FEMA personnel, and offering general technical assistance to SFHA are administrative actions that have no effect on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Levee Accreditation Process and AR Zone–A99 Designations

The final three mapping designations under the flood hazard mapping program element are levee accreditation (Zone X [shaded]) and AR Zone and A99 determinations. These mapping designations are non-discretionary.

FEMA has criteria that must be followed by a community before a levee, levee system, or floodwall can be depicted on a FIRM as providing risk reduction to the 1-percent-annual-chance flood (also known as the Base Flood). However, FEMA does not certify, design, construct, permit, or approve levees, levee systems, or floodwalls.²¹ FEMA only accredits levees, levee systems, and floodwalls that meet, and continue to meet, the minimum design, operation, and maintenance criteria outlined in 44 C.F.R. § 65.10; it is the communities' responsibility to maintain levees in compliance with those criteria.

Communities eligible for Zone A99 or Zone AR designations must show FEMA that, through the design, construction, or restoration of a flood protection structure, certain project milestones are met. These milestones may include proof the project has been authorized and paid for, the community has not been responsible for any delay in the project, and the project provided 1-percent-annual-chance flood risk reduction on an effective FIRM. Mapping a Zone A99 or Zone AR designation would create some changes in insurance premium rates, but the mandatory flood insurance purchase requirements and the minimum floodplain management criteria will still apply to those areas.

However, it is important to note that these actions (the determination that the levee system meets accreditation, Zone AR, or Zone A99 requirements) by themselves have no mapping consequences until a LOMC is issued reflecting these changes on a map. Likewise, the changes to insurance rates will not go into effect until a revised FIRM is issued and effective.

NE	Because accreditation and zone determinations are non-discretionary actions that take place after any floodplain development has occurred that may affect ESA-listed species, designated critical habitat, or EFH, and because these actions have no consequences (mapping or otherwise) until a LOMC is issued, accreditation and zone determinations will have no effect on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH.
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²¹ This was acknowledged by a Federal court in National Wildlife Federation v. FEMA, 2014 U.S. Dist, LEXIS 151386 (W.D. Wa. 2014).

Other "No Effect" Actions under Flood Hazard Mapping Element

FEMA has determined that several aspects under the NFIP's flood hazard mapping program are administrative and non-regulatory in nature and would thus have no effect on ESA species, designated critical habitat, or EFH. These "no effect" actions under flood hazard mapping primarily include desktop reviews and data organization, and they do not directly or indirectly influence floodplain construction or development practices. No effect actions under the flood hazard mapping program element include map sequencing; LOMA, Letter of Determination Review (LODR), and CLOMA processes; data development and dissemination; and implementation of mapping standards, policies, and regulations. FEMA has discretion over how it disseminates data, but it does not have discretion over the performance of engineering analyses in creating FISs and SFHA maps.

NE	FEMA's administrative and non-regulatory actions do not directly or indirectly influence floodplain construction or development practices. Accordingly, FEMA's administrative and non-regulatory actions will have "No Effect" on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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6.1.3 Flood Insurance

Administering the Provision of Flood Insurance

FEMA does not have discretion over the provision of flood insurance. However, as FEMA consented to assess the effects of all aspects of the NFIP in this evaluation, FEMA has made effects determinations for the flood insurance elements of the program as well. FEMA has determined that all components under the NFIP's flood insurance program area are administrative in nature and would, therefore, have no effect on ESA species, designated critical habitats, or EFH. These no effect actions under the flood insurance program area are either administrative in nature, pertaining to the sale and marketing of flood insurance policies, or involve educating policyholders, WYO companies, agents, claims adjusters, and others about NFIP insurance-related program requirements and the terms and conditions of NFIP flood insurance policies. No effect actions under the flood insurance program element include: administering the WYO program, development and publication of insurance rates, insurance policy management, educating insurance agents and claims adjusters, marketing, adjusting loss claims, paying valid claims, and providing general technical assistance by insurance personnel.

NE	Administration of the provision of flood insurance under the NFIP includes administering the WYO program; development and publication of insurance rates; insurance policy management; educating insurance agents and claims adjusters; marketing; adjusting loss claims; paying valid claims; and providing general technical assistance by insurance personnel. These activities are administrative in nature and will have no effect on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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Flood Insurance Premium Rate Increases

FEMA's proposed modifications to the development and publication of insurance rates – to implement the premium rate increases imposed by Biggert Waters and HFIAA – will also have "no effect" on ESA species, critical habitats, or EFH. This change only applies to pre-FIRM policyholders. As discussed above, pre-FIRM policyholders are policyholders who built prior to the community's first FIRM. Since nearly all existing NFIP communities have FIRMs, the population of potential new pre-FIRM policyholders would be limited to policyholders in the existing NFIP communities without a FIRM or policyholders in communities that join the NFIP.

The likelihood of a project proponent making a decision about whether or not to develop in the floodplain based on the premium increases that may be applicable should his or her community be mapped and/or join the NFIP is so remote that it is not even worthy of consideration in a discussion of the impacts of this proposed change. As such, FEMA's determination is that this proposed change would have "no effect" on ESA species, designated critical habitats, or EFH.

NE	Premium rate increases imposed by Biggert Waters and HFIAA will have no effect on species listed as threatened or endangered or proposed for listing under the ESA, designated critical habitats, and EFH.
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Premium Installment Payments

Moreover, FEMA's proposed modifications to the sale of its insurance policies—to allow payment of policy premiums in installments—are unlikely to influence future developers and property buyers in SFHA areas. The program changes to allow for non-escrowed policyholders to pay for their flood insurance in installments is unlikely to encourage development because it is unlikely that an individual or family with the affordability issues that would necessitate utilization of an installment plan would have the disposable income to use for financing new floodplain development. Additionally, because FEMA intends to add a monthly service fee to installment plan policies, these policies are actually more expensive than annual policies, a factor that will serve to discourage their widespread use by anyone other than policyholders currently in a high flood risk area (but not subject to mandatory purchase since those premiums would be escrowed) for whom flood insurance is otherwise not affordable.

NE	Program changes that allow for non-escrowed policyholders to pay for their flood insurance in installments will have no effect on species listed as threatened, endangered, or proposed for listing under the ESA, designated critical habitats, and EFH.
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6.2 Interdependent and Interrelated Actions

The ESA implementing regulations define interdependent actions as those actions having no independent utility apart from the action under consideration (Proposed Action). Interrelated actions are part of a larger action and depend on the larger action for their justification (50 C.F.R. § 402.02). FEMA has determined that there are no interdependent actions.

The mandatory purchase requirement, which is discussed below, is an interrelated action because the NFIP was the reason for its establishment in 1973. When Tropical Storm Agnes resulted in significant damages in 1972 and only 95,000 NFIP policies were in force nationwide, it became evident that relatively few individuals in eligible communities who had sustained flood damage had purchased flood insurance. Congress found that the availability of subsidized flood insurance under the NFIA did not, by itself, provide sufficient incentive to attract extensive local community enrollment in the Program (S. Rep. No. 93-583, 93d Cong., 1st Sess. 4, reprinted in [1973] U.S. Code Cong. & Ad. News 3217, 3220 (Senate Report)). Accordingly, in order to increase the number of NFIP policies in force, Congress passed the Flood Disaster Protection Act of 1973 (1973 Act) (42 U.S.C. §§ 4001–4128). The Act contained a provision requiring the purchase of flood insurance as a condition of receiving federally-backed loans and Federal assistance in the SFHAs of participating communities. This is referred to as the mandatory flood insurance purchase requirement and resulted in an increase in flood insurance policies to approximately 1.2 million by the end of 1977, and 5.5 million as of May 31, 2012.

The mandatory purchase requirement is not a FEMA action. Although the mandatory purchase requirement is found in the NFIA, it is not implemented or enforced by the NFIP. While FEMA

administers the NFIP, it has no responsibility or authority with respect to lender compliance with the mandatory flood insurance purchase requirement. This responsibility falls on the Federal agency lender regulators and secondary-market purchasers.

The NFIA, as amended by the 1973 Act, states that regulated lending institutions cannot make, increase, extend, or renew any loan secured by improved real estate or a mobile home located, or to be located, in an SFHA in a participating NFIP community unless the secured building and any personal property securing the loan are covered by flood insurance for the term of the loan (Flood Disaster Protection Act of 1973, P. Law 93-234, as codified at 42 U.S.C. § 4012a(b)). Furthermore, Federal officers or agencies cannot approve any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, disaster assistance loan or grant, for acquisition or construction purposes within an SFHA in a participating community unless the building or mobile home and any personal property to which such financial assistance relates is covered during the life of the property (42 U.S.C. § 4012a(a)). For example, this would prohibit mortgage loans guaranteed by the Department of Veterans Affairs, insured by the Federal Housing Administration, or secured by the Rural Economic and Community Development Services. In the case of disaster assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended, this prohibition only applies to assistance in connection with flooding²² (42 U.S.C. §§ 5154, 5154a, 5171, and 5174).

Even with the establishment of the mandatory purchase requirement, the number of NFIP policies in force was still very low. Following the multi-billion dollar flood disaster in the Midwest in 1993, Congress enacted the National Flood Insurance Reform Act of 1994 (1994 Act). One of the purposes of the 1994 Act is to improve compliance with the mandatory purchase requirements of the NFIP by lenders, servicers, and secondary-market purchasers. Congress was concerned over the low level of insurance participation among eligible property owners and resulting increases in Federal disaster relief payments.

The law requires Federal agency lender regulators to develop regulations to direct their federally regulated lenders not to make, increase, extend, or renew any loan on applicable property unless flood insurance is purchased and maintained. The law also addresses the responsibility of regulated lending institutions and Government-Sponsored Enterprises (i.e., Fannie Mae and Freddie Mac) in providing a notice of and requiring flood insurance coverage for the term of the loan on buildings located in any SFHA in participating NFIP communities.

The 1994 Act significantly strengthened the 1973 Act by imposing important new obligations on both mortgage originators and servicers, including mandatory escrow requirements for flood insurance and mandatory provisions for "forced placement" of insurance. Specifically, the 1994 Act requires the forced placement of flood insurance if a lender or servicer determines that the building securing the loan is not adequately insured. Lenders may, on their own initiative, require the purchase of flood insurance even if a structure is located outside the SFHA. A decision to require coverage under such circumstance is not compelled by statute. Lenders have this prerogative to require flood insurance to protect their investments.

²² Section 202(b) of the 1973 Act prohibited Federal officers or agencies from approving any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, disaster assistance loan or grant, for acquisition or construction purposes within SFHAs in non-participating communities. However, the Housing and Community Development Act of 1977 amended section 202(b) of the 1973 Act to permit regulated lending institutions to make conventional loans in a SFHA of a non-participating community. It required them to notify the purchaser or lessee of improved property situated in a SFHA of a non-participating community and used to secure a loan being made, increased, extended, or renewed, whether Federal disaster assistance for flood damage will be available.

In a 2013 report, the Congressional Research Service found that nationally, recent reports suggest that only 18 percent of Americans in flood zone areas have flood insurance despite the mandatory purchase requirement (Congressional Research Service, 2013). That report stated:

Despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress.

This suggests that despite the fact that the mandatory purchase requirement has incentivized communities to participate in the NFIP, it has not had similar success in incentivizing the behavior of individuals.

As stated above, the mandatory purchase requirement was included here as an interrelated action because the NFIP was the reason for its establishment in 1973. However, with the revision of the NFIA by the Biggert Waters Act to allow private flood insurance to satisfy the mandatory purchase requirement (42 U.S.C. § 4012a) and the continuing buildup of a private flood insurance market, the extent to which the mandatory purchase requirement will remain an interrelated action is unclear.

6.3 Cumulative Effects

According to the ESA, cumulative effects are effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Proposed Action included in this evaluation (50 C.F.R. § 402.02). This definition applies only to Section 7 analyses and should not be confused with the broader use of this term in the National Environmental Policy Act or other environmental laws. An assessment of cumulative effects occurs when the combined effects of an action are added to, or interact with, other effects in a particular place and within a particular timeframe.

For the purposes of this BE, reasonably foreseeable future actions are those State, Tribal, and local development projects in SFHAs nationwide likely to occur within the next 20 to 30 years. Because there are more than 22,000 NFIP-participating communities within the nationwide Action Area, these future effects would be difficult to reasonably quantify.

Cumulative effects occurring in floodplains could include the indirect effects of the Proposed Action, combined with private floodplain development activities across the nation initiated by State agencies or local jurisdictions, Tribal entities, or private landowners. Activities could range from residential and business development to expansion and construction of new infrastructure, such as buildings, roads, utilities, or water-related projects (e.g., irrigation withdrawals, bank protection, and general land clearing). These factors may inevitably affect surface waters and terrestrial and aquatic habitats. Across the nation, there are a number of State, local, and Tribal efforts to reduce and minimize ongoing cumulative effects to ESA species, designated critical habitats, and EFH to restore habitats, provide greater protection, and apply increasingly stringent water-related regulations.

While it is reasonably foreseeable that there will be private floodplain development in the Action Area within the next 20 to 30 years, the extent and the impacts of such development is not reasonably foreseeable. There are also a number of factors affecting ESA-listed species within the timeframe of the Proposed Action, which were discussed in detail in Section 3.5, that make it

very difficult to determine what effects to ESA-listed species are properly attributable to private floodplain development, even if the extent of such development were somehow ascertainable. Moreover, the factors themselves are difficult to quantify.

There are a variety of unknown influencers related to protected species and habitats in the U.S. that are challenging to quantify. The U.S. population is continuing to grow, particularly near coastal floodplains, and is expected to continue growing. With an ever changing economy, development can increase or decrease in an area depending on the location. Between 1980 and 2000, the U.S. population increased by 24 percent. Over this same period, the amount of developed land in the U.S. increased by 34 percent. Forests, in particular, have been the largest source of land converted to developed uses in recent decades, with resulting impacts on forest cover and other ecological attributes (Alig, Kline, & Lichtenstein, 2003). With additional development comes supporting infrastructure and related activities associated with an increase in population, which may in turn contribute to adverse cumulative effects to some species groups.

Hunting and overexploitation of species has occurred for centuries. Many large aquatic species, such as whales, were added as ESA species due to hunting and overexploitation. Large terrestrial animals are often killed merely because they make large targets or are trophies for large game hunters. Flightless birds and slow-moving animals face hunting pressure by introduced predators and humans. Animals of large size require considerable amounts of habitat and are, therefore, naturally rarer than species with smaller habitat requirements. When human populations rise and wilderness is replaced with towns and industry, large animals are the first to disappear, due either to loss of habitat and prey or because they are killed as potential threats. (Endangered Species Handbook, 1983)

Agricultural drainage and stormwater runoff introduce contaminants resulting in a wide range of effects that accumulate in the food chain. Water pollution can alter water quality in ways that are often detrimental to species impacting temperature, pH, sedimentation, visibility, hardness, dissolved oxygen, salinity, and nutrient availability. Half of the threatened and endangered species in the United States depend on water, living in the water for all or part of their life cycle or foraging on aquatic plants and/or animals. Domestic and industrial facilities, although regulated through a permit process, may exceed the permitted limits or otherwise discharge more than the receiving water system can accommodate. (U.S. Fish and Wildlife Service, 2015s)

Diseases affect species from the individual level to the ecosystem level, and can be the main driver of a species becoming threatened or endangered if pathogen transmission does not decrease as hosts become rare. Diseases can be detrimental to entire populations if the species has a high level of social interaction. Quantifying the impact of disease as an extinction factor has been difficult to quantify, because the effects of disease are difficult to isolate from other potential factors. (Frick, et al., 2015)

Disease also has a compounding effect on those endangered or threatened species with small populations and little genetic diversity. Lack of genetic diversity often results from inbreeding caused by geographic population division, founder effects, small population sizes, and lineage turnover. Species with fewer individuals or dispersed populations are more susceptible to succumbing to disease, as the species lacks the genetic diversity to effectively respond to the disease. (Agnarsson, Aviles, & Maddison, 2012)

Invasive species are species introduced to an ecosystem to which it is not native. Invasive species often cause harm to existing native species. Invasive species may be introduced intentionally, such as for pets or biocontrol, or unintentionally, such as in ballast water, hidden within vegetation, or other pathways. Invasive species can disturb natural communities and ecosystems. Impacts directly resulting from invasive species include reduction in stream flow;

water degradation; displacement and/or major alteration of native plant communities including composition of the understory; competition for natural resources; disruption of the food chain; increase soil erosion; and increase wildfire potential. (U.S. Fish and Wildlife Service, 2012b)

Climate change has triggered changes in extreme weather, increasing the number and strength of events over the past 50 years. Events that potentially damage habitats include heat waves, drought, heavy precipitation (rain and snowfall), flooding events, hurricanes, and other storms such as tornadoes, hail, and damaging thunderstorms (U.S. Global Change Research Program, Undated). Increased extreme weather events not only have destructive effects to the areas in which they occur, but also to species. Migratory bird species located as far as 60 miles from a hurricane can experience a long-term population loss and during times of drought, population losses can be as high as 13 percent. (National Aeronautics and Space Administration, 2010)

Climate change can potentially cause abrupt changes to habitat and ecosystems, and may be a threat to many species. Notably, climate change is affecting the migration of songbirds; birds' arrival dates are occurring before the availability of the necessary food supply. Climate change has exacerbated wildfires, insect outbreaks, pathogens, coral bleaching, disease outbreaks, and tree mortality. Higher water temperatures resulting from climate change impact cold and cool water fish, and rising sea levels affect fish and wildlife habitats. (U.S. Fish and Wildlife Service, 2012a)

It is generally accepted that climate change will result in a sea-level rise of 0.5 m to 2.0 m by 2100 thereby causing erosion and increased flooding, as well as submerging low-lying coastal areas. Habitat degradation and elimination will directly result from unmitigated climate change; however, there is much uncertainty concerning the magnitude and sources of impacts of sea-level-rise. Contradicting views on the effects of climate change are found in literature, and both are supported by empirical evidence. One school of thought believes the effects of sea level rise will be mitigated and habitat protection measures put in place, and those protection measures will be successful. In this body of research, actual impacts are smaller than potential impacts, although significant costs are associated with habitat protection measures. Conversely, others believe that climate change adaptation, mitigation, and habitat protection measures will either fail or will not be attempted, perhaps due to infeasibility. Potential impacts are accepted as actual impacts, translating to numerous, high impact disasters, with a high probability of retreat and abandonment of affected areas. More research on the effects of climate change adaptation, protection, and mitigation in coastal areas is necessary. (Nicholls, R. et al., 2010)

7 CONCLUSIONS

Based on a review of the current status of ESA species and critical habitat, the environmental baseline for the Action Area, the effects of the Proposed Action, and cumulative effects, FEMA has determined that the Proposed Action will have no effect on the continued existence of species listed as threatened or endangered under the ESA, designated critical habitat, and EFH.

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Appendix A: NFIP Program Description (June 25, 2015)

1 NFIP Introduction

Participation in the NFIP is based on a voluntary agreement between participating (local, tribal, and States) communities and the Federal government. If a community adopts and enforces a floodplain management ordinance that meets certain minimum floodplain management requirements to reduce future flood risks within an area known as the Special Flood Hazard Area, or SFHA, the Federal government will make flood insurance available to property owners in that community. Providing NFIP flood insurance indemnifies property owners from flood losses and reduces the costs of disaster assistance. NFIP floodplain management requirements are designed to reduce future flood damages and reduce disaster assistance costs. In addition to providing flood insurance and reducing flood damages through floodplain management, the NFIP identifies and maps the nation's floodplains. Maps depicting flood hazard information are disseminated to create broad-based awareness of flood hazards, provide data for rating flood insurance policies, and for determining the appropriate minimum floodplain management criteria for flood-prone areas.

1.1 Flood Insurance

Congress mandated that FEMA carry out a program that "will enable interested persons to purchase insurance against loss resulting from physical damage to or loss of real property or personal property related thereto arising from any flood occurring in the United States." 42 U.S.C. § 4011(a). The National Flood Insurance Act (NFIA) states that FEMA "shall make flood insurance available" in communities that have (1) evidenced interest in securing flood insurance through the NFIP and (2) adopted adequate floodplain management regulations consistent with criteria developed by FEMA. See 42 U.S.C. §§ 4012(c), 4022(a); *see also*, 44 C.F.R. § 60.1(a).

The NFIA made federal flood insurance available to property owners or lessees residing in communities that agreed to participate in the NFIP through the adoption of floodplain management guidelines. Congress recognized that insurance for "existing buildings" constructed before a community joined the NFIP would be expensive if the premiums were not subsidized by the Federal government. Congress also recognized that most of these older flood-prone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. Under the NFIP, "existing buildings" are generally referred to as Pre-FIRM (Flood Insurance Rate Map) buildings. These buildings were built before the flood risk was known and identified on the community's FIRM.

Subsidized insurance was available for existing buildings, but communities were required to protect new construction and substantially improved¹ structures through adoption and enforcement of community floodplain management ordinances. Subject to certain exceptions established in statute,² the NFIA requires that full actuarial rates reflecting the complete flood risk

¹ "Substantially damaged" or "substantially improved" refers to structures in which the cost to repair, or the cost to improve, the existing structure equals or exceeds 50% of the property's market value. Existing pre-FIRM buildings must be brought into compliance with the NFIP criteria when they are substantially damaged or improved.

² The statutory provisions that require FEMA to charge rates that are not actuarial are 42 U.S.C. 4014(e) and (f) (for certain unfinished or deaccredited levees) and 42 U.S.C. 4015(i) for policies of properties newly mapped into the SFHA).

be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. 42 U.S.C. §§ 4014(a)(1), 4015(b). These buildings are referred to as "Post-FIRM" buildings. Once FEMA identifies the flood risk and makes the information available to communities, actuarial rating assures that those located in such areas bear the full risks associated with buildings in flood-prone areas.

With the passage of the Biggert Waters Flood Insurance Reform Act of 2012 (BW-12), Congress mandated that the subsidies be phased out for certain pre-FIRM properties. The pre-FIRM properties for which subsidies will be phased out include non-primary residences, business properties, severe repetitive loss properties, substantially damaged properties, substantially improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property. BW-12 mandates that the premium rates on these properties be increased by 25% each year until full risk rates are achieved. FEMA has already begun phasing in full risk rates for pre-FIRM non-primary residences, severe repetitive loss properties (1-4 residences), substantially damaged or improved properties, and properties where the cumulative claims payments exceed the fair market value of the property. The rates on these properties will also be increased by 25% each year until full risk rates are achieved.

BW-12 also established a Reserve Fund, which is an account that would be established separate from other program funds and would be "available for meeting the expected future obligations of the flood insurance program..." FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment is primarily designed to build reserves to help meet expected future obligations in higher than average loss years; however, the funds can also be used to pay interest or principal on the current large amount of Program borrowing. The Reserve Fund Assessment was introduced in October 2013 as a 5% assessment, with that percentage expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1B annually.

On March 21, 2014, President Obama signed into law the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA). HFIAA removed some of the provisions of BW-12, not included in the discussion above, requiring the phase out of subsidies on pre-FIRM properties. Additionally, HFIAA amended the BW-12 provision requiring application of full risk rates to policies renewed after a lapse to exclude policies that lapsed because the policyholder was no longer required to maintain flood insurance. However, HFIAA also required a phase out of subsidies on all pre-FIRM properties at a rate of no less than 5% and no more than 15% premium increases per year, subject to certain exceptions established by statute (such as the BW-12 provisions) requiring a quicker phase-out for certain types of pre-FIRM properties. Accordingly, the subsidies on all pre-FIRM properties will likely be phased out within the next 15-20 years.

Under HFIAA, other changes to the Program include a new surcharge for all new and renewed policies (a \$25 surcharge on all policies for primary residences and a \$250 surcharge on all other policies). Implementation of the new surcharge begins in 2015 on all policies, with all funds collected from the surcharge to be deposited in the Reserve Fund described above. In addition, HFIAA requires FEMA to establish an affordability framework to address the affordability issues that have arisen since the passage of BW-12 and the associated premium rate increases.

1.2 The 100-Year Floodplain Standard

FEMA jurisdiction is limited to the Special Flood Hazard Area (SFHA), which is defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year (otherwise known as the 100-year floodplain). The 1-percent-annual-chance flood standard has been used since the inception of the NFIP and is used for insurance rating, and flood mapping purposes, as well as being used for floodplain management purposes by FEMA and all of the NFIP participating communities.

In order to assess and manage the flood risk, a national standard was needed. The U.S. Department of Housing and Urban Development, which initially administered the NFIP before FEMA was created, began its administration of the NFIP by calling on a group of experts to advise the agency as to the best standard to be used as the basis for risk assessment, insurance rating, and floodplain management for the Program. After extensive study and coordination with Federal and State agencies, this group recommended the 1-percent-annual-chance flood (also referred to as the 100-year or "Base Flood") be used as the standard for the NFIP.

The 1-percent-annual-chance flood was chosen on the basis that it provides a high level of protection while not imposing overly stringent requirements or the burden of excessive costs on property owners. The 1-percent-annual-chance flood (or 100-year flood) represents a magnitude and frequency that has a statistical probability of being equaled or exceeded in any given year, or, stated alternatively, the 100-year flood has a 26% (or about 1 in 4) chance of occurring over the life of a 30-year mortgage.

In 1973, the Senate Committee on Banking, Housing and Urban Affairs, which had oversight responsibility for the NFIP, heard arguments on both sides on the appropriateness of the 100-year base flood standard. The Committee concluded that the 1-percent-annual-chance flood was reasonable and consistent with national objectives in reducing flood losses. In 1981, the Office of Management and Budget (OMB) directed FEMA to review the use of the 1-percent-annual-chance flood as part of the President's 1981 Task Force on Regulatory Relief. In its report to OMB, FEMA reaffirmed the overwhelming support for the 100-year standard in responses from the public and private sector. Additionally, the standard was re-validated within the last decade at the Gilbert F. White National Policy Forum.

1.3 Floodplain Management

Congress created the NFIP to "provid[e] appropriate protection against the perils of flood losses" and to "minimiz[e] exposure of property to flood losses." 42 U.S.C. § 4001(c). A community's participation in the NFIP is voluntary. Participation is based on an agreement between communities and the Federal government whereby as a condition of receiving federal flood insurance, communities agree to adopt and enforce certain floodplain management criteria designed to reduce flood hazard risk. A "community" is a governmental body with the authority to "adopt and enforce floodplain management regulations for the areas within its jurisdiction." 44 C.F.R. § 59.1. Eligible communities can include cities, villages, towns, townships, counties, parishes, States, and Indian tribes. *Id.*

FEMA has no land use authority. The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations, falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances. Consequently, the

NFIP was created as a Federal-State-Local partnership that depends on State statutes and regulations that authorize local governments to regulate floodplain development under the State's police powers to protect to the health, safety, and general welfare of its citizens. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

Because FEMA has no land use or permitting authority, its role is limited to, establishing the minimum floodplain management criteria, enrolling communities in the NFIP, and monitoring and oversight to ensure that communities are complying with the NFIP program requirements, and community-level enforcement of the program requirements.

1.3.1 Enrolling Communities in the NFIP

The NFIP provides flood insurance coverage only in States and communities that adopt and enforce floodplain management measures that meet the minimum floodplain management criteria established by regulation. Communities must apply to participate, submit compliant floodplain management requirements, and meet other program requirements. FEMA has established processes to enroll communities in the NFIP and to ensure that eligible communities continue to meet program requirements.

1.3.2 Floodplain Management Criteria

In order to participate in the NFIP, a community must adopt and enforce floodplain management regulations that meets the NFIP floodplain management criteria. See 44 C.F.R. §§ 59.2(b), 59.22(a)(3), 60.1(d). Additionally, communities are allowed, and encouraged, to adopt floodplain management regulations that are more restrictive than the minimum criteria. These criteria are designed to reduce flood damage and encourage better long-range management and use of flood-prone areas. In the absence of the minimum floodplain management criteria, much floodplain development would go completely unregulated except to the extent that the communities themselves voluntarily regulate it. Many communities had little or no floodplain development regulations in place prior to joining the NFIP.

FEMA sets certain nationally applicable minimum floodplain management criteria related to reducing flood hazard risk in floodplain areas for all NFIP participating communities. These minimum floodplain management criteria must be incorporated into community ordinances and regulations as a condition of participation in the Program. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. As such, FEMA cannot prohibit development; it can only place certain requirements on how that development will occur.

Communities incorporate these requirements into their zoning codes, subdivision ordinances, and/or building codes, or they adopt special purpose floodplain management ordinances. These NFIP requirements apply to areas mapped as SFHAs. The community ordinances must also include effective enforcement provisions. See 44 C.F.R. § 59.2(b). A community that fails to adequately enforce its floodplain management ordinance may be put on probation or suspended from the NFIP. See 44 C.F.R. § 59.24(b)-(c).

Because FEMA is not authorized by statute to act as a permitting authority, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process. Before a property

owner can undertake any development in the SFHA, a permit must be obtained from the community. 44 C.F.R. § 60.3(a)(2). The community is responsible for reviewing the proposed development to ensure that it complies with the community's floodplain management ordinance and that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, such as Clean Water Act wetland permits from the United States Army Corps of Engineers (USACE). *Id.* FEMA has no knowledge of any community issued permits in the floodplain until subsequent community monitoring efforts occur.

Participating communities must apply the minimum floodplain management criteria to all new construction in the SFHA, as well as to existing buildings in the SFHA that have been substantially damaged or substantially improved. It is the community's responsibility to make substantial improvement or substantial damage determinations. If a community determines that the cost of any re-construction, rehabilitation, addition, or other improvements to a building equals or exceeds 50% of the market value of the building before the construction began, the building is considered a "substantial improvement". If a community determines that the cost of restoring a building equals or exceeds 50 of the market value of the building before the damage occurred, the building is considered "substantially damaged".

1.3.3 Map Adoption Process

The basis for a community's floodplain management regulations is the flood hazard data provided to the community by FEMA. As discussed in more detail below, FEMA identifies flood hazards nationwide and publishes and periodically updates flood hazard data in support of the NFIP. This flood hazard data is provided to the communities in the form of a Flood Insurance Rate Map (FIRM) or Flood Insurance Study (FIS). Each time FEMA provides a community with additional flood hazard data, that community must adopt new floodplain management regulations, or amend existing regulations, to incorporate the new data. The community has 6 months to incorporate the new data or it will be immediately suspended from the NFIP. (44 C.F.R. §§ 59.24(a) and 60.13).

1.3.4 Compliance Monitoring: Community Assistance Contacts and Visits

FEMA, or the States on behalf of FEMA, conduct Community Assistance Contacts (CACs) and Community Assistance Visits (CAVs) to monitor community floodplain management programs. A CAC is a telephone call or brief visit to an NFIP community for the purpose of establishing or re-establishing contact to determine if any program-related problems exist and to offer assistance. A CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program. A CAV typically involves a tour of the floodplain, a meeting with local floodplain management officials, and an examination of the community's floodplain development permit and variance files.

1.3.5 Enforcement

When a potential violation is reported to FEMA for further investigation, FEMA will notify the community. FEMA may also identify potential violations while conducting a CAC or a CAV. FEMA has an established process for pursuing compliance actions including technical assistance, probation, and finally suspension. Additionally, a community that participates in the Community Rating System (discussed below) must be fully compliant with the minimum standards of the NFIP. A CRS community that is not fully compliant will be provided an opportunity to remedy the violation to the maximum extent possible. If substantive program

deficiencies or violations have not been remedied to the maximum extent possible, the community will be retrograded to a Class 10 (non-participation in CRS).

Compliance actions will be taken if any violations are identified and not remedied to the maximum extent possible (44 C.F.R. § 59.24 (b)-(c)). When a community has failed to enforce the NFIP floodplain management requirements and FEMA has identified one or more substantive program deficiencies or violations, FEMA may initiate an enforcement action against the community in order to obtain compliance. A substantive violation or program deficiency is one that has resulted, or could result, in increased potential flood damages or flood stages in the community and surrounding communities. When community assistance has failed to resolve a community's compliance problems, the NFIP may place the community on probation. When a community is placed on probation, a \$50 surcharge will be added to the flood insurance policies of all policyholders in that community (44 C.F.R. §§ 59.24(b)-(c) and 61.16). Probation lasts for a minimum of one year and may be extended.

Communities that do not comply while on probation can be suspended from the NFIP. Flood insurance is not available from FEMA in communities that have been suspended. Suspension also means that the community will be unable to obtain many forms of disaster assistance when a community suffers a disaster. Additionally, lenders will not be able to provide loans backed by the Federal government for property located in the SFHA if a community is suspended from the program (44 C.F.R. § 59.24(b)-(c)).

1.3.6 State Floodplain Management Role

States also have a role in the NFIP and many have established State floodplain management programs. Each State has designated an NFIP State Coordinating Agency as a point of contact for the NFIP. Generally, the State Coordinating Agency is the State environmental or natural resources agency or the State emergency management agency. Most States provide technical assistance to communities using FEMA funding under the Community Assistance Program – State Support Services Element (CAP-SSSE), their own funding, or a combination of the two. CAP-SSSE was developed in recognition that there were not sufficient FEMA staff resources to provide technical assistance to or monitor compliance with all the participating NFIP communities and that other resources would have to be leveraged.

Many States have adopted floodplain management statutes and regulations and have established and funded their own floodplain management programs. States must also have floodplain management regulations or executive orders in place that meet the minimum requirements of the NFIP for State-owned properties in SFHAs. Where a State requires that communities adopt more restrictive requirements than the NFIP minimum requirements, such as a more restrictive floodway or additional freeboard (requiring new construction to be elevated to a level 1 or more feet higher than the BFE), the State requirements take precedence over the NFIP minimum floodplain management standards, as long as the state enforces these higher standards..

1.3.7 Community Rating System

The NFIP Community Rating System ("CRS") was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards, and was codified under the National Flood Insurance Reform Act of 1994. See, *generally*, 42 U.S.C. § 4022(b). Any community in full compliance with the minimum NFIP floodplain management requirements may apply to join the CRS.

Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

- Reduce and avoid flood damages to insurable property;
- Protect public health and safety;
- Reduce damage to property;
- Prevent increases in flood damage from new construction;
- Reduce the risk of erosion damage;
- Protect natural and beneficial floodplain functions;
- Strengthen and support the insurance aspects of the NFIP;
- Improve flood insurance policy coverage;
- Improve actuarial rating;
- Foster comprehensive floodplain management;
- Protect natural floodplain functions;
- Address safety and health; and
- Protect other community assets such as infrastructure, critical facilities and open space.

The CRS uses a class rating system to determine flood insurance premium reductions for residents. CRS classes are rated from 10 to 1. As a community engages in additional mitigation activities, community residents become eligible for additional NFIP premium policy discounts. Each class improvement produces an additional 5% discount in flood insurance premiums, with a Class 1 community receiving the maximum 45% reduction in flood insurance premiums. The CRS recognizes 19 creditable activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Some CRS activities for which communities may receive credit are environmentally protective activities, such as preserving open space, creating higher standards for stormwater management, and preserving the natural and beneficial functions of floodplains.³

As of June 20, 2014, there are 1,296 communities receiving flood insurance premium discounts based on their implementation of local mitigation, outreach, and educational activities that go well beyond minimum NFIP requirements. Although premium discounts are one of the benefits of participation in the CRS, these communities are carrying out important activities that save lives, reduce property damage, and protect the natural and beneficial functions of floodplains. These 1,200-plus communities represent a significant portion of the nation's flood risk as evidenced by the fact that they account for over 66% of the NFIP's policy base. Communities

³ The Coordinator's Manual for the CRS includes the CRS Schedule, which sets the criteria for CRS classification, and the CRS Commentary on the Schedule. Section 100 gives general background information on the CRS. Section 200 explains the application and verification procedures. Sections 300 through 700 explain the credit points and calculations that will be used to verify CRS credit. The procedures in these sections are used by a community to submit a modification for a better CRS classification.

receiving premium discounts through the CRS cover a full range of sizes from small to large, and a broad mixture of flood risks, including coastal and riverine.

1.4 Flood Hazard Mapping

Through its Flood Hazard Mapping Program, FEMA identifies flood hazards, assesses flood risks, and collaborates with States and communities to provide accurate flood hazard and risk data to guide them to mitigation actions. Mapping of flood hazards promotes public awareness of the degree of hazard within such areas and provides for the expeditious identification and dissemination of flood hazard information. The flood maps are accessed frequently for planning and design activities and for lending and real estate transactions. They are used by mortgage lenders, insurers, real estate agents, map determination companies, community officials, land developers, engineers and surveyors, State and local emergency response officials, and property owners. The flood maps are also used by States and communities for emergency management, land-use planning, and water resources planning and by Federal agencies implementing Executive Order 11988, Floodplain Management, for Federal actions proposed in or affecting floodplains.

Under the NFIA, as amended, FEMA is required by Congress to identify flood-prone areas and to subdivide them into flood risk zones to promote public awareness of the degree of hazard within such areas and to provide for the expeditious identification and dissemination of flood hazard information. See 42 U.S.C. § 4101. While a variety of flood zones are mapped on FIRMs, the 100 year flood (or 1-percent-annual-chance flood as it is now called) is the standard used for implementation of the NFIP.

The NFIA also requires FEMA to assess the need to revise and update FIRMs and flood-risk zones "based on an analysis of all natural hazards affecting flood risks." 42 U.S.C. § 4101(e)-(f). State or local governments may request map revisions, but they must provide sufficient technical data to justify the request. See 42 U.S.C. § 4104 (f)(2) and 44 C.F.R. §§ 65.4- 65.8; 44 C.F.R. Part 72. However, revisions and updates to floodplain areas and flood risk zones are subject to budget constraints and fluctuations in congressional appropriations.

1.4.1 Flood Insurance Studies

To assess flood hazards in a community, FEMA conducts Flood Insurance Studies ("FISs") and publishes FIS reports that describe the flood hazards for the community. FEMA uses the information developed during the FIS to prepare Flood Insurance Rate Maps ("FIRMs") that show flood hazard delineations in the community, subdivided risk zones that can be used to determine flood insurance risk premiums, and other types of flood hazard information. FIRMs typically show flood elevations and areas subject to inundation by the 1% annual-chance flood. 44 C.F.R. § 59.144 C.F.R. § 59.1. The detail of the flood hazard information shown on the FIRM is dependent on the level of detail of the study, which is in turn based on funding constraints and community mapping needs. There are a number of significant flood hazard designations shown on FIRMs. These are as follows:

Base Flood Elevations - For flooding sources studied based on detailed hydraulic methods, FEMA develops a profile of Base Flood Elevations (BFEs), or the flood levels along a flooding source that have a 1% chance of occurring in a given year. This flood profile is published in the FIS report, and BFEs for specific locations along the profile are noted on the FIRM. Profiles of other flood frequencies (e.g., the 0.2% annual-chance, or 500-year, flood) also may be developed as part of an FIS and published in the FIS report.

Special Flood Hazard Areas (SFHAs) - An SFHA is defined as the area along a flooding source that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance flood also is described as the base, or 100-year, flood. SFHAs are subdivided into a number of zones based on the types of flood hazards present. See 44 C.F.R §§ 59.1 and 64.3. These areas are shown on the FIRM as either V zones (V, VE, V1-30) or A zones (A, AE, A1-30, AO, AH, AR, AR1-30). V zones are high hazard zones in coastal areas that are subject to high velocity wave impacts. A zones include coastal floodplains that are less hazardous than V zones, floodplains along rivers and streams, and areas susceptible to other flooding sources. This area is also known as the 100-year floodplain.

Regulatory Floodways - A regulatory floodway is the channel of a riverine flooding source and the adjacent land areas that must be kept clear of obstructions to allow passage of the 1-percent-annual-chance flood without causing the water surface elevation to rise beyond a designated height in areas of the SFHA outside the floodway (floodway fringe). Designation of regulatory floodways is done separately from the hydrologic and hydraulic analyses performed to delineate SFHAs and calculate BFEs.

0.2% annual-chance Floodplain - The 0.2%-annual-chance floodplain is defined as the area subject to inundation by the flood having a 0.2% chance of being equaled or exceeded in any given year. This area is also known as the 500-year floodplain.

Velocity or V-Zones - FEMA designates V-zones (or "coastal high hazard areas") on NFIP maps to delineate areas where larger waves (3 feet or greater) and other dynamic forces can be expected to cause damages and erosion. Communities participating in the NFIP are required to carry out certain floodplain management activities in V-zones, and FEMA works with communities through the Risk MAP process to delineate such areas whenever funding is available to perform the complex modeling that is necessary.

Primary Frontal Dune - FEMA also considers the existence of a Primary Frontal Dune⁴ in determining the inland extent of V-zones. Additionally, FEMA designates coastal A-zones in coastal high hazard areas⁵ landward of the V-zone delineation.

After completing the analyses of the flood hazards for a community, an FIS report can be compiled and flood hazard data can be reflected on the FIRM, which functions as the basis for insurance rate-setting by FEMA. The FIS report gives a narrative of the flood hazards as well as

⁴ Section 59.1 defines "primary frontal dune" as follows:

...a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

⁵ Section 59.1 of the NFIP regulations defines "coastal high hazard area" as follows:

...an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

the flood profiles and floodway data, while the FIRM reflects the graphical representation of the flood risk within a community. Table A-1 summarizes zones within the SFHA and how the zone designations label correlates directly to the flood hazard information that has been provided for that area.

Table A-1 Special Flood Hazard Area Designations

Zone Designation	Definition
A	SFHAs with no BFEs or floodway determined
AE	SFHA with BFEs determined and in some cases floodway determined
A1-A30	SFHAs with BFEs determined and in some cases floodway determined (old format, not used on newer FIRMs)
AH	SFHA with flood depths of 1 to 3 ft (usually areas of ponding); BFEs determined
AO	SFHA with flood depths of 1 to 3 ft (usually sheet flow on sloping terrain or ponding); average depths determined
V	Coastal flood zone with no BFE determined
VE	Coastal flood zone with velocity hazard (wave action); BFE determined
V1-V30	Coastal flood zone with velocity hazard (wave action); BFE determined (old format, not used on newer FIRMs)

In addition to flood insurance rating uses, the level of flood hazard shown on FIRMs is also a factor in determining the regulations that apply to communities that participate in the NFIP. See 44 C.F.R. § 60.3, with the presence of V-zones, or coastal high hazard zones, requiring enforcement of the most stringent floodplain management requirements to maintain eligibility for participation in the NFIP.

After completing the analyses of the flood hazards for a community, an FIS report can be compiled and flood hazard data can be reflected on the FIRM, which functions as the basis for insurance rate-setting by FEMA. The FIS report gives a narrative of the flood hazards as well as the flood profiles and floodway data, while the FIRM reflects the graphical representation of the flood risk within a community.

1.4.2 Risk Mapping, Assessment, and Planning (Risk MAP)

Risk MAP represents a focus on delivery of quality data that increases public awareness of hazards and leads to action that reduces risks to life and property. The goals under Risk MAP are as follows:

- **Flood Hazard Data.** Address gaps in flood hazard data to form a solid foundation for risk assessment, floodplain management and actuarial soundness of the National Flood Insurance Program (NFIP).
- **Public Awareness/Outreach.** Ensure that a measurable increase of the public's awareness and understanding of risk results in a measurable reduction of current and future vulnerability.

- Hazard Mitigation Planning. Lead and support States, local and tribal communities to effectively engage in risk-based mitigation planning resulting in sustainable actions that reduce or eliminate risks to life and property from natural hazards.
- Enhanced Digital Platform. Provides an enhanced digital platform that improves management of Risk MAP, stewards information produced by Risk MAP, and improves communication and sharing of risk data and related products to all levels of government and the public.
- Alignment and Synergies. Align Risk Analysis programs and develop synergies to enhance decision-making capabilities through effective risk communication and management.

The Risk MAP process was developed not only to introduce new and useful tools to help address these challenges, but also to create partnerships with communities affected by flooding and other hazards. By engaging local communities throughout the process and by sharing ownership of the products, Risk MAP results in tools that meet the needs of individual communities and stakeholders, and can be used to effectively communicate and reduce risk from flooding and other hazards.

In addition to production of two regulatory products, FISs and FIRMs, that are used to establish flood insurance rates and determine the applicability of the minimum floodplain management criteria, Risk MAP produces non-regulatory products that are companions to the regulatory documents. These products are useful tools that can be used by communities to assess, communicate, and reduce risk from flooding.

1.4.3 Technical Mapping Advisory Council

Biggert Waters further clarifies FEMA's mapping mandate by specifying that FEMA is to identify, review, update, maintain, and publish NFIP rate maps with respect to all populated areas and areas of possible population growth within the 100-year and 500-year floodplains; areas of residual risk, including areas that are protected by levees, dams, and other flood control structures; areas that could be inundated as a result of the failure of a levee, dam, or other flood control structure; and the level of protection provided by flood control structures. 42 U.S.C. § 4101b. However, in implementing these new requirements, FEMA must consider the recommendations of the Technical Mapping Advisory Council (TMAC), a body to be established 42 U.S.C. 4101a. *Id.* at § 4101b(a). The TMAC will provide recommendations on how these mandates should be carried out. Once the TMAC has issued its recommendations, FEMA will determine whether and how to incorporate those recommendations into its flood mapping program.

The TMAC is also required to consult with scientists and technical experts, other Federal agencies, States, and local officials to develop recommendations regarding consideration of future conditions (based on best available climate science, sea level rise data, and predictions of future development) with respect to preparation of FIRMs. Based on these consultations, the TMAC is required to prepare a separate report from the TMAC to the FEMA Administrator that will contain recommendations regarding the treatment of future conditions within the context of the NFIP. FEMA established the TMAC, and it was first convened in October 2014. The TMAC will produce recommendations via their first annual report in October 2015.

1.4.4 Mapping Process

Work on flood hazard mapping continues to be conducted under the Risk Mapping, Assessment, and Planning (Risk MAP) Program vision, which integrates and aligns FEMA's individual risk analysis programs. The Risk MAP approach depends on beginning outreach and community engagement early in the project and carrying it through the project life cycle. It is dependent on collaboration between FEMA and communities in making project decisions and leveraging local data to improve the depiction of localized risk.

The NFIP study and mapping process currently employed under Risk MAP can be subdivided into the following Risk MAP project phases:

- Planning and Budgeting;
- Discovery;
- Data Development and sharing;
- Risk awareness and mitigation outreach;
- Proposed NFIP map changes and impacts;
- Preliminary NFIP map release and mitigation planning; and
- Due process and path forward.

1.4.4.1 Planning and Budgeting

The purpose of the planning and budgeting phase is to identify which watersheds will be reviewed and the order in which this should occur. Rough drafts of project budgets, schedules, and scope are developed during this phase through interaction between FEMA, FEMA contractors, and State and community stakeholders.

1.4.4.2 Discovery

Once a watershed has been selected to receive a new study, discovery is completed prior to the development of a flood risk project. The purpose of the discovery process is to engage communities, understand their watershed needs, inform them of the purpose of FEMA's engagement, and balance FEMA resources to plan project execution. Projects may not lead to development of a regulatory product such as a new FIRM or FIS.

The discovery process provides for the exchange of information among the various stakeholders and includes meeting with stakeholders to better understand the watershed, deciding whether a flood risk project is appropriate, and if so collaborating on the project planning in detail. Discovery is required for all new and updated flood risk projects.

1.4.4.3 Data Development and Sharing

After Discovery is completed and if a flood risk product is appropriate, FEMA begins data development and sharing for the areas identified during the Discovery phase. This phase will entail completion of some or all of the following tasks:

- Developing or obtaining topographic and field survey data needed for engineering analyses and floodplain boundary delineations or redelineations;
- Performing engineering analyses to develop new or updated flood hazard data and delineating or redelineating floodplain boundaries;

- Obtaining and preparing the base map for FIRM production;
- Digitally transferring those floodplain boundaries that are not being updated directly from the effective flood maps;
- Merging new or updated flood hazard data (for updated portions of flooding sources) with effective flood hazard data to produce the new or updated FIRM;
- Producing or revising the FIS report, including the text, Flood Profiles, and data tables (e.g., Summary of Discharges Table, Floodway Data Table); and
- Producing and delivering non-regulatory products such as HAZUS analyses and depth grids.

During the data development and sharing phase, FEMA issues the preliminary copies of the new or updated FIRM and FIS report to officials of the affected communities for review and for distribution to other interested parties in the communities, who then have the opportunity to comment on the Preliminary FIRM and FIS report through an informal comment period, and through formal meetings with community officials and the public. If information received during the informal public review or subsequent meetings requires FEMA to make changes in base map or flood hazard information, FEMA incorporates these changes and issues Revised Preliminary maps and a revised FIS report.

1.4.4.4 Risk Awareness and Mitigation Outreach

This phase focuses comprehensively on mitigation planning, mitigation options available to communities, sharing of success stories, and potential mitigation actions that communities can initiate.

1.4.4.5 Proposed NFIP Map Changes and Impacts

This phase involves collaboration between FEMA and community officials to plan for preliminary map release, build consensus on the impacts of mapping changes, and encourage implementation of mitigation using available resources.

1.4.4.6 Preliminary NFIP Map Release and Mitigation Planning

In this phase, FEMA shares the preliminary map with community officials and works with them on uses for Risk MAP product. FEMA also provides information to stress the value of and timeline for updates to the mitigation plan and solicits a commitment from community to act.

1.4.4.7 Due Process and Path Forward

During this phase, FEMA works with community officials to share flood hazard and risk information with local citizens, explain the new proposed maps, actions taken and planned, and individual responsibility for managing risk. These efforts are aimed at encouraging communities to identify short-and long-term efforts to progress toward increasing flood risk awareness and floodplain management. This phase includes execution of the statutory due process activities required for changes in flood elevation information, including publication of the public notice in a local newspaper and the Federal Register of the pending start of a formal 90-day appeal period, during which time affected property owners can work through the community to submit information that tends to negate or contradict the information presented on the FIRM. Once all appeals are resolved, FEMA issues a final determination. Communities are then required to adopt the new FIS and FIRM into their floodplain management ordinance within 6 months from

the date of the final determination or they will be automatically placed on suspension from the program. See 44 C.F.R. § 59.24.

1.4.4.8 Process for Reflecting Changes to Flood Maps

The flood risk information presented on a FIRM and in the FIS report forms the technical basis for the administration of the NFIP. FEMA exercises great care to ensure that the analytical methods employed in producing a FIS are scientifically and technically correct, that the engineering standards followed meet professional standards, and, ultimately, that the results of the FIS are accurate. Nevertheless, FEMA recognizes that changes to the maps and reports may be necessary. Some reasons for the changes are improvements in the techniques used in assessing flood risks, changes in physical conditions in the floodplains or watersheds, and the availability of new scientific or technical data.

FEMA is statutorily required to revise flood maps "(1) upon the determination of the Director, according to the assessment under subsection (e), that revision and updating are necessary for the areas and zones; or (2) upon the request from any State or local government stating that specific floodplain areas or flood-risk zones in the State or locality need revision or updating, if sufficient technical data justifying the request is submitted and the unit of government making the request agrees to provide funds in an amount determined by the Director... ." 42 U.S.C. § 4101.

1.4.5 Letter of Map Change

FEMA can revise maps by conducting a new or revised FIS or through a Physical Map Revision (PMR) or a Letter of Map Change (LOMC). A PMR involves the revision of a full FIRM panel, which will then be reprinted and published with a new effective date. There are a number of LOMCs that FEMA issues including the Letter of Map Amendment (LOMA), the Letter of Map Revision (LOMR), the Letter of Map Revision based on Fill (LOMR-F), and conditional versions of these letters.

In addition, there are limitations imposed by the scale at which the maps are prepared, which may result in individual properties being inadvertently included in SFHAs. FEMA has developed a process, referred to as a LOMA, to correct these inadvertent inclusions. A LOMA is issued pursuant to an administrative procedure that involves the review of technical data submitted by the owner of property who believes the property has incorrectly been included in a designated SFHA. A LOMA establishes whether a specific property, or a specific structure on the property, is or is not located in an SFHA. LOMA applications typically involve the provision of additional information such as better and more precise elevation information. FEMA issues a letter stating that the property is in or out of the SFHA. These letters are not related to the floodplain development for the physical structure, and there is no associated floodplain development involved. In fact, a LOMA cannot be issued if fill has been added to the lot or parcel.

FEMA has also established administrative procedures for changing or revising effective maps based on new or revised scientific or technical data that reflect other changes to the floodplain. These map actions are referred to as Letter of Map Revision (LOMR) and Letter of Map Revision based on Fill (LOMR-F).

The LOMR process is an administrative process by which a community can submit technical data to revise the FIS and FIRM. The result is a letter from FEMA to the Chief Executive Officer of the community officially revising the current effective FIRM and FIS. The reasons for these types of revisions are flood control projects, physical change (natural or manmade) to the

floodplain or watershed, updated flood hazard data, and/or improvements in the processes through which flood risk is assessed.

A LOMR-F is submitted for properties on which fill has been placed to raise the structure or lot to or above, the 1-percent-annual-chance flood elevation. NFIP regulations require that the lowest adjacent grade of the structure be at or above the 1-percent-annual-chance flood elevation for a LOMR-F to be issued. The participating community must also determine that the land and any existing or proposed structures are "reasonably safe from flooding." Additionally, both the lowest point on the lot and the lowest floor of the structure must be at or above the 1-percent-annual-chance flood elevation. A LOMR-F revises the currently effective FEMA map and establishes that a specific property is or is not located in an SFHA.

NFIP regulations require FEMA to revise and amend maps and FIS reports, as warranted, or after it receives requests from community officials and individual property owners. To help FEMA ensure that the maps and reports present information that accurately reflects existing flood risks, the NFIP regulations require that each NFIP community inform FEMA of any physical changes that affect BFEs in the community and, within six months of the date that such data are available, submit data that show the effects of the changes.

In making revisions and amendments, FEMA must adhere to the same engineering standards applied in the preparation of the original FIRMs and FIS reports. Therefore, when requesting changes to FIRMs and FIS reports, community officials and property owners are required to submit adequate supporting data. Those data enable FEMA to review and evaluate the requests and to carry out its responsibility of ensuring that the flood-risk information presented is scientifically and technically correct.

1.4.6 Conditional Letters of Map Change (CLOMC)

Because LOMAs, LOMR-Fs, and LOMRs officially amend or revise the flood maps, they must reflect existing conditions, such as an "as-built" project. However, communities, developers, and property owners may submit requests for proposed projects in floodplain areas to FEMA for review and comment. FEMA's comment is provided in the form of a "conditional" amendment or revision, also known as a CLOMA, CLOMR-F, or CLOMR, which state whether the proposed project, if built as proposed, would warrant a map revision. A CLOMA, CLOMR-F, or CLOMR does not constitute a building permit or approval; the authority to approve projects and issue building permits lies with the local community and, in some instances, State agencies.⁶

1.4.7 Depiction of Levees and Coastal Structures on Maps

FEMA does not certify, design, construct, fund, permit, or otherwise approve levees, levee systems, or floodwalls. See, generally, 44 C.F.R. § 65.10. However, FEMA has criteria that must be met before any levee, levee system, or floodwall can be depicted on a FIRM as providing protection from the 1-percent-annual-chance flood, also referred to as the base flood. *Id.* These criteria may be found in 44 C.F.R. §65.10. To be depicted on a FIRM as providing protection for the base flood, or accredited, the community or other party must provide FEMA with specific data certified by a registered engineer or a Federal agency with responsibility for

⁶ Additional information on the requirements for LOMR, CLOMR, LOMR-F, CLOMR-F, LOMA, and CLOMA processing may be found in Volume 2, Section 2.4 of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*. The regulatory requirements for LOMRs, CLOMRs, LOMR-Fs, and CLOMR-Fs may be found in Parts 65 and 72 of the NFIP regulations. The regulatory requirements for LOMAs and CLOMAs may be found in parts 70 and 72 of the NFIP regulations.

levee design demonstrating the levee, levee system, or floodwall provides protection from the base flood. *Id.* § 65.10; see also 44 C.F.R. § 65.2. FEMA's review of this data is "for the sole purpose of establish[ing] appropriate risk-zone determinations for NFIP maps" and does not "constitute a determination or warranty by FEMA as to how a structure or system will perform in a flood event." *Id.* at § 65.10(a). Because of the potentially devastating effects to life and property should a levee or floodwall fail or be overtopped, FEMA takes great care in considering the impacts of such structures on flood hazards.

FEMA recognizes only a levee, levee system, or floodwall that meets, and continues to meet, minimum design, operation, and maintenance criteria. Specifically, the criteria established in 44 C.F.R. §65.10 must be satisfied before such a structure may be accredited and mapped as providing protection from the 1-percent-annual-chance flood event.

However, structures that cannot meet the accreditation requirements of 44 C.F.R. § 65.10, such as non-accredited levees or levee systems, may still provide some protection from the 1-percent-annual-chance flood. To address such structures, FEMA has developed an approach for analyzing flood hazards in the vicinity of non-accredited levees, levee systems, or floodwalls. This approach is known as the Levee Analysis and Mapping Procedure ("LAMP"). The operating guidance for LAMP may be found at [http://www.fema.gov/media-library-data/1382477406782-6e78917df29206c388557ca0baf22d3b/Operating+Guidance+12-13+Non-Accredited+Levee+Analysis+and+Mapping+Guidance+\(Sept.+2013\).pdf](http://www.fema.gov/media-library-data/1382477406782-6e78917df29206c388557ca0baf22d3b/Operating+Guidance+12-13+Non-Accredited+Levee+Analysis+and+Mapping+Guidance+(Sept.+2013).pdf).

LAMP leverages recent technological advances in data collection and hydrologic and hydraulic modeling that allow refinements to the assessment of flood hazard reduction that non-accredited levee systems provide. FEMA's previous approach to mapping areas adjacent to non-accredited levees, levee systems, and floodwalls was to map the area as if the levee, levee system, or floodwall did not exist. The new LAMP approach involves selection of one of five specifically documented procedures. Selection of an appropriate procedure, as explained in the operating guidance, is based on available data for each reach, or continuous length of a levee system to which a single analysis and mapping procedure may be applied; available engineering data for the structure; and stakeholder engagement.

1.4.8 Zone A-99 Levees

Communities, State, and Federal agencies may design and build new levee systems or they may restore the flood risk-reduction capability of existing levee systems to address flood hazards and reduce flood risks in a particular community or particular area of a State. When these types of projects involve Federal funds and certain milestones are met, a community may choose to submit the appropriate data and documentation to FEMA and request an "adequate progress" determination. To establish eligibility for an "adequate progress determination", the community must show that:

- 100% of the total financial project cost of the completed flood protection system has been authorized;
- At least 50% of the total financial project cost of the completed flood protection system has been expended;
- At least 60% of the total financial project cost of the completed flood protection system has been appropriated;

- All critical features of the flood protection system, as identified by FEMA, are under construction, and each critical feature is 50% completed as measured by the actual expenditure of the estimated construction budget funds; and
- The community has not been responsible for any delay in the completion of the system. 42 U.S.C. § 4014(e); *see also*, 44 C.F.R. § 61.12.

If FEMA makes an adequate progress determination, the SFHA zone designation will be changed to the Zone A99 designation for the levee-impacted area. The flood insurance premium rates for properties located within the Zone A99 will be the same as the standard lower risk rates that would be applicable when the project is completed. See 42 U.S.C. § 4014(e). However, the mandatory flood insurance purchase requirement is still in effect for areas receiving the designation change. Additionally, the floodplain management criteria still apply to these areas. See 44 C.F.R. § 60.3(f).

1.4.9 Zone AR Levees

Communities, State agencies, or Federal agencies may restore the flood protection and risk reduction capability of existing levee systems to address flood hazards and reduce flood risks in a particular community or particular area of a State. When such projects involve restoration of a levee system that meets the criteria in 44 C.F.R. § 65.14, a community may choose to submit the appropriate data and documentation to FEMA and request that FEMA make a "flood protection restoration" determination.

Zone AR is a flood insurance risk zone designation that may be used by FEMA to identify flood risk on a FIRM in areas where a flood protection system (i.e., levee system) previously credited with providing protection against the 1-percent-annual-chance or greater level of flood protection no longer provides that level of protection. See 42 U.S.C. § 4014(f). The "A" denotes that the area is an SFHA, and the "R" denotes that the flood protection system is being restored to a 1-percent-annual-chance level of flood protection.

A community may be eligible for the Zone AR designation if the community is engaged in the process of restoring a flood protection system that was:

- Constructed using Federal funds;
- Recognized as providing 1-percent-annual-chance flood protection on the effective FIRM; and
- Decertified by a Federal agency responsible for flood protection design or construction. 44 C.F.R. § 65.14.

If FEMA makes a "flood protection restoration" determination, insurable structures behind the levee may receive significantly lower flood insurance premiums. See 42 U.S.C. § 4014(f). However, the mandatory flood insurance purchase requirement is still in effect for areas receiving the designation change. Additionally, the floodplain management criteria still apply to these areas. See 44 C.F.R. § 60.3(f).

1.4.10 Mapping Coastal Barrier Resources System Areas and Otherwise Protected Areas

The U.S. Congress passed the Coastal Barrier Resources Act in 1982 and the Coastal Barrier Improvement Act in 1990, defining and establishing a system of protected coastal areas (including the Great Lakes) and Otherwise Protected Areas (OPAs) known as the Coastal Barrier Resources System (CBRS). The Acts provide protection to CBRS areas by prohibiting

most expenditures of Federal funds in CBRS areas, including the sale of flood insurance for buildings constructed or substantially improved after the effective date of the CBRS area. These prohibitions refer to "any form of loan, grant, guarantee, insurance, payment, rebate, subsidy or any other form of direct or indirect Federal assistance," with specific and limited exceptions.

Because of the prohibition on the sale of flood insurance for buildings constructed or substantially improved after the CBRS effective date, it is critical to depict these areas on FIRMs. Thus, FEMA, in cooperation with the U.S. Fish and Wildlife Service (FWS), transfers the boundaries from congressionally adopted source maps to FIRMs to help ensure that insurance agents will not inadvertently sell flood insurance policies for ineligible buildings.

To ensure the integrity of the CBRS boundaries on the FIRMs, FEMA entered into an agreement with FWS that enables them to provide an official CBRS data layer to FEMA during the map revision process.

1.5 Mandatory Purchase Requirement

The NFIA was passed in 1968 and, as of 1972 when Tropical Storm Agnes in 1972 resulted in significant damages, there were only 95,000 policies in force. It became evident that relatively few individuals in eligible communities who had sustained flood damage had purchased flood insurance. In order to increase the number of Federal flood policies in force, Congress passed the Flood Disaster Protection Act of 1973 (1973 Act) (42 U.S.C. §§ 4001–4128). The Act contained a provision requiring the purchase of flood insurance as a condition of receiving federally backed loans and Federal assistance in special flood hazard areas of participating communities. This is referred to as the mandatory flood insurance purchase requirement and resulted in an increase in flood insurance policies to approximately 1.2 million by the end of 1977, and 5.5 million as of May 31, 2012.

The mandatory purchase requirement is not FEMA's action. While FEMA administers the NFIP, it has no responsibility or authority with respect to lender compliance with the mandatory flood insurance purchase requirement – this responsibility falls on the Federal agency lender regulators and secondary-market purchasers. .

Specifically, the NFIA, as amended by the 1973 Act, states that regulated lending institutions cannot make, increase, extend, or renew any loan secured by improved real estate or a mobile home located, or to be located, in an SFHA in a participating NFIP community unless the secured building and any personal property securing the loan are covered by flood insurance for the term of the loan. See Flood Disaster Protection Act of 1973, PL 93-234, as codified at 42 U.S.C. § 4012a(b). Furthermore, Federal officers or agencies cannot approve any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, disaster assistance loan or grant, for acquisition or construction purposes within an SFHA in a participating community unless the building or mobile home and any personal property to which such financial assistance relates is covered during the life of the property. *Id.* at § 4012a(a). For example, this would prohibit mortgage loans guaranteed by the Department of Veterans Affairs, insured by the Federal Housing Administration, or secured by the Rural Economic and Community Development Services. In the case of disaster assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended; this prohibition only applies to assistance in connection with the flooding of properties within flood disaster areas in which the owners have not acquired and maintained flood insurance as required under Federal law.

Following the multi-billion dollar flood disaster in the Midwest in 1993, Congress enacted the National Flood Insurance Reform Act of 1994 (1994 Act). One of the purposes of the 1994 Act is to improve compliance with the mandatory purchase requirements of the NFIP by lenders, servicers, and secondary-market purchasers. Congress was concerned over the low level of insurance participation among eligible property owners and resulting increases in Federal disaster relief payments.

The law requires Federal agency lender regulators to develop regulations to direct their federally regulated lenders not to make, increase, extend, or renew any loan on applicable property unless flood insurance is purchased and maintained. The law also addresses the responsibility of regulated lending institutions and Government-Sponsored Enterprises (GSEs) (i.e., Fannie Mae and Freddie Mac) in providing a notice of and requiring flood insurance coverage for the term of the loan on buildings located in any SFHA in participating NFIP communities.

The 1994 Act significantly strengthened the 1973 Act by imposing important new obligations on both mortgage originators and servicers, including mandatory escrow requirements for flood insurance and mandatory provisions for "forced placement" of insurance. Specifically, the 1994 Act requires the forced placement of flood insurance if a lender or servicer determines that the building securing the loan is not adequately insured.

Lenders may, on their own initiative, require the purchase of flood insurance even if a structure is located outside the SFHA. A decision to require coverage under such circumstance is not compelled by statute. Lenders have this prerogative to require flood insurance to protect their investments.

2 NFIP Discretionary Actions

Section 7 of the Endangered Species Act (ESA) focuses on actions where there is discretionary Federal involvement or control. The actions and program elements comprising the NFIP are a mix of direct mandates (providing little or no flexibility in implementation) and discretionary actions. Under Section 7(a)(2) of the ESA, Federal agencies are required to consult only if there is discretionary involvement or control: "...where the Federal agency lacks the discretion to influence the private action, consultation would be a meaningless exercise; the agency simply does not possess the ability to implement measures that inure to the benefit [of] the protected species." 50 C.F.R. § 402.03. Accordingly, the analysis of effects focuses on the actions where FEMA has discretionary control over implementation of the NFIP. This section presents a detailed description of each of these NFIP discretionary actions. In National Wildlife Federation v. FEMA, the court has already held that the provision of flood insurance is a non-discretionary action for which "FEMA has no obligation to consult". See National Wildlife Federation v. FEMA, 245 F.Supp.2d 1151, 1174 (W.D. Wa. 2004). As such, there will be no discussion of any FEMA actions related to the provision of flood insurance in this section.

2.1 Special Flood Hazard Area Mapping – Discretionary Actions

The FEMA Administrator is required by statute to identify and map the Nation's flood-prone areas and to establish flood-risk zones in these areas. Since the inception of the NFIP, FEMA has complied with this statutory requirement by performing engineering studies of flood-prone communities and producing flood maps. However, there are some processes by which this is accomplished that can be considered discretionary. Based on a review of the components of the mapping program, there are five areas in which FEMA has some discretionary authority.

- When and Where to Publish FIRM Updates
- When and Where to Publish New BFEs, SFHAs, and Floodways
- Non-Regulatory Features and Products
- Certain Mapping Standards and Regulations
- Review and issuance of CLOMRs and CLOMR-Fs

2.1.1 When and Where to Publish FIRM Updates

The FEMA Flood Hazard Mapping Program (Risk MAP) is allocated a budget each year by Congress. With that budget, FEMA must meet *the* regulatory requirements for processing map changes requested by communities and individuals; respond to stakeholder correspondence; distribute flood hazard data products; establish and maintain cost and schedule controls; track and monitor performance; support the development of State and local capabilities through the Cooperating Technical Partners program and carry out other core program functions. These core functions utilize a significant portion of the budget.

The remaining funds are allocated to the overall program priorities established by the administration in the President's budget. Since 2009, one of the major budgetary commitments has been to update the maps for 100% of the populated coastline. In recent years, FEMA also has significant commitments to update analyses and maps affected by flood protection systems. The remaining budget is allocated to addressing other needs. Mapping priorities often are established by Congress from year to year in appropriations legislation, and FEMA must incorporate those priorities in determining how to allocate funding to specific mapping activities.

Risk MAP is addressing mapping needs by watershed. The overall guiding principle for Risk MAP project selection is that watersheds are prioritized for update based on both the level of flood risk and the need for flood hazard data updates. Risk MAP has developed an estimate of flood risk across the country and has tools that allow staff to rank watersheds based on this flood risk estimate. Risk MAP also has a system called the Coordinated Needs Management System (CNMS) for tracking flooding sources for which an updated flood hazard map is needed. FEMA also uses this system to inform the project selection process in prioritizing areas that need to be restudied with whatever funding may be available to assist FEMA in complying with the statutory requirement to assess the need for map updates every five years as the risk in a watershed changes in response to population growth and development. The funds for mapping updates are allocated to Regional offices based on a planning and budgeting process that takes into account factors such as population and risk and regional/local knowledge of needs, State and local input, and national data quantifying flood risk and update needs in furtherance of its focus on advancing mitigation actions in local communities.

2.1.2 When and Where to Publish New BFEs, SFHAs, and Floodways

FEMA employs a mix of study approaches in identifying a community's flood hazards. Current procedures for establishing new floodplain delineations typically involve selection and use of engineering techniques and models, combined with topographic information, to determine the water-surface elevations or flood depths and the extent of the floodplain. The availability of technical data, resolution of topography, and precision of hydrologic and hydraulic elements determine the appropriate engineering technique and methodology used in the engineering analysis. The level of study detail, in coordination with the participating community, determines if

BFEs, floodways, and other engineered components will be displayed on the flood map. Less complex study methods may be used to identify flood hazards when the availability, precision, or resolution of technical data limits the accuracy of the engineering analysis results. FEMA can enhance the complexity of the studies and level of study detail in areas where there are deficiencies in data availability or resolution through improved data acquisition or creation. Factors such as community input, population impact, population growth, structure impact, and watershed characteristics are used to determine if an enhancement to a less complex level of study is warranted.

2.1.3 Non-Regulatory Products and Features

As discussed above, FEMA provides other data layers and information to facilitate improved flood risk management and communication at the local level. Unlike regulatory flood hazard products on the MSC (FIRM, FIS Report, FIRM Database), Flood Risk Products are not intended to be used as the basis for official actions required under the NFIP, such as determining mandatory insurance purchase requirements for a property, determining the insurance rate for a property or enforcing minimum building standards for construction in a floodplain. These products work alongside regulatory products to provide additional flood risk information and to support a community's overall floodplain management and hazard mitigation strategies and plans. There are also two key non-regulatory features that the NFIP offers- the Limit of Moderate Wave Action (LiMWA) and a future conditions layer on existing FIRMs. Although these do not exist as separate products because they are placed on the actual FIRM, they are non-regulatory features because they are not associated with any regulatory requirements under the NFIP (although communities may, and do, choose to regulate based on these non-regulatory features).

2.1.3.1 Limit of Moderate Wave Action (LiMWA)

Dangerous flood hazards can also exist in coastal areas affected by waves equal to or greater than 1.5 feet in height during the 1-percent-annual-chance flood. There is international consensus in the building science community that waves between 1.5 and 3 feet in height, or moderate wave action, can cause significant damage to coastal structures, and applying V-zone floodplain management regulations to such areas is encouraged. FEMA now delineates the LiMWA, which depicts the portion of the SFHA where base flood wave heights are between 1.5 feet and 3 feet, on all new coastal Risk MAP studies to assist communities interested in voluntarily applying V-zone requirements in those areas.

2.1.3.2 Future Conditions Maps

At the request of the community, FEMA may indicate zones to identify areas of future-conditions flood hazards. See 44 C.F.R. § 64.3. The future conditions flood hazard information is provided for informational purposes only, and it is up to the community to decide whether to use the information to regulate floodplain development. When future conditions floodplains are included on the FIRM, both the existing conditions floodplain and the future conditions floodplain will be shown. The existing conditions data will continue to be used to establish flood insurance rates and to determine if flood insurance is required.

With the passage of the Biggert Waters Flood Insurance Reform Act of 2012 (Biggert Waters), FEMA is now required to include certain information on its flood maps, such as information about sea level rise, land subsidence, and coastal erosion, among other things. However, the Act requires that FEMA must base its decisions about how, and the extent to which, this

information will be incorporated on the recommendations of the TMAC. The TMAC is also required to develop recommendations on how to (a) ensure that flood insurance rate maps incorporate the best available climate science to assess flood risks and (b) ensure that FEMA uses the best available methodology to consider the impact of (i) the rise in sea level and (ii) future development on flood risk. Therefore, although FEMA has discretion to provide future conditions data to interested communities consistent with its current regulations, it does not have the discretion to act ahead of the TMAC in implementing the changes required by Biggert Waters. The TMAC convened in October of 2014, and it is expected to produce its recommendations approximately one year after it was convened.

2.1.4 Certain Mapping Standards and Regulations

To assure accuracy and consistency nationwide, FEMA has established standards for flood map studies, as well as the associated coordination and documentation activities. FEMA has also established product specifications for FIS reports, maps, and related NFIP products. These standards are provided in FEMA Policy FP 204-078-1: Standards for Flood Risk Analysis and Mapping. The product specifications are published as separate technical reference documents. These documents are available at <http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping>. In addition, FEMA provides supplemental guidance to support implementation of the standards. This guidance is a recommended method to meet the standard. However, acceptable approaches are not limited to this recommended method; mapping partners may use other methods to meet or exceed the standard. FEMA also has a number of regulations establishing its process for identification of flood hazards. These are as follows:

- Part 64- outlines the steps a community needs to take in order to assist the agency's effort in providing up-to-date identification and publication of flood hazards, establishes the administrative procedure for obtaining CLOMCs, and establishes the requirements for levee accreditation.
- Part 65- Establishes procedures for community consultation;
- Part 67-establishes procedures for appealing flood elevation determinations;
- Part 70-provides the administrative procedure for obtaining a letter of map change; and
- Part 72-establishes the procedures and fees for processing LOMCs and CLOMCs.

See 44 C.F.R. Parts 64, 65, 67, 70, and 72.

Many of these standards and regulations are dictated by the language of the statute, such as the appeal standard laid out in 44 C.F.R. § 67.6. Additionally, a number of these standards are dictated by the science, such as the standard established in 44 C.F.R. § 65.11, which states that FEMA will consider storm-induced dune erosion potential in its determination of coastal flood hazards and risk mapping efforts. However, there are some of these standards that are discretionary, such as the procedures for submitting payment for a map change in 44 C.F.R. § 72.4.

2.1.5 Conditional Letters of Map Change

As discussed in the Program Overview section, FEMA can revise maps by conducting a new or revised FIS or through a Physical Map Revision (PMR) or a Letter of Map Change (LOMC). Because LOMR-Fs and LOMRs officially revise the flood maps, they must reflect existing

conditions, such as an "as-built" project. FEMA has no discretion regarding whether or not to issue a LOMC. Conversely, communities, developers, and property owners do occasionally submit requests for proposed projects in floodplain areas to FEMA for review and comment. Such requests typically include data and analyses of the pre- and post-project conditions so that FEMA can ascertain the impact on flood hazards of the proposed project. FEMA reviews such requests using the same data and engineering standards that are used for "as-built" requests. FEMA's comment is provided in the form of a "conditional" amendment or revision, also known as a CLOMA, CLOMR-F, or CLOMR, which states whether the proposed project, if built as proposed, would justify a map revision. A CLOMA, CLOMR-F, or CLOMR does not constitute a building permit or approval; the authority to approve projects and issue building permits lies with the local community and, in some instances, State agencies.⁷

A CLOMA is "FEMA's comment on whether a proposed structure or group of structures that would, upon construction, be located on existing natural ground above the base (1% annual chance) flood elevation on a legally defined parcel of land that is partially inundated by the base flood." 44 C.F.R. § 72.2. A CLOMR is "FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the" SFHA. *Id.* A CLOMR-F is "FEMA's comment on a proposed project that would, upon construction, result in a modification of the SFHA through the placement of fill outside the existing regulatory floodway." *Id.*

CLOMAs, CLOMRs, and CLOMR-Fs do not constitute a building permit or approval. The authority to approve projects and issue building permits lies with the local community and, in some instances, State agencies. However, per NFIP regulations, there are specific instances when a CLOMR is required. Communities must submit a CLOMR whenever a proposed project in an area with no designated regulatory floodway would result in an increase in the surface water elevation of the base flood by more than a foot or whenever a project in an area with a designated regulatory floodway would result in any increase in base flood elevations.

2.2 Minimum Floodplain Management Criteria

Under the NFIA, FEMA may not provide flood insurance to property owners unless the community adopts and enforces floodplain management criteria established under the authority of Section 1361(c) of the Act. 42 U.S.C. § 4022. These criteria are established in the NFIP regulations at 44 C.F.R. § 60.3. The community must adopt a floodplain management ordinance that meets or exceeds the minimum NFIP criteria. FEMA has no direct involvement in the administration of local floodplain management ordinances. Since the Federal government does not have land use authority, FEMA has no direct involvement in the administration of local floodplain management ordinances.

Under the NFIP, the minimum floodplain management requirements that a community must adopt to participate depends on the type of flood risk data (detailed FIS and FIRMs with BFEs, with Floodways, with Coastal High Hazards (V Zones), or approximate Zone A and Zone V without BFEs) that the community has been provided by FEMA. There are certain communities

⁷ Additional information on the requirements for LOMR, CLOMR, LOMR-F, CLOMR-F, LOMA, and CLOMA processing may be found in Volume 2, Section 2.4 of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*. The regulatory requirements for LOMRs, CLOMRs, LOMR-Fs, and CLOMR-Fs may be found in Parts 65 and 72 of the NFIP regulations. The regulatory requirements for LOMAs and CLOMAs may be found in parts 70 and 72 of the NFIP regulations.

for which FEMA has not provided flood zone maps to the community. However, by joining the program, the community has indicated the presence of flooding and has committed to regulating floodplain development.

NFIP communities are required to regulate all development in SFHAs. See 44 C.F.R. § 60.3. Before a property owner can undertake any development in the SFHA, a permit must be obtained from the community. The community is responsible for reviewing the proposed development to ensure that it complies with the community's floodplain management ordinance (containing the minimum NFIP floodplain management standards of 44 C.F.R. § 60.3, and any higher standards the community adopts). As part of the permitting process, communities are also required to review proposed development in SFHAs to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, such as 404 wetland permits from the Army Corps of Engineers or permits required by the ESA. The minimum floodplain management requirements are further described below.

2.2.1 Discretionary Actions

Based on a review of the components of the floodplain management program, there are six areas in which FEMA has discretionary authority.

- Establishing Minimum Criteria
- Training/Technical Assistance
- Administration of CAP-SSSE Grants
- Compliance Monitoring
- Enforcement
- Administration of the Community Rating System

2.2.1.1 Establishing Minimum Criteria

As discussed above, in order to participate in the NFIP, a community must adopt and enforce floodplain management regulation that meets the NFIP floodplain management criteria (44 C.F.R. §§ 59.2(b), 59.22(a)(3), 60.1(d)). The intent of these standards is to reduce flood risk and prevent loss of life and property. FEMA sets certain nationally applicable minimum floodplain management criteria related to reducing flood hazard risk in floodplain areas for all NFIP participating communities. These minimum floodplain management criteria must be incorporated into community ordinances and regulations as a condition of participation in the Program. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. As such, FEMA cannot prohibit development; it can only place certain requirements on how that development will occur. For example, the minimum floodplain management criteria do not prohibit development in the floodway, but they do require that development to be done in such a way that it does not result in an increase in flood heights (except as provided in 44 C.F.R. 60.3(d)(4)).

Communities incorporate these requirements into their zoning codes, subdivision ordinances, and building codes, or they adopt special purpose floodplain management ordinances. These NFIP requirements apply to areas mapped as SFHAs. The community ordinances must also include effective enforcement provisions (44 C.F.R. § 59.2(b)).

For all new and substantially improved buildings in Zone A:

- All new construction and substantial improvements of residential buildings must have the lowest floor (including basement) elevated to or above the BFE. 44 C.F.R. § 60.3(c)(2).
- All new construction and substantial improvements of non-residential buildings must either have the lowest floor (including basement) elevated to or above the BFE or dry-floodproofed to the BFE. Dry floodproofing means that the building must be designed and constructed to be watertight, substantially impermeable to floodwaters. 44 C.F.R. § 60.3(c)(3).
- Because extended foundation or other enclosure walls will be exposed to flood forces, they must be designed and constructed to withstand hydrostatic pressure (otherwise the walls can fail and the building can be damaged). The NFIP regulations require that foundation and enclosure walls subject to the 100-year flood be constructed with flood-resistant materials and contain openings that will permit the automatic entry and exit of floodwaters. These openings allow floodwaters to reach equal levels on both sides of the walls, thereby lessening the potential for damage. Any enclosed area below the BFE can only be used for the parking of vehicles, building access, or storage. 44 C.F.R. § 60.3(c)(5).

For all new and substantially improved buildings in Zone V:

- All new construction and substantial improvements of buildings must be elevated on piles and columns so that the bottom of the lowest horizontal structural member of the lowest floor is elevated to or above the BFE. 44 C.F.R. § 60.3(e)(4). All new construction and substantial improvements of buildings must be properly anchored to resist flotation, collapse, and lateral movement. *Id.*
- Fill may not be used for structural support. 44 C.F.R. § 60.3(e)(6).
- In Zone V, the velocity of the wave action associated with coastal flooding can exert strong hydrodynamic forces on any obstruction to the flow of water. Standard foundations such as solid masonry walls or wood-frame walls will obstruct flow and be at risk to damage from high-velocity wave forces. In addition, solid foundation walls can direct coastal floodwaters into the elevated portion of the building or into adjacent buildings. The result can be structural failure of the building.
 - For these reasons, the area below the lowest floor of the elevated building in Zone V must either be free of obstruction, or any enclosure must be constructed with open wood lattice-panels or insect screening or, be constructed with non-supporting/non-load bearing breakaway walls which meet applicable NFIP criteria.
 - Any enclosed area below the BFE can only be used for the parking of vehicles, building access, or storage. 44 C.F.R. § 60.3(e)(5).
 - For the purposes of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls that exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(i) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and

(ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards.

- In order to further protect structures from damaging wave impacts, structures must be located landward of the reach of mean high tide. 44 C.F.R. § 60.3(e)(3).
- Man-made alteration of sand dunes and mangrove stands must not increase potential flood damage. 44 C.F.R. § 60.3(e)(7).

2.2.1.1.1 Floodway Requirements

In addition to the above requirements, communities are required to select and adopt a regulatory floodway in riverine Zone AE when floodway data is provided by FEMA. The regulatory floodway must be designed to carry the waters of the 1-percent-annual-chance flood without increasing the water surface elevation of that flood more than one foot at any point. See 44 C.F.R. § 60.3(d)(2). Once the floodway is designated, the community must prohibit development within that floodway that would cause any increase in flood heights. See 44 C.F.R. § 60.3(d)(3).

For communities that have flood elevations, but where no floodway has been designated, the community must prohibit all new construction and substantial improvements within the entire SFHA unless it can be demonstrated that the cumulative effect of any proposed development, when combined with all other existing and anticipated development, will not increase the elevation of the base flood by more than one foot. See 44 C.F.R. § 60.3(c)(10). These requirements have the effect of limiting development in the most hazardous and environmentally sensitive part of the floodplain.

2.2.1.1.2 Other Significant Provisions of the Minimum Criteria

Within the minimum criteria for the NFIP (44 C.F.R. § 60.3), there are several provisions that are significant for purposes of the effects discussion, including the following:

Precedence Provision

- "Any floodplain management regulations adopted by a State or community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence." 44 C.F.R. § 60.1(d).

Permit Provisions

Participating Communities Shall:

- "Require permits for all proposed construction and other developments including the placement of manufactured homes, within Zone A on the community's FHBM or FIRM." 44 C.F.R. § 60.3(b)(1).

- "Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. § 1334." 44 C.F.R. § 60.3(a)(2).

Provisions Related to Water Supply and Sanitary Sewage Systems

- Require new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems. 44 C.F.R. § 60.3(a)(5).
- Require (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and (ii) onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding. 44 C.F.R. § 60.3(a)(6).

2.2.1.2 Training/Technical Assistance

FEMA's compliance approach focuses on encouraging and promoting compliance, rather than threatening to penalize communities for non-compliance. FEMA provides training and technical assistance to help a community achieve compliant status. FEMA offers training both to the community floodplain managers who must administer the local floodplain ordinances and to FEMA floodplain management staff. Such training is provided through FEMA's national training center, the Emergency Management Institute, local training events, conferences, workshops, webinars, home study courses, and guidance. Additionally, the CRS provides incentives to communities undertaking such training. FEMA also encourages its floodplain management staff and community partners to become certified floodplain managers through the Certified Floodplain Management program offered by the Association of State Floodplain Managers. This program, which was developed with input from FEMA staff, is a formalized procedure allowing individuals to demonstrate that they have a standardized level of knowledge and skills in floodplain management and a commitment to continual education in floodplain management.

FEMA also provides technical assistance to communities. Technical assistance takes many forms, including phone and other contacts with NFIP communities, visits to communities, workshops, webinars, the issuance of procedural guidance, development of technical publications, and responding to inquiries. Technical assistance may be provided on a more formal basis through CACs and CAVs, as discussed below, or in response to specific inquiries by the communities. In order to reach a broader audience in a quicker amount of time, FEMA also offers workshops and webinars. Additionally, FEMA produces procedural guidance and technical publications, such as the "NFIP Guidance for Conducting CACs and CAVs" and the "NFIP Community Compliance Program Guidance."

In addition to technical assistance provided to communities as part of a CAV or CAC, FEMA provides technical and planning assistance through workshops and other contacts with community officials, property owners, builders and developers, architects and engineers, surveyors, lenders, and other NFIP constituents. Following major flood disasters, FEMA staff work closely with communities in providing technical assistance on the NFIP floodplain management requirements, particularly the substantial damage requirement, and on developing a reconstruction strategy for property impacted by floods to determine appropriate mitigation measures, such as elevation, acquisition, or relocation of flood-damaged structures. FEMA conducts extensive training of local and State officials responsible for administering floodplain management programs. Numerous publications have been produced on the NFIP, including

ones on mitigation measures that can be undertaken to minimize or eliminate future flood damages.

2.2.1.3 Community Assistance Program-State Support Services Element (CAP-SSSE)

The CAP-SSSE Program provides funding to states to provide technical assistance to NFIP participating communities and to monitor compliance with the NFIP program requirements. Examples of fundable CAP-SSSE activities include: strategic planning, ordinance assistance, community assistance contacts and community assistance visits, outreach workshops and other training, general technical assistance, mapping coordination assistance, and assistance to communities in responding to disasters.

2.2.1.4 Compliance Monitoring

Once FEMA provides a community with the flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain management ordinance that meets or exceeds the minimum NFIP requirements. FEMA monitors communities to ensure that they have adopted an ordinance that meets or exceeds the minimum NFIP floodplain management criteria and to ensure that they are effectively enforcing their ordinance. While the NFIP floodplain management criteria are administered by States and communities through their floodplain management regulations, FEMA's role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. If communities do not adequately enforce their floodplain management regulations, they can be placed on probation and potentially suspended from the Program following probation.

A basic compliance monitoring tool for FEMA in the NFIP is conducting CACs and CAVs. A CAC is a call or a brief visit with a community for the purpose of determining if any program related problems exist and to offer assistance. A CAC includes an overview of the community's floodplain management ordinances, procedures, and enforcement provisions. A CAC can be used (1) to monitor low risk communities (i.e. communities with relatively low development pressure) to determine if technical assistance or additional follow-up is required; (2) as a screening tool for determining whether a community should receive the level of attention of a CAV; (3) as a follow-up to a CAV to ensure compliance issues have been resolved.

A CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program and its knowledge and understanding of the floodplain management requirements of the NFIP. A CAV visit includes a field inspection, file review of permits and variances, and a meeting with the community to discuss any identified deficiencies, offer technical assistance, help address any deficiencies, and identify good floodplain management practices. In 2011, FEMA published a new guidance document, *FEMA F-776: National Flood Insurance Program (NFIP) Guidance for Conducting Community Assistance Contacts and Community Assistance Visits*. This document highlights 44 C.F.R. § 60.3(a)(2), which requires communities to ensure all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law.

2.2.1.5 Enforcement

When a potential violation is reported to FEMA for further investigation, FEMA will notify the community. FEMA may also identify potential violations while conducting a CAC or a CAV. FEMA has an established process for pursuing compliance actions including technical assistance, probation, and finally suspension. Additionally, a community that participates in the

CRS must be fully compliant with the minimum standards of the NFIP. A CRS community that is not fully compliant will be provided an opportunity to remedy the violation to the maximum extent possible. If substantive program deficiencies or violations have not been remedied, the community will be retrograded to a Class 10 (non-participation in CRS).

Technical assistance provided to a community is often the best approach because it is a chance to provide education and find a programmatic solution that will prevent the violation from happening again. A physical violation must be mitigated to the maximum extent possible, and mitigation actions have to be approved by FEMA. Most deficiencies in a community's floodplain management program or violations of local ordinances are generally due to lack of understanding of the NFIP requirements, lack of technical skills, failure to understand the rationales behind the NFIP requirements, or lack of an appreciation of the insurance implications and other consequences of a decision. Most problems that are identified can be solved through community assistance efforts. Compliance actions will be taken if any violations are identified and not remedied to the maximum extent possible (44 C.F.R. § 59.24 (b)-(c)). When a community has failed to enforce the NFIP floodplain management requirements and the FEMA Regional Office has identified one or more substantive program deficiencies or violations, FEMA may initiate an enforcement action against the community in order to obtain compliance. A substantive violation or program deficiency is one that has resulted, or could result, in increased potential flood damages or flood stages in the community and surrounding communities. When community assistance has failed to resolve a community's compliance problems, the NFIP may place the community on probation. When a community is placed on probation, FEMA must place a notice in the Federal Register and add a \$50 surcharge to the flood insurance policies of all policyholders in that community (44 C.F.R. §§ 59.24(b)-(c) and § 61.16). Probation lasts for a minimum of one year and may be extended.

Communities that do not comply while on probation can be suspended from the NFIP. Flood insurance is not available from FEMA in communities that have been suspended. Suspension also means that the community will be unable to obtain many forms of disaster assistance when a community suffers a disaster. Additionally, lenders will not be able to provide loans backed by the Federal government for property located in the SFHA if a community is suspended from the program (44 C.F.R. § 59.24(b)-(c)).

If an insured structure is identified as a violation of the community's floodplain management ordinance, FEMA can have the insurance company review the information and possibly rerate the structure to reflect the increased risk to the structure. This can result in significantly higher flood insurance rates on the structure, which may encourage the property owner to bring the building into compliance. In addition, the NFIA provides that the NFIP may deny flood insurance coverage for any property that the Administrator finds has been declared by a duly constituted State or local zoning authority, or other authorized public body, to be in violation of State or local floodplain management regulations (42 U.S.C. § 4023).

A community that participates in the Community Rating System (CRS) must be fully compliant with the minimum standards of the NFIP. A CRS community that is not fully compliant will be provided an opportunity to remedy the violation to the maximum extent possible. If substantive program deficiencies or violations have not been remedied, the community will be retrograded from the CRS program. Continued failure to remedy violations may prompt FEMA to take steps toward placing the community on probation.

2.2.1.6 *Community Rating System*

The final discretionary element in the NFIP that may affect listed species is the CRS. The CRS provides discounts on flood insurance premiums in communities that establish floodplain management programs that go beyond NFIP minimum requirements. Under the CRS, communities receive credit for implementing more restrictive regulations; the acquisition, relocation, or floodproofing of flood-prone buildings; the preservation of open space; and other measures that reduce flood damages or protect the natural resources and functions of floodplains.

FEMA established the CRS in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards, and it was codified in 1994 (42 U.S.C. § 4022). Section 541 of the 1994 NFIRA (42 U.S.C. § 4022) amended the NFIA to codify the CRS in the NFIP and to expand the CRS goals to include incentives for reducing the risk of flood-related erosion and for encouraging measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit towards premium reductions for activities that contribute to them.

Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

- Reduce and avoid flood damage to insurable property
- Protect public health and safety
- Reduce damage to property
- Prevent increases in flood damage from new construction
- Reduce the risk of erosion damage, and
- Protect natural and beneficial floodplain functions
- Strengthen and support the insurance aspects of the NFIP
- Improve flood insurance policy coverage, and
- Improve actuarial rating
- Foster comprehensive floodplain management
- Protect natural floodplain functions
- Address safety and health, and
- Protect other community assets such as infrastructure, critical facilities and open space

The CRS recognizes 19 creditable activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Warning and Response. Table A-2 lists the various activities, along with their associated available credit, under each general category.

For example, credits are provided for use of future conditions hydrology, more restrictive floodway standards, prohibiting fill in the floodway, adopting compensatory storage regulations, innovative land development criteria, stormwater management regulations, other higher regulatory standards, and local floodplain management plans. Credits are also provided in the

CRS for preserving open space in its natural state, low-density zoning, and acquiring and clearing buildings from the floodplain and returning the area to open space.

Through an application and on-site verification process, participating communities must demonstrate which CRS activities are being implemented and how those activity credit criteria are being met. Communities must also provide documentation to support these conclusions. In reviewing applications, FEMA uses a five-step process to determine the number of credits given to a community:

- Element Credit Points – the determination of whether the community's program includes the Elements associated with a particular creditable activity;
- Impact Adjustment – for each Element, the effectiveness/size of the activity is determined to measure the expected impact/improvement (using impact ratios);
- Credit Calculation – credit points are multiplied by impact ratios and summed to determine the amount of credit received for each activity;
- Community Growth Adjustment – a multiplier for the 400 series activities is applied to reflect the communities growth rate (the higher the rate, the larger the multiplier); and
- Community Classification – points for all of the activities are totaled to determine the community's overall score.

Table A-2: Credit Points Awarded for CRS Activities

Credit Number	Activity	Maximum Credit Points Allowed	Average Credit Points Received
Series 300	Public Information	981	258
310	Elevation Certificates Maintain FEMA elevation certificates for new construction in the floodplain	116	46
320	Map Information Service Provide Flood Insurance Rate Map (FIRM) information to people who inquire, and publicize this service	90	53
330	Outreach Projects Send information about flood hazards, flood insurance, flood protection measures, and/or the natural and beneficial functions of floodplains to flood-prone or all residents of a community	350	63
340	Hazard Disclosure Real estate agents advise potential purchasers of flood-prone property about the flood hazard. Regulations require notice of the hazard.	80	14
350	Flood Protection Information The public library and/or community's website maintains references on flood insurance and protection.	125	33
360	Flood Protection Assistance Give inquiring property owners technical advice on how to protect their buildings from flooding, and publicize this service.	110	49
Series 400	Mapping and Regulations	5,841	926
410	Additional Flood Data Develop new flood elevations, floodway delineations, wave heights, or other regulatory flood hazard data for an area not mapped in detail by the FIS. Have a more restrictive mapping standard	802	65
420	Open Space Requirement <ul style="list-style-type: none"> Prevent flood damage by keeping flood-prone lands free of development. Protect and enhance the natural functions of floodplains.	2,020	474

Credit Number	Activity	Maximum Credit Points Allowed	Average Credit Points Received
430	Higher Regulatory Standards <ul style="list-style-type: none"> Require freeboard Require soil tests for engineered foundations Require compensatory storage Zone the floodplain for minimum lot sizes of 1 acre or larger Require coastal construction standards in Zone AE Have regulations tailored to protect critical facilities or areas subject to special flood hazards such as alluvial fans, ice jams, subsidence or coastal erosion. 	2,042	214
40	Flood Data Maintenance Keep flood and property data on computer records. Use better base maps. Maintain elevation reference maps.	222	54
450	Stormwater Management <ul style="list-style-type: none"> Regulate new development throughout the watershed to ensure that post-development runoff is no worse than pre-development runoff Regulate new construction to minimize soil erosion and protect or improve water quality. Regulate new development to minimize the impact of development on the watershed. 	755	119
Series 500	Flood Damage Reduction	5,042	525
510	Floodplain Management Planning Prepare, adopt, implement, and update a comprehensive flood hazard mitigation using a standard planning process.	622	123
520	Acquisition and Relocation Acquire and/or relocate flood-prone buildings so that they are out of the floodplain.	2,250	136
530	Flood Protection Protection of existing floodplain development by floodproofing, elevation, or minor structural projects.	1600	52
540	Drainage System Maintenance Conduct periodic inspections of all channels and retention basins, and remove debris as needed.	570	214

Credit Number	Activity	Maximum Credit Points Allowed	Average Credit Points Received
Series 600	Warning and Response	790	144
610	Flood Warning and Response Provide timely identification of impending flood threats, disseminate warning to floodplain occupants and coordinate response.	395	144
620	Levees Inspect and maintain existing levees, identify impending levee failures, disseminate warning to appropriate floodplain occupants and coordinate response.	235	0
630	Dams States provide dam safety information to communities, and communities provide timely identification of an impending dam failure, disseminate warnings to those who may be impacted and coordinate response.	160	0
All Series (Total)		12,654	1,853

Source: 2013 CRS Coordinator's Manual, including Table 110-2, available at <http://www.fema.gov/media-library/assets/documents/8768?id=2434>

The total points available are separated into nine different classes. All communities enrolled in the NFIP begin as a Class 10 community. As actions satisfying the criteria associated with the 19 creditable activities are demonstrated, the community moves into a new class. Class 1 represents the highest possible rating. The credits required to obtain the various classes and the resulting discounts on insurance premiums are summarized in Table A-3.

Table A-3: Discounts Available for Specific CRS Point Levels

Rate Class	Credit Points Required	Discount
1	4,500+	45%
2	4,000-4,499	40%
3	3,500-3,999	35%
4	3,000-3,499	30%
5	2,500-2,999	25%
6	2,000-2,499	20%
7	1,500-1,999	15%
8	1,000-1,499	10%
9	500-999	5%
10	0-499	0%

Source: FEMA Brochure – National Flood Insurance Community Rating System A local Officials Guide to Saving Lives Preventing Property Damage Reducing the cost of Flood Insurance

FEMA recently changed some of the creditable activities and the points available under those activities based on an evaluation of the CRS program through the 2008 CRS Strategic Plan. These changes are detailed in the 2013 CRS Coordinator's Manual Changes that affect listed species and their habitats include:

- Activity 420 – Open Space Preservation – Increases total points available for preservation of vacant lands within the floodplain. Additional credit points have been made available if the vacant land is preserved in its natural state, is designated in a plan to protect natural functions, and is designated as critical habitat for threatened or endangered species or the species is present. Credit has also been made available for a regulation or program that preserves river or coastal shorelines in their natural state. Credit is given for regulations or policies that prohibit rip rap, alteration, armoring, or dredging or filling of channels. Additionally the prohibitions must include filling or alterations of a beach including beach renourishment, alterations to sand dunes, and construction of shoreline armoring projects.
- Activity 430 – Higher Regulatory Standards – New credits are provided for communities that restrict filling or buildings within the regulatory floodplain. This includes credits for higher standards in what is known as Coastal A zones, which are areas designated as Zone A in SFHAs but are subject to action from 1.5 feet to 3 feet waves.
- Activity 520 – Acquisition and Relocation – 50% more credit is available for buildings that are removed from Zone V and Coastal A Zone. Buildings would have to be removed from these zones, not just relocated to a different location within the floodplain. New environmental review criteria have been implemented to ensure that projects will not have a negative impact on environmental, historical, and cultural resources. The CRS

now has new "Environmental and Historic Preservation Certifications" forms that communities must sign.

- Activity 530 – Flood Protection, Activity 540 – Drainage System Maintenance, and Activity 620 – Levees – Include new environmental review criteria will also be implemented to ensure that projects will not have a negative impact on environmental, historical, and cultural resources.

2.2.1.6.1 CRS Guidelines Potentially Affecting Listed Species

In contrast to other elements of the NFIP, the criteria and rating system included in the CRS are largely discretionary. In the 1994 Act, Congress made only one stipulation on the CRS: that all activities included in the CRS have some relation to reducing flood damage. Therefore, all criteria included must contribute to a reduction in flood risk for the local community.

Three of the four categories of activities included in the CRS have the potential to affect listed species. These series include: Series 400, Mapping and Regulation; Series 500, Flood Damage Reduction; and Series 600, Flood Preparedness. All available credits within the CRS were analyzed to identify their impact on listed species. Those determined to affect listed species are discussed individually below.

2.2.1.6.2 Open Space Preservation (Activity 420)

The total credit available for preservation of vacant lands within the floodplain has been increased in the 2013 *CRS Coordinator's Manual*. Under this activity communities can be awarded up to 2,020 points for keeping parcels within the floodplain free from development. Up to 1,450 points are awarded for keeping the property under public ownership, designating the property as a private preserve, or restricting the development of the property so that buildings or fill are prohibited. An additional credit of up to 350 points will be awarded if the parcels are preserved as natural functions open space. These are parcels that are preserved in, or have been restored to, a natural state to protect natural and beneficial floodplain functions. Examples include areas that have been designated in a plan to protect natural functions and areas designated as critical habitat for threatened or endangered species or if the species is present. Up to 120 points are available for a regulation or program that preserves channels or shorelines in their natural state.

Promoting the preservation of vacant lands within SFHAs in coastal ecosystems has the following beneficial effects on listed species by: (1) preserving habitat within or adjacent to the beach/dune and estuarine ecosystem, (2) preserving native vegetation on undisturbed sites, (3) preventing the negative consequences of filling within or adjacent to the beach/dune and estuarine systems, and (4) reducing the amount of urban runoff that negatively impacts aquatic ecosystems.

Up to 250 points are provided for regulations that require new subdivisions and other developments to set aside all flood prone lands as open space, drainage or flowage easements, backyards, or otherwise keep them free from development. This credit is prorated based on the percentage of floodplain kept open by the regulations. A maximum of 600 points are offered for the establishment of low density zoning in floodplains. Credit is given for those portions of the floodplain subject to zoning rules that require a minimum of 5 acre per building or unit. Maximum credit is provided for a 10-acre or larger minimum lot size.

2.2.1.6.3 Higher Regulatory Standards (Activity 430)

In addition to providing credits for open space preservation, the CRS also provides up to 2,740 points to jurisdictions that adopt higher flood management regulatory standards.

Up to 1,330 credits points are provided for the limitation of development within floodplains. This includes the prohibition of fill in the floodplain, buildings in the floodplain and/or the outdoor storage of materials in the floodplain.

A maximum of 650 points is available to communities that map or designate the Coastal A Zone (i.e. those SFHAs identified as A zones but that are subject to action from 1.5 to 3 feet waves during the base flood) and require all new buildings within the Coastal A Zone to meet Zone V standards. Points available under this activity are prorated based on the number of Zone V standards the community requires to be met for new building activity, which would include prohibiting the use of fill as a method of structure elevation in these areas.

For all floodplain land, credit is either provided within the Open Space Preservation activity or the Higher Regulatory Standards activity. A single parcel cannot receive credit under both activities.

Credit for development standards are prorated based on the affected area. For example, if half of a community's floodplain is open space it receives no other higher regulatory standard credit for those areas since no development can occur here. Overall, the elements within this credit will beneficially affect listed species by decreasing the amount of and intensity of development in the coastal SFHA, protecting shoreline habitat, and improving water quality by limiting development within the floodplain.

2.2.1.6.4 Stormwater Management (Activity 450)

To receive credit in the Stormwater Management activity, local jurisdictions must implement regulations, plans, and programs to reduce the overall effects of increased stormwater runoff that results from development throughout a watershed. Regulations that ensure the pre-development peak flow does not exceed post-development peak flow, and implementation of a watershed master plan, can earn a community up to 695 points. Additional points are available for implementing sediment and erosion control regulations, regulating the quality of stormwater runoff, and requiring low impact development approaches. These criteria beneficially affect listed species by reducing the amount of sediment and potentially toxic runoff deposited into the waterway thus improving water quality. These criteria are especially beneficial to fragile estuarine ecosystems that are dependent on good water quality for proper maintenance of function.

2.2.1.6.5 Floodplain Management Planning (Activity 510)

The Floodplain Management Planning credit assigns points for the adoption of a floodplain management plan by the local jurisdiction. The floodplain management plan may reduce the amount of floodplain development within a community through recognition of flood hazards and methods to mitigate those hazards. Credits are available to jurisdictions if the plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection. The preparation of a floodplain management plan does not necessarily reduce the amount of floodplain development allowed within a community. However, there is an opportunity through the planning effort to recognize the importance of maintenance of natural resources as an important component of floodplain management. In general, any additional floodplain management planning approved for CRS credit would be expected to lead to improved

conditions for listed species and their habitats. As with any plan, the plan needs to be implemented in order to have any effect. Up to 100 points are available for a community that prepares a Natural Floodplain Functions Plan of one or more of the following types: a habitat conservation plan; a habitat protection and restoration plan; a green infrastructure plan; or a watershed ecological attributes plan.

2.2.1.6.6 Acquisition and Relocation (Activity 520)

A maximum of 3,200 points (the most available for any activity) are available for acquiring, relocating, or otherwise clearing buildings out of the flood hazard area and assuring that the property will remain vacant. The credit is based on the number of buildings cleared as a portion of the total number of buildings in the community's SFHA. Pursuant to the CRS changes implemented in the summer of 2013, a 50% credit bonus is now available for buildings that are removed from Zone V and Coastal A Zone. Additionally, new environmental review criteria have been implemented to ensure that projects will not have a negative impact on environmental, historical, and cultural resources. Certifications are required for projects initiated after April 1, 2013 to document that communities or project funding agencies are communicating and coordinating with agencies responsible for environmental and historic preservation.

2.2.1.6.7 Flood Protection (Activity 530)

A credit of up to 1600 points is available for projects that retrofit structures to reduce or eliminate flooding damage or for small structural flood control projects. Retrofit projects include elevating buildings, dry flood proofing, or wet flood proofing. Qualifying structural flood control projects include channel modifications, storm sewer improvements, and barriers.

Environmental review criteria for this activity have been enhanced to ensure that projects will not have a negative impact on environmental, historical, and cultural resources. Certifications are required for projects initiated after April 1, 2013 to document that communities or project funding agencies are communicating and coordinating with agencies responsible for environmental and historic preservation.

2.2.1.6.8 Levees (Activity 620)

A final credit affecting listed species is credit for Levees. Credit is provided for identifying levees at risk of potential failure, disseminating warnings to floodplain occupants that would be impacted by a levee failure, and coordinating emergency response efforts, including coordination with operators of critical facilities.

Credit is available for all accredited and non-accredited levees, provided that annual inspections are performed and required maintenance is undertaken. The construction of new levees is not credited. Annual certifications are required for levee credit to help ensure that levee owners are communicating and coordinating with agencies responsible for environmental preservation.

APPENDIX D. FEDERALLY RECOGNIZED TRIBES

The following table lists Federally Recognized Tribes by FEMA Region.

Region I	
Connecticut	
The Mashantucket (Western) Pequot Tribal Nation	P.O. Box 3060 Mashantucket, CT 06338
Mohegan Indian Tribe	13 Crow Hill Road Uncasville, CT 06382
Massachusetts	
Mashpee Wampanoag Tribe	108 Meetinghouse Road Mashpee, MA 02649
Wampanoag Tribe of Gay Head (Aquinnah) of Massachusetts	20 Black Brook Road Aquinnah, MA 02535
Maine	
Aroostook Band of Micmac Indians	7 Northern Road Presque Isle, ME 04769
Houlton Band of Maliseet Indians	88 Bell Road Littleton, ME 04730
Passamaquoddy Tribe	P.O. Box 301 Princeton, ME 04668
Passamaquoddy at Sipayik	P.O. Box 343 Perry, ME 04667
Penobscot Nation	12 Wabanaki Way Indian Island, ME 04468
Rhode Island	
Narragansett Indian Tribe	Post Office Box 268 Charlestown, RI 02813

Region II	
New York	
Cayuga Nation	P.O. Box 803 Seneca Falls, NY 13148
Oneida Nation of New York	2037 Dreamcatcher Plaza Oneida, NY 13421
Onondaga Nation	3951 Route 11 Onondaga Nation Nedrow, NY 13120
Saint Regis Mohawk Tribe (formerly the St. Regis Band of Mohawk Indians of New York)	412 State Route 37 Akwesasne, New York 13655
Seneca Nation of Indians	90 Ohiyo Way Salamanca, NY 14779
Shinnecock Indian Nation	P.O. Box 5006 Southampton, NY 11969
Tonawanda Band of Seneca	P.O. Box 795 7027 Meadville Road Basom, NY 14013
Tuscarora Nation of New York	2006 Mount Hope Road Lewiston, NY 14092

Region III	
Virginia	
Pamunkey Indian Tribe	191 Lay Landing Road Pamunkey Indian Reservation King William, VA 23086

Region IV	
Alabama	
Poarch Band of Creeks	5811 Jack Springs Road Atmore, AL 36502
Florida	
Miccosukee Tribe of Indians of Florida	Tamiami Station P.O. Box 440021 Miami, FL 33144
Seminole Tribe of Florida (Dania, Big Cypress, Brighton, Hollywood and Tampa Reservations)	6300 Stirling Road Hollywood, FL 33024
Mississippi	
Mississippi Band of Choctaw Indians	P.O. Box 6010 Choctaw Branch Choctaw, MS 39350
North Carolina	
Eastern Band of Cherokee Indians	P.O. Box 455 Qualla Boundary Cherokee, NC 28719
South Carolina	
Catawba Indian Nation (Catawba Tribe of South Carolina)	996 Avenue of the Nations Rock Hill, SC 29730

Region V	
Indiana	
Pokagon Band of Potawatomi Indians (Michigan and Indiana)	P.O. Box 180 Dowagiac, MI 49047
Michigan	
Bay Mills Indian Community	12140 West Lakeshore Drive Brimley, MI 49715
Grand Traverse Band of Ottawa and Chippewa Indians	2605 NW Bayshore Drive Suttons Bay, MI 49682
Hannahville Indian Community	N14911 Hannahville B-1 Road Wilson, MI 49896
Nottawaseppi Huron Band of the Potawatomi	1485 Mno-Bmadzewn Way Fulton, MI 49052
Keweenaw Bay Indian Community	16429 Beartown Road Baraga, MI 49908
Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan	P.O. Box 249 Watersmeet, MI 49969
Little River Band of Ottawa Indians	2608 Government Center Drive Manistee, MI 49660
Little Traverse Bay Bands of Odawa Indians	7500 Odawa Circle Harbor Springs, MI 49740
Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan	P.O. Box 218 Dorr, MI 49323
Pokagon Band of Potawatomi Indians (Michigan and Indiana)	P.O. Box 180 Dowagiac, MI 49047
Saginaw Chippewa Indian Tribe of Michigan	7070 East Broadway Road Mt. Pleasant, MI 48858
Sault Ste. Marie Tribe of Chippewa Indians of Michigan	523 Ashmun Street Sault Ste. Marie, MI 49783
Minnesota	
Lower Sioux Indian Community in the State of Minnesota	P.O. Box 308 Morton, MN 56270
Mdewakanton Sioux Community	
Bois Forte Band (Nett Lake) (Minnesota Chippewa Tribe)	P.O. Box 16 Nett Lake, MN 55772
Fond du Lac Band (Minnesota Chippewa Tribe)	1720 Big Lake Road Cloquet, MN 55720
Grand Portage Band (Minnesota Chippewa)	P.O. Box 428 Grand Portage, MN 55605
Leech Lake Band of Ojibwe (Minnesota Chippewa)	190 Sailstar Drive Cass Lake, MN 56633

Mille Lacs Band of Ojibwe (Minnesota Chippewa)	43408 Oodena Drive Onamia, MN 56359
White Earth Band (Minnesota Chippewa)	P.O. Box 418 White Earth, MN 56591
Prairie Island Indian Community in the State of Minnesota	5636 Sturgeon Lake Road Welch, MN 55089
Mdewakanton Sioux Indians	NO CONTACT INFORMATION
Red Lake Band of Chippewa Indians	P.O. Box 550 Red Lake, MN 56671
Shakopee Mdewakanton Sioux Community of Minnesota	2330 Sioux Trail, NW Prior Lake, MN 55372-9077
Upper Sioux Community	P.O. Box 147 Granite Falls, MN 56241
Wisconsin	
Bad River Band of the Lake Superior Tribe of Chippewa Indians of the Bad River Reservation	P.O. Box 39 Odanah, WI 54861
Forest County Potawatomi Community	P.O. Box 340 Crandon, WI 54520
Ho-Chunk Nation of Wisconsin	P.O. Box 667 Black River Falls, WI 54615
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin	13394 West Trepania Road, Building #1 Hayward, WI 54843
Lac du Flambeau Band of Lake Superior Chippewa Indians of the Lac du Flambeau Reservation of Wisconsin	P.O. Box 67 Lac du Flambeau, WI 54538
Menominee Indian Tribe of Wisconsin	P.O. Box 910 Keshena, WI 54135-0910
Oneida Tribe of Indians of Wisconsin	P.O. Box 365 Oneida, WI 54155
Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin	88385 Pike Road Highway 13 Bayfield, WI 54814
St. Croix Chippewa Indians of Wisconsin	24663 Angeline Avenue Webster, WI 54893
Sokaogon Chippewa Community	3051 Sand Lake Road Crandon, WI 54520
Stockbridge Munsee Community	N8476 Mo He Con Nuck Road Bowler, WI 54416

Region VI	
Louisiana	
Chitimacha Tribe of Louisiana	P.O. Box 661 Charenton, LA 70523
Coushatta Tribe of Louisiana	P.O. Box 818 Elton, LA 70532
Jena Band of Choctaw Indians	P.O. Box 14 Jena, LA 71342
Tunica-Biloxi Indian Tribe of Louisiana	P.O. Box 1589 Marksville, LA 71351
Oklahoma	
Absentee-Shawnee Tribe of Indians	2025 S. Gordon Cooper Drive Shawnee, OK 74801
Alabama-Quassarte Tribal Town	P.O. Box 187 Wetumka, OK 74883
Apache Tribe of Oklahoma	511 E. Colorado Anadarko, OK 73005
Caddo Nation of Oklahoma	P.O. Box 487 Binger, OK 73009
Cherokee Nation	P.O. Box 948 Tahlequah, OK 74465
Cheyenne and Arapaho Tribes	P.O. Box 38 Concho, OK 73022
Citizen Potawatomi Nation	1601 South Gordon Cooper Drive Shawnee, OK 74801
Comanche Nation	HC-32, Box 1720 584 NW Bingo Road Lawton, OK 73502 P
Delaware Nation	P.O. Box 825 Anadarko, OK 73005
Delaware Tribe of Indians	5100 Tuxedo Boulevard Bartlesville, OK 74006
Eastern Shawnee Tribe of Oklahoma	P.O. Box 350 Seneca, MO 64865
Fort Sill Apache Tribe of Oklahoma	Rt. 2, Box 121 43187 US Highway 281 Apache, OK 73006
Iowa Tribe of Oklahoma	Route 1, Box 721 Perkins, OK 74059

Kaw Nation	Drawer 50 698 Grandview Drive Kaw City, OK 74641
Kialegee Tribal Town	P.O. Box 332 Wetumka, OK 74883
Kickapoo Tribe of Oklahoma	P.O. Box 70 McCloud, OK 74851
Kiowa Indian Tribe of Oklahoma	P.O. Box 369 Carnegie, OK 73015
Miami Tribe of Oklahoma	P.O. Box 1326 Miami, OK 74355
Modoc Tribe of Oklahoma	418 G Street, Southeast Miami, OK 74354
Muscogee (Creek) Nation	P.O. Box 580 Okmulgee, OK 74447
Ottawa Tribe of Oklahoma	P.O. Box 110 Miami, OK 74355
Otoe-Missouria Tribe of Indians	8151 Highway 177 Red Rock, OK 74651
Pawnee Nation of Oklahoma	P.O. Box 470 Pawnee, OK 74058
Peoria Tribe of Indians of Oklahoma	P.O. Box 1527 Miami, OK 74355
Ponca Tribe of Indians of Oklahoma	20 White Eagle Drive Ponca City, OK 74601
Quapaw Tribe of Indians	P.O. Box 765 Quapaw, OK 74363
Sac & Fox Nation	920883 S. Highway 99, Building A Stroud, OK 74079
Seminole Nation of Oklahoma	P.O. Box 1498 Wewoka, OK 74884
Seneca-Cayuga Nation	23701 South 655 Road Grove, OK 74344
Shawnee Tribe	P.O. Box 189 Miami, OK 74354
The Chickasaw Nation	P.O. Box 1548 Ada, OK 74821
The Choctaw Nation of Oklahoma	P.O. Drawer 1210 Durant, OK 74702
The Osage Nation	P.O. Box 779 Pawhuska, OK 74056

Thlopthlocco Tribal Town	P.O. Box 188 Okemah, OK 74859
Tonkawa Tribe of Indians of Oklahoma	1 Rush Buffalo Road Tonkawa, OK 74653
United Keetoowah Band of Cherokee Indians in Oklahoma	P.O. Box 746 Tahlequah, OK 74465
Wichita and Affiliated Tribes (Wichita, Keechi, Waco and Tawakonie)	P.O. Box 729 Anadarko, OK 73005
Wyandotte Nation	64700 East Highway 60 Wyandotte, OK 74370
New Mexico	
Jicarilla Apache Nation	P.O. Box 507 Dulce, NM 87528
Mescalero Apache Tribe of the Mescalero Reservation	P.O. Box 227 Mescalero, NM 88340
Navajo Nation (Arizona, New Mexico and Utah)	P.O. Box 7440 Window Rock, AZ 86515
Ohkay Owingeh (formerly the Pueblo of San Juan)	P.O. Box 1099 Ohkay Owingeh, NM 87566
Pueblo of Acoma	P.O. Box 309 Acoma, NM 87034
Pueblo of Cochiti	P.O. Box 70 Cochiti, NM 87072
Pueblo of Jemez	P.O. Box 100 Jemez Pueblo, NM 87024
Pueblo of Isleta	P.O. Box 1270 Isleta, NM 87022
Pueblo of Laguna	P.O. Box 194 Laguna, NM 87026
Pueblo of Nambe	Route 1, Box 117-BB Santa Fe, NM 87506
Pueblo of Picuris	P.O. Box 127 Penasco, NM 87553
Pueblo of Pojoaque	78 Cities of Gold Road Santa Fe, NM 87506
Pueblo of San Felipe	P.O. Box 4339 San Felipe Pueblo, NM 87001
Pueblo of San Ildefonso	Route 5, Box 315-A Santa Fe, NM 87506
Pueblo of Sandia	481 Sandia Loop Bernalillo, NM 87004

Pueblo of Santa Ana	2 Dove Road Santa Ana Pueblo, NM 87004
Pueblo of Santa Clara	P.O. Box 580 Española, NM 87532
Kewa Pueblo	P.O. Box 99 Santo Domingo Pueblo, NM 87052
Pueblo of Taos	P.O. Box 1846 Taos, NM 87571
Pueblo of Tesuque	RR 42, Box 360-T Santa Fe, NM 87506
Pueblo of Zia	135 Capitol Square Drive Zia Pueblo, NM 87053
Ute Mountain Tribe of the Ute Mountain Reservation (Colorado, New Mexico and Utah)	Ute Mountain Ute Tribe 124 Mike Wash Road Towaoc, CO 81334
Zuni Tribe of the Zuni Reservation	P.O. Box 339 Zuni, NM 87327
Texas	
Alabama-Coushatta Tribe of Texas	571 State Park Road 56 Livingston, TX 77351
Kickapoo Traditional Tribe of Texas	HC 1, Box 9700 Eagle Pass, TX 78852
Ysleta Del Sur Pueblo	P.O. Box 17579 Ysleta Station El Paso, TX 79917

Region VII	
Iowa	
Sac & Fox Tribe of the Mississippi in Iowa	349 Meskwaki Road Tama, IA 52339
Kansas	
Iowa Tribe of Kansas and Nebraska	3345 B. Thrasher Road White Cloud, KS 66439
Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas	1107 Goldfinch Road Horton, KS 66439
Prairie Band Potawatomi Nation	16281 Q Road Mayetta, KS 66509
Sac & Fox Nation of Missouri (Kansas and Nebraska)	305 N. Main Street Reserve, KS 66434
Nebraska	
Iowa Tribe of Kansas and Nebraska	3345 B. Thrasher Road White Cloud, KS 66439
Omaha Tribe of Nebraska	P.O. Box 368 Macy, NE 68039
Ponca Tribe of Nebraska	P.O. Box 288 Niobrara, NE 68760
Sac & Fox Nation of Missouri (Kansas and Nebraska)	305 N. Main Street Reserve, KS 66434
Santee Sioux Nation	108 Spirit Lake Avenue West Niobrara, NE 68760
Winnebago Tribe of Nebraska	P.O. Box 687 Winnebago, NE 68071

Region VIII	
Colorado	
Southern Ute Indian Tribe of the Southern Ute Reservation	Southern Ute Reservation, Colorado 356 Ouray Drive, P.O. Box 737 Ignacio, CO 81137
Ute Mountain Tribe of the Ute Mountain Reservation (Colorado, New Mexico and Utah)	Ute Mountain Ute Tribe 124 Mike Wash Road Towaoc, CO 81334
Montana	
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation	P.O. Box 1027 Poplar, MT 59255
Blackfeet Tribe of the Blackfeet Indian Reservation of Montana	P.O. Box 850 Browning, MT 59417
Chippewa-Cree Indians of the Rocky Boy's Reservation	96 Clinic Road Box Elder, MT 59521
Confederated Salish and Kootenai Tribes of the Flathead Reservation	P.O. Box 278 Pablo, MT 59855
Crow Tribe of Montana	P.O. Box 159 Crow Agency, MT 59022
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana	RR 1, Box 66 Harlem, MT 59526
Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation	P.O. Box 128 Lame Deer, MT 59043
North Dakota	
Spirit Lake Tribe	P.O. Box 359 Fort Totten, ND 58335
Standing Rock Sioux Tribe (North Dakota and South Dakota)	P.O. Box D Fort Yates, ND 58538
Three Affiliated Tribes of the Fort Berthold Reservation	404 Frontage Road New Town, ND 58763
Turtle Mountain Band of Chippewa Indians of North Dakota	P.O. Box 900 Belcourt, ND 58316
South Dakota	
Cheyenne River Sioux Tribe of the Cheyenne River Reservation	P.O. Box 590 Eagle Butte, SD 57625
Crow Creek Sioux Tribe of the Crow Creek Reservation	P.O. Box 50 Fort Thompson, SD 57339
Flandreau Santee Sioux Tribe of South Dakota	P.O. Box 283 Flandreau, SD 57028
Lower Brule Sioux Tribe of the Lower Brule Reservation	187 Oyate Circle Lower Brule, SD 57548

Oglala Sioux Tribe (previously listed as Oglala Sioux Tribe of the Pine Ridge Reservation)	P.O. Box 2070 Pine Ridge, SD 57770
Rosebud Sioux Tribe of the Rosebud Indian Reservation	P.O. Box 430 Rosebud, SD 57570
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation	P.O. Box 509 Agency Village, SD 57262
Standing Rock Sioux Tribe (North Dakota and South Dakota)	P.O. Box D Fort Yates, ND 58538
Yankton Sioux Tribe of South Dakota	P.O. Box 1153 Wagner, SD 57361
Utah	
Confederated Tribes of the Goshute Reservation (Nevada and Utah)	P.O. Box 6104 195 Tribal Center Road Ibapah, UT 84034
Navajo Nation (Arizona, New Mexico and Utah)	P.O. Box 7440 Window Rock, AZ 86515
Northwestern Band of Shoshoni Nation	707 North Main Street Brigham City, UT 84302
Paiute Indian Tribe of Utah (Cedar Band of Paiutes, Kanosh Band of Paiutes, Koosharem Band of Paiutes, Indian Peaks Band of Paiutes, and Shivwits Band of Paiutes)	440 N. Paiute Drive Cedar City, UT 84720
Skull Valley Band of Goshute Indians of Utah	P.O. Box 448 Grantsville, UT 84029
Ute Indian Tribe of the Uintah and Ouray Reservation	P.O. Box 190 Ft. Duchesne, UT 84026
Ute Mountain Ute Tribe (Colorado, New Mexico and Utah)	P.O. Box 248 Towaoc, CO 81334
Wyoming	
Arapaho Tribe of the Wind River Reservation	P.O. Box 396 Fort Washakie, WY 82514
Shoshone Tribe of the Wind River Reservation	P.O. Box 538 Fort Washakie, WY 82514

Region IX	
Arizona	
Ak Chin Indian Community of the Maricopa (Ak Chin) Indian Reservation	42507 W. Peters & Nall Road Maricopa, AZ 85138
Cocopah Tribe of Arizona	County 15th & Avenue G Somerton, AZ 85350
Colorado River Indian Tribes of the Colorado River Indian Reservation (Arizona and California)	26600 Mohave Road Parker, AZ 85344
Fort McDowell Yavapai Nation	P.O. Box 17779 Fountain Hills, AZ 85269
Fort Mojave Indian Tribe (Arizona, California and Nevada)	500 Merriman Avenue Needles, CA 92363
Gila River Indian Community of the Gila River Indian Reservation	P.O. Box 97 Sacaton, AZ 85147
Havasupai Tribe of the Havasupai Reservation	P.O. Box 10 Supai, AZ 86435
Hopi Tribe of Arizona	P.O. Box 123 Kykotsmovi, AZ 86039
Hualapai Indian Tribe of the Hualapai Indian Reservation	P.O. Box 179 Peach Springs, AZ 86434
Kaibab Band of Paiute Indians of the Kaibab Indian Reservation	HC 65, Box 2 Fredonia, AZ 86022
Navajo Nation (Arizona, New Mexico and Utah)	P.O. Box 7440 Window Rock, AZ 86515
Pascua Yaqui Tribe of Arizona	7474 S. Camino de Oeste Tucson, AZ 85757
Quechan Tribe of the Fort Yuma Indian Reservation (Arizona and California)	P.O. Box 1899 Yuma, AZ 85366
Salt River Pima-Maricopa Indian Community of the Salt River Reservation	10005 East Osborn Road SRP-MIC Scottsdale, AZ 85256
San Carlos Apache Tribe of the San Carlos Reservation	P.O. Box 0 San Carlos, AZ 85550
San Juan Southern Paiute Tribe of Arizona	P.O. Box 1989 Tuba City, AZ 86045
Tohono O'odham Nation of Arizona	P.O. Box 837 Sells, AZ 85634
Tonto Apache Tribe of Arizona	Tonto Apache Reservation #30 Payson, AZ 85541
White Mountain Apache Tribe of the Fort Apache Reservation	P.O. Box 700 Whiteriver, AZ 85941

Yavapai-Apache Nation of the Camp Verde Indian Reservation	2400 W. Datsi Camp Verde, AZ 86322
Yavapai-Prescott Indian Tribe	530 E. Merritt Prescott, AZ 86301
California	
Agua Caliente Band of Cahuilla Indians of the Agua Caliente Indian Reservation	Agua Caliente Tribal Administration Plaza 5401 Dinah Shore Drive Palm Springs, CA 92264
Alturas Indian Rancheria	P.O. Box 340 Alturas, CA 96101
Augustine Band of Cahuilla Indians	P.O. Box 846 Coachella, CA 92236
Bear River Band of the Rohnerville Rancheria	27 Bear River Drive Loleta, CA 95551
Berry Creek Rancheria of Maidu Indians of California	5 Tyme Way Oroville, CA 95966
Big Lagoon Rancheria	P.O. Box 3060 Trinidad, CA 95570
Big Pine Band Paiute Tribe of the Owens Valley	P.O. Box 700 Big Pine, CA 93513
Big Sandy Rancheria of Western Mono Indians of California	P.O. Box 337 Auberry, CA 93602
Big Valley Band of Pomo Indians of the Big Valley Rancheria	2726 Mission Rancheria Road Lakeport, CA 95453
Bishop Paiute Tribe (previously listed as Paiute-Shoshone Indians of the Bishop Community of the Bishop Colony)	50 Tu Su Lane Bishop, CA 93514
Blue Lake Rancheria	P.O. Box 428 Blue Lake, CA 95525
Bridgeport Indian Colony	P.O. Box 37 Bridgeport, CA 93517
Buena Vista Rancheria of Me-Wuk Indians of California	1418 20th Street Suite 200 Sacramento, CA 95811
Cabazon Band of Mission Indians	84-245 Indio Springs Parkway Indio, CA 92203
Cachil DeHe Band of Wintun Indians of the Colusa Indian Community of the Colusa Rancheria	3730 Highway 45 Colusa, CA 95932
Cahuilla Band of Mission Indians of the Cahuilla Reservation	52701 Highway 371 Anza, CA 92539
Cahto Indian Tribe of the Laytonville Rancheria	P.O. Box 1239 Laytonville, CA 95454

California Valley Miwok Tribe	2140 Shattuck Avenue, #602 Berkeley, CA 94704
Campo Band of Diegueño Mission Indians of the Campo Indian Reservation	36190 Church Road, Suite 1 Campo, CA 91906
Capitan Grande Band of Diegueño Mission Indians of California: Barona Group of Capitan Grande Band of Mission Indians of the Barona Reservation; Viejas (Baron Long) Group of Capitan Grande Band of Mission Indians of the Viejas Reservation	1095 Barona Road Lakeside, CA 92040
Cedarville Rancheria	300 West 1st Street Alturas, CA 96101
Chemehuevi Indian Tribe of the Chemehuevi Reservation	P.O. Box 1976 Havasu Lake, CA 92363
Cher-Ae Heights Indian Community of the Trinidad Rancheria	P.O. Box 630 Trinidad, CA 95570
Chicken Ranch Rancheria of Me-Wuk Indians of California	P.O. Box 1159 Jamestown, CA 95327
Cloverdale Rancheria of Pomo Indians of California	555 S. Cloverdale Boulevard Cloverdale, CA 95425
Cold Springs Rancheria of Mono Indians of California	P.O. Box 209 Tollhouse, CA 93667
Colorado River Indian Tribes of the Colorado River Indian Reservation (Arizona and California)	26600 Mohave Road Parker, AZ 85344
Cortina Indian Rancheria of Wintun Indians of California	P.O. Box 1630 Williams, CA 95987
Coyote Valley Band of Pomo Indians of California	P.O. Box 39 Redwood Valley, CA 95470
Death Valley Timbi-Sha Shoshone Tribe	P.O. Box 1779 Bishop, CA 93515
Dry Creek Rancheria of Pomo Indians	P.O. Box 607 Geyserville, CA 95441
Elem Indian Colony of Pomo Indians of the Sulphur Bank Rancheria	P.O. Box 757 Lower Lake, CA 95457
Elk Valley Rancheria	2332 Howland Hill Road Crescent City, CA 95531
Enterprise Rancheria of Maidu Indians of California	2133 Montevista Avenue Oroville, CA 95966
Ewiiapaayp Band of Kumeyaay Indians	4054 Willow Road Alpine, CA 91901
Federated Indians of Graton Rancheria	6400 Redwood Drive Suite 300 Rohnert Park, CA 94928

Fort Bidwell Indian Community of the Fort Bidwell Reservation of California	P.O. Box 129 Fort Bidwell, CA 96112
Fort Independence Indian Community of Paiute Indians of the Fort Independence Reservation	P.O. Box 67 Independence, CA 93526
Fort Mojave Indian Tribe (Arizona, California and Nevada)	500 Merriman Avenue Needles, CA 92363
Greenville Rancheria	P.O. Box 279 Greenville, CA 95947
Grindstone Indian Rancheria of Wintun-Wailaki Indians of California	P.O. Box 63 Elk Creek, CA 95939
Guidiville Rancheria of California	P.O. Box 339 Talmage, CA 95481
Habematolel Pomo of Upper Lake	P.O. Box 516 Upper Lake, CA 95485
Hoop Valley Tribe	P.O. Box 1348 Hoop Valley, CA 95546
Hopland Band of Pomo Indians	3000 Shanel Road Hopland, CA 95449
Inaja Band of Diegueño Mission Indians of the Inaja and Cosmit Reservation	P.O. Box 130 Santa Ysabel, CA 92070
Ione Band of Miwok Indians of California	P.O. Box 699 Plymouth, CA 95669
Jackson Band of Miwok Indians	P.O. Box 1090 Jackson, CA 95642
Jamul Indian Village of California	P.O. Box 612 Jamul, CA 91935
Karuk Tribe	P.O. Box 1016 Happy Camp, CA 96039
Kashia Band of Pomo Indians of the Stewart's Point Rancheria	1420 Guerneville Road Suite 1 Santa Rosa, CA 95403
Koi Nation of Northern California	P.O. Box 3162 Santa Rosa, CA 95402
La Jolla Band of Luiseño Indians	22000 Highway 76 Pauma Valley, CA 92061
La Posta Band of Diegueño Mission Indians of the La Posta Indian Reservation	8 Crestwood Road Boulevard, CA 91905
Lone Pine Paiute-Shoshone Tribe	P.O. Box 747 Lone Pine, CA 93545
Los Coyotes Band of Cahuilla & Cupeno Indians	P.O. Box 189 Warner Springs, CA 92086

Lytton Rancheria of California	437 Aviation Boulevard Santa Rosa, CA 95403
Manchester Band of Pomo Indians of the Manchester Rancheria	P.O. Box 623 Point Arena, CA 95468
Manzanita Band of Diegueño Mission Indians of the Manzanita Reservation	P.O. Box 1302 Boulevard, CA 91905
Mechoopda Indian Tribe of Chico Rancheria Mesa Grande Band of Diegueño Mission Indians of the Mesa Grande Reservation	125 Mission Ranch Boulevard Chico, CA 95926
Middletown Rancheria of Pomo Indians of California	P.O. Box 1035 Middletown, CA 95461
Mooretown Rancheria of Maidu Indians of California	1 Alverda Drive Oroville, CA 95966
Morongo Band of Cahuilla Mission Indians	12700 Pumarra Road Banning, CA 92220
Northfork Rancheria of Mono Indians of California	P.O. Box 929 North Fork, CA 93643
Pala Band of Luiseño Mission Indians of the Pala Reservation	35008 Pala-Temecula Road PMB – 50 Pala, CA 92059
Paskenta Band of Nomlaki Indians of California	P.O. Box 709 Corning, CA 96021
Pauma Band of Luiseño Mission Indians of the Pauma & Yuima Reservation	P.O. Box 369 Pauma Valley, CA 92061
Pechanga Band of Luiseño Mission Indians of the Pechanga Reservation	P.O. Box 1477 Temecula, CA 92593
Picayune Rancheria of Chukchansi Indians of California	8080 N. Palm Suite 206 Fresno, CA 92711
Pinoleville Pomo Nation (formerly the Pinoleville Rancheria of Pomo Indians of California)	500 B Pinoleville Drive Ukiah, CA 95482
Pit River Tribe (includes XL Ranch, Big Bend, Likely, Lookout, Montgomery Creek and Roaring Creek Rancherias)	36970 Park Avenue Burney, CA 96013
Potter Valley Tribe (formerly the Potter Valley Rancheria of Pomo Indians of California)	2251 South State Street Ukiah, CA 95482
Quartz Valley Indian Community of the Quartz Valley Reservation of California	13601 Quartz Valley Road Fort Jones, CA 96032
Quechan Tribe of the Fort Yuma Indian Reservation (Arizona and California)	P.O. Box 1899 Yuma, AZ 85366
Ramona Band of Cahuilla	P.O. Box 391670 Anza, CA 92539
Redding Rancheria	2000 Redding Rancheria Road Redding, CA 96001

Redwood Valley or Little River Band of Pomo Indians of the Redwood Valley Rancheria California	3250 Road I Redwood Valley, CA 95470
Resighini Rancheria	P.O. Box 529 Klamath, CA 95548
Rincon Band of Luiseño Mission Indians of the Rincon Reservation	1 West Tribal Road Valley Center, CA 92082
Robinson Rancheria	P.O. Box 4015 Nice, CA 95464
Round Valley Indian Tribes, Round Valley Reservation	77826 Covelo Road Covelo, CA 95428
San Manuel Band of Serrano Mission Indians of the San Manuel Reservation	26569 Community Center Drive Highland, CA 92346
San Pasqual Band of Diegueño Mission Indians of California	P.O. Box 365 Valley Center, CA 92082
Santa Rosa Indian Community of the Santa Rosa Rancheria	P.O. Box 8 Lemoore, CA 93245
Santa Rosa Band of Cahuilla Indians (formerly the Santa Rosa Band of Cahuilla Mission Indians of the Santa Rosa Reservation)	P.O. Box 391820 Anza, CA 92539
Santa Ynez Band of Chumash Mission Indians of the Santa Ynez Reservation	P.O. Box 517 Santa Ynez, CA 93460
Lipay Nation of Santa Ysabel (Previously listed as the Santa Ysabel Band of Diegueño Mission Indians of the Santa Ysabel Reservation)	PO Box 130 Schoolhouse Canyon Rd Santa Ysabel, CA 92070
Scotts Valley Band of Pomo Indians of California	1005 Parallel Drive Lakeport, CA 95453
Sheep Ranch Rancheria of Me-Wuk Indians	2140 Shattuck Ave. #602 Berkeley, CA 94704
Sherwood Valley Rancheria of Pomo Indians of California	190 Sherwood Hill Drive Willits, CA 95490
Shingle Springs Band of Miwok Indians, Shingle Springs Rancheria (Verona Tract)	P.O. Box 1340 Shingle Springs, CA 95682
Smith River Rancheria	140 Rowdy Creek Road Smith River, CA 95567
Soboba Band of Luiseño Indians	P.O. Box 487 San Jacinto, CA 92581
Susanville Indian Rancheria	745 Joaquin Street Susanville, CA 96130
Sycuan Band of the Kumeyaay Nation (formerly the Sycuan Band of Diegueno Mission Indians of California)	1 Kwaaypaay Court El Cajon, CA 92019
Table Mountain Rancheria of California	P.O. Box 410 Friant, CA 93626

Tejon Indian Tribe	1731 Hasti Acres Drive Suite 108 Bakersfield, CA 93309
Torres-Martinez Desert Cahuilla Indians	P.O. Box 1160 Thermal, CA 92274
Tule River Indian Tribe of the Tule River Reservation	P.O. Box 589 Porterville, CA 93258
Tuolumne Band of Me-Wuk Indians of the Tuolumne Rancheria of California	P.O. Box 699 Tuolumne, CA 95379
Twenty-Nine Palms Band of Mission Indians of California	46-200 Harrison Place Coachella, CA 92236
United Auburn Indian Community of the Auburn Rancheria of California	10720 Indian Hill Road Auburn, CA 95603
Upper Lake Band of Pomo Indians	P.O. Box 516 Upper Lake, CA 95485
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	25669 Highway 6 PMB 1 Benton, CA 93512
Washoe Tribe (Carson Colony, Dresslerville Colony, Woodfords Community, Stewart Community and Washoe Ranches) (California and Nevada)	919 Highway 395 South Gardenerville, NV 89410
Wilton Rancheria	9728 Kent Street Elk Grove, CA 95624
Wiyot Tribe (formerly the Table Bluff Reservation-Wiyot Tribe)	1000 Wiyot Drive Loleta, CA 95551
Yocha Dehe Wintun Nation	P.O. Box 18 Brooks, CA 95606
Yurok Tribe of the Yurok Reservation	P.O. Box 1027 Klamath, CA 95548
Nevada	
Confederated Tribes of the Goshute Reservation (Nevada and Utah)	P.O. Box 6104 195 Tribal Center Road Ibapah, Utah 84034
Duckwater Shoshone Tribe of the Duckwater Reservation	P.O. Box 140068 Duckwater, NV 89314
Ely Shoshone Tribe of Nevada	16 Shoshone Circle Ely, NV 89301
Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation (Nevada and Oregon)	P.O. Box 457 McDermitt, NV 89421
Fort Mojave Indian Tribe (Arizona, California and Nevada)	500 Merriman Avenue Needles, CA 92363

Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony	One Paiute Drive Las Vegas, NV 89106
Lovelock Paiute Tribe of the Lovelock Indian Colony	P.O. Box 878 Lovelock, NV 89419
Moapa Band of Paiute Indians of the Moapa River Indian Reservation	P.O. Box 340 Moapa, NV 89025
Paiute-Shoshone Tribe of the Fallon Reservation and Colony	565 Rio Vista Road Fallon, NV 89406
Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation	P.O. Box 256 Nixon, NV 89424
Reno-Sparks Indian Colony	98 Colony Road Reno, NV 89502
Shoshone-Paiute Tribes of the Duck Valley Reservation	P.O. Box 219 Owyhee, NV 89832
Summit Lake Paiute Tribe of Nevada	1708 H Street Sparks, NV 89431
Te-Moak Tribe of Western Shoshone Indians of Nevada (Four constituent bands: Battle Mountain Band; Elko Band; South Fork Band; Wells Band)	525 Sunset Street Elko, NV 89801
Walker River Paiute Tribe of the Walker River Reservation	P.O. Box 220 Schurz, NV 89427
Washoe Tribe (Nevada and California) (Carson Colony, Dresslerville Colony, Woodfords Community, Stewart Community and Washoe Ranches)	919 Highway 395 South Gardnerville, NV 89410
Winnemucca Indian Colony of Nevada	595 Humboldt Street Reno, NV 89509
Yerington Paiute Tribe of the Yerington Colony & Campbell Ranch	171 Campbell Lane Yerington, NV 89447
Yomba Shoshone Tribe of the Yomba Reservation	HC 61, Box 6275 Austin, NV 89310
Hawaii	
For an official list of Native Hawaiian organizations, please use the following link: https://www.doi.gov/hawaiian/NHOL	

Region X	
Alaska	
Native Village of Afognak (formerly the Village of Afognak)	323 Carolyn Street Kodiak, AK 99615
Agdaagux Tribe of King Cove	P.O. Box 249 King Cove, AK 99612
Native Village of Akhiok	P.O. Box 5030 Akhiok, AK 99615
Akiachak Native Community	P.O. Box 51070 Akiachak, AK 99551
Akiak Native Community	P.O. Box 52127 Akiak, AK 99552
Native Village of Akutan	P.O. Box 89 Akutan, AK 99553
Village of Alakanuk	P.O. Box 149 Alakanuk, AK 99554
Alatna Village	P.O. Box 70 Allakaket, AK 99720
Native Village of Aleknagik	P.O. Box 115 Aleknagik, AK 99555
Algaaciq Native Village (St. Mary's)	P.O. Box 48 St. Mary's, AK 99658
Allakaket Village	P.O. Box 50 Allakaket, AK 99720
Native Village of Ambler	P.O. Box 47 Ambler, AK 99786
Village of Anaktuvuk Pass	P.O. Box 21170 Anaktuvuk Pass, AK 99721
Yupit of Andreafski	P.O. Box 88 51 Westdahl Street Saint Mary's, AK 99658
Angoon Community Association	P.O. Box 328 Angoon, AK 99820
Village of Aniak	P.O. Box 349 Aniak, AK 99557
Anvik Village	P.O. Box 10 Anvik, AK 99558
Arctic Village (See Native Village of Venetie Tribal Government)	P.O. Box 81080 Venetie, AK 99781
Asa'carsarmiut Tribe	P.O. Box 32249 2 Phone No: Fax No: P

Native Village of Atka	P.O. Box 47030 Atka, AK 99547
Village of Atmautluak	P.O. Box 6568 Atmautluak, AK 99559
Atqasuk Village (Atkasook)	P.O. Box 91108 Atqasuk, AK 99791
Native Village of Barrow Inupiat Traditional Government	P.O. Box 1130 Barrow, AK 99723
Beaver Village	P.O. Box 24029 Beaver, AK 99724
Native Village of Belkofski	P.O. Box 57 King Cove, AK 99612
Village of Bill Moore's Slough	P.O. Box 20288 Kotlik, AK 99620
Birch Creek Tribe	P.O. Box 71372 Fort Yukon, AK 99701
Native Village of Brevig Mission	101 Mission Street P.O. Box 85039 Brevig Mission, AK 99785
Native Village of Buckland	P.O. Box 67 Buckland, AK 99727
Native Village of Cantwell	P.O. Box 94 Cantwell, AK 99729
Native Village of Chenega (aka Chanega)	P.O. Box 8079 Chenega Bay, AK 99574
Chalkyitsik Village	P.O. Box 57 Chalkyitsik, AK 99788
Cheesh-Na Tribe (formerly the Native Village of Chistochina)	P.O. Box 241 Gakona, AK 99586
Village of Chefnak	P.O. Box 110 Chefnak, AK 99561
Chevak Native Village	P.O. Box 140 Chevak, AK 99563
Chickaloon Native Village	P.O. Box 1105 Chickaloon, AK 99674
Chignik Bay Tribal Council (formerly the Native Village of Chignik)	P.O. Box 50 Chignik, AK 99564
Native Village of Chignik Lagoon	HC 60, P.O. Box 2207 Haines, AK 99827
Chignik Lake Village	P.O. Box 33 Chignik Lake, AK 99548

Chilkat Indian Village (Klukwan)	HC 60, P.O. Box 2207 Haines, AK 99827
Chilkoot Indian Association (Haines)	P.O. Box 490 Haines, AK 99827
Chinik Eskimo Community (Golovin)	P.O. Box 62020 Golovin, AK 99762
Native Village of Chitina	P.O. Box 31 Chitina, AK 99566
Native Village of Chuathbaluk (Russian Mission, Kuskokwim)	#1 Teen Center Trail, P.O. Box CHU Chuathbaluk, AK 99557
Chuloonawick Native Village	P.O. Box 245 Emmonak, AK 99581
Circle Native Community	P.O. Box 89 Circle, AK 99733
Village of Clarks Point	P.O. Box 90 Clarks Point, AK 99569
Native Village of Council	P.O. Box 2050 Nome, AK 99762
Craig Tribal Association (previously listed as the Craig Community Association)	P.O. Box 828 Craig, AK 99921
Village of Crooked Creek Curyung Tribal Council	P.O. Box 69 Crooked Creek, AK 99575
Native Village of Deering	P.O. Box 36089 Deering, AK 99736
Native Village of Diomedede (aka Inalik)	P.O. Box 7079 Diomedede, AK 99762
Village of Dot Lake	P.O. Box 2279 Dot Lake, AK 99737
Douglas Indian Association	811 W. 12th Street Juneau, AK 99801
Native Village of Eagle	P.O. Box 19 Eagle, AK 99738
Native Village of Eek	P.O. Box 89 Eek, AK 99578
Egegik Village	P.O. Box 29 Egegik, AK 99579
Eklutna Native Village	26339 Eklutna Village Road Chugiak, AK 99567
Native Village of Ekuk	P.O. Box 530 Dillingham, AK 99576

Native Village of Ekwok (previously listed as Ekwok Village)	P.O. Box 70 Ekwok, AK 99580
Native Village of Elim	P.O. Box 39070 Elim, AK 99739
Emmonak Village	126 Frontage Road Emmonak, AK 99581
Evansville Village (aka Bettles Field)	P.O. Box 26087 Bettles Field, AK 99726
Native Village of Eyak (Cordova)	P.O. Box 1388 Cordova, AK 99574
Native Village of False Pass	P.O. Box 29 False Pass, AK 99583
Native Village of Fort Yukon	P.O. Box 126 Fort Yukon, AK 99740
Native Village of Gakona	P.O. Box 102 Gakona, AK 99586
Galena Village (aka Loudon Village)	100 Tiger Highway Galena, AK 99741
Native Village of Gambell	P.O. Box 90 Gambell, AK 99742
Native Village of Georgetown	5313 Arctic Boulevard Suite 104 Anchorage, AK 99518
Native Village of Goodnews Bay	P.O. Box 03 Goodnews Bay, AK 99589
Organized Village of Grayling (aka Holikachuk)	P.O. Box 49 Grayling, AK 99590
Gulkana Village	P.O. Box 254 Gulkana, AK 99586
Native Village of Hamilton	P.O. Box 20248 Kotlik, AK 99620
Healy Lake Village	P.O. Box 60300 Fairbanks, AK 99706
Holy Cross Village	P.O. Box 89 Holy Cross, AK 99602
Hoonah Indian Association	P.O. Box 602 Hoonah, AK 99829
Native Village of Hooper Bay	P.O. Box 69 Hooper Bay, AK 99604
Hughes Village	P.O. Box 45029 Hughes, AK 99745

Huslia Village	P.O. Box 70 Huslia, AK 99746
Hydaburg Cooperative Association	P.O. Box 349 Hydaburg, AK 99922
Igiugig Village	P.O. Box 4008 Igiugig, AK 99613
Village of Iliamna	P.O. Box 286 1/2 Mile Safety Hill Iliamna, AK 99606
Inupiat Community of the Arctic Slope	P.O. Box 934 Barrow, AK 99723
Iqurmut Traditional Council (formerly the Native Village of Russian Mission)	P.O. Box 09 #1 Church Road Russian Mission, AK 99657
Ivanoff Bay Village	7926 Old Seward Highway Suite B-5 Anchorage, AK 99518
Kaguyak Village	P.O. Box 5078 Akhiok, AK 99615
Organized Village of Kake	P.O. Box 316 Kake, AK 99830
Kaktovik Village (aka Barter Island)	P.O. Box 52 Kaktovik, AK 99747
Village of Kalskag	P.O. Box 50 Kalskag, AK 99607
Village of Kaltag	P.O. Box 129 Kaltag, AK 99748
Native Village of Kanatak	P.O. Box 876822 Wasilla, AK 99687
Native Village of Karluk	P.O. Box 22 Karluk, AK 99608
Organized Village of Kasaan	P.O. Box 26 – Kasaan
Kasigluk Traditional Elders Council (formerly the Native Village of Kasigluk)	P.O. Box 19 19 Tangerpacaraq Road Kasigluk, AK 99609
Kenaitze Indian Tribe	P.O. Box 988 Kenai, AK 99611
Ketchikan Indian Corporation	2960 Tongass Avenue Ketchikan, AK 99901
Native Village of Kiana	P.O. Box 69 Kiana, AK 99749

King Island Native Community	P.O. Box 682 Nome, AK 99762
King Salmon Tribe	P.O. Box 68 King Salmon, AK 99613
Native Village of Kipnuk	P.O. Box 57 Kipnuk, AK 99614
Native Village of Kivalina	P.O. Box 50051 Kivalina, AK 99750
Klawock Cooperative Association	P.O. Box 430 Klawock, AK 99925
Native Village of Kluti Kaah (aka Copper Center)	P.O. Box 68 Mile 104 Old Richardson Highway Copper Center, AK 99573
Knik Tribe	P.O. Box 871565 Wasilla, AK 99687
Native Village of Kobuk	P.O. Box 51039 Kobuk, AK 99751
Kokhanok Village	P.O. Box 1007 Kokhanok, AK 99606
Native Village of Kongiganak	P.O. Box 5069 Akallaam Lavkarra Kongiganak, AK 99559
Village of Kotlik	P.O. Box 20210 Kotlik, AK 99620
Native Village of Kotzebue	P.O. Box 296 600 W. 5th Avenue Kotzebue, AK 99752
Native Village of Koyuk	P.O. Box 53030 Koyuk, AK 99753
Koyukuk Native Village	P.O. Box 109 Koyukuk, AK 99754
Organized Village of Kwethluk	P.O. Box 130 Kwethluk, AK 99621
Native Village of Kwigillingok	P.O. Box 90 Kwigillingok, AK 99622
Native Village of Kwinhagak (aka Quinhagak)	P.O. Box 149 Quinhagak, AK 99655
Native Village of Larsen Bay	P.O. Box 50 Larsen Bay, AK 99624
Levelock Village	P.O. Box 70 Levelock, AK 99625

Lime Village	P.O. Box LVD Lime Village VIA McGrath, AK 99627
Village of Lower Kalskag	P.O. Box 27 Lower Kalskag, AK 99626
Manley Hot Springs Village	P.O. Box 105 Manley Hot Springs, AK 99756
Manokotak Village	P.O. Box 169 Manokotak, AK 99628
Native Village of Marshall (aka Fortuna Ledge)	P.O. Box 110 Marshall, AK 99585
Native Village of Mary's Igloo	P.O. Box 546 Teller, AK 99778
McGrath Native Village	P.O. Box 134 McGrath, AK 99627
Native Village of Mekoryuk	P.O. Box 66 Mekoryuk, AK 99630
Mentasta Traditional Council	P.O. Box 6019 Mile 6 Mentasta Spur Road Mentasta, AK 99780
Metlakatla Indian Community, Annette Island Reserve	P.O. Box 8 Metlakatla, AK 99926
Native Village of Minto	P.O. Box 58026 Minto, AK 99758
Naknek Native Village	P.O. Box 210 Naknek, AK 99633
Native Village of Nanwalek (aka English Bay)	P.O. Box 8028 Nanwalek, AK 99603
Native Village of Napaimute	P.O. Box 1301 Bethel, AK 99559
Native Village of Napakiak	P.O. Box 34069 Napakiak, AK 99634
Native Village of Napaskiak	P.O. Box 6009 Napaskiak, AK 99559
Native Village of Nelson Lagoon	P.O. Box 913 Nelson Lagoon, AK 99571
Nenana Native Association	P.O. Box 369 Nenana, AK 99760
New Koliganek Village Council	P.O. Box 5057 Koliganek, AK 99576
New Stuyahok Village	P.O. Box 49 New Stuyahok, AK 99636

Newhalen Village	P.O. Box 207 Newhalen, AK 99606
Newtok Village	CONTACT BIA ALASKA REGIONAL OFFICE FOR FURTHER INFORMATION
Native Village of Nightmute	P.O. Box 90021 Nightmute, AK 99690
Nikolai Village	P.O. Box 9107 Nikolai, AK 99691
Native Village of Nikolski	P.O. Box 105 Nikolski, AK 99638
Ninilchik Village	P.O. Box 39070 Ninilchik, AK 99639
Native Village of Noatak	P.O. Box 89 Noatak, AK 99761
Nome Eskimo Community	P.O. Box 1090 Nome, AK 99762
Nondalton Village	P.O. Box 49 Nondalton, AK 99640
Noorvik Native Community	P.O. Box 209 Noorvik, AK 99763
Northway Village	P.O. Box 516 Northway, AK 99764
Native Village of Nuiqsut (aka Nooiksut)	P.O. Box 89169 Nuiqsut, AK 99789
Nulato Village	P.O. Box 65049 Nulato, AK 99765
Nunakauyarmiut Tribe (formerly the Native Village of Toksook Bay)	P.O. Box 37048 Toksook Bay, AK 99637
Native Village of Nunam Iqua (formerly the Native Village of Sheldon's Point)	P.O. Box 27 Nunam Iqua, AK 99666
Native Village of Nunapitchuk	P.O. Box 130 Nunapitchuk, AK 99641
Village of Ohogamiut	P.O. Box 49 Marshall, AK 99585
Village of Old Harbor	P.O. Box 62 Old Harbor, AK 99643
Orutsararmuit Traditional Native Council (aka Bethel)	P.O. Box 927 Bethel, AK 99559
Oscarville Traditional Village	P.O. Box 6129 Napaskiak, AK 99559

Native Village of Ouzinkie	P.O. Box 130 Ouzinkie, AK 99644
Native Village of Paimiut	P.O. Box 230 Hooper Bay, AK 99604
Pauloff Harbor Village	P.O. Box 97 Sand Point, AK 99661
Pedro Bay Village	P.O. Box 47020 2516 Mountain Circle Pedro Bay, AK 99647
Native Village of Perryville	P.O. Box 89 Perryville, AK 99648
Petersburg Indian Association	P.O. Box 1418 Petersburg, AK 99833
Native Village of Pilot Point	P.O. Box 109 Pilot Point, AK 99766
Pilot Station Traditional Village	P.O. Box 5119 Pilot Station, AK 99650
Native Village of Pitka's Point	P.O. Box 127 St. Mary's, AK 99658
Platinum Traditional Village	P.O. Box 8 Platinum, AK 99651
Native Village of Point Hope	P.O. Box 109 Point Hope, AK 99766
Native Village of Point Lay	P.O. Box 59031 Point Lay, AK 99759
Native Village of Port Graham	P.O. Box 5510 Port Graham, AK 99603
Native Village of Port Heiden	P.O. Box 49007 Port Heiden, AK 99549
Native Village of Port Lions	P.O. Box 69 Port Lions, AK 99550
Portage Creek Village (aka Ohgsenakale)	1327 E. 72nd Avenue, Unit B Anchorage, AK 99515
Pribilof Islands Aleut Communities of St. Paul & St. George Islands	P.O. Box 86 Saint Paul Island, AK 99660
Qagan Tayagungin Tribe of Sand Point Village	P.O. Box 447 Sand Point, AK 99661
Qawalangin Tribe of Unalaska	P.O. Box 334 Unalaska, AK 99685
Rampart Village	P.O. Box 67029 Rampart, AK 99767

Village of Red Devil	P.O. Box 61 Red Devil, AK 99656
Native Village of Ruby	P.O. Box 68210 Ruby, AK 99768
Saint George Island (See Pribilof Islands Aleut Communities of St. Paul & St. George Islands)	P.O. Box 940 Saint George Island, AK 99591
Native Village of Saint Michael	P.O. Box 59050 Saint Michael, AK 99659
Saint Paul Island (See Pribilof Islands Aleut Communities of St. Paul & St. George Islands)	P.O. Box 86 Saint Paul Island, AK 99660
Village of Salamatoff	P.O. Box 2682 Kenai, AK 99611
Native Village of Savoonga	P.O. Box 120 Savoonga, AK 99769
Organized Village of Saxman	Route 2, Box 2-Saxman Ketchikan, AK 99901
Native Village of Scammon Bay	P.O. Box 110 Scammon Bay, AK 99662
Native Village of Selawik	59 North Tundra Street Selawik, AK 99770
Seldovia Village Tribe	Drawer L Seldovia, AK 99663
Shageluk Native Village	P.O. Box 35 Shageluk, AK 99665
Native Village of Shaktoolik	P.O. Box 100 Shaktoolik, AK 99771
Native Village of Shishmaref	P.O. Box 72110 Shishmaref, AK 99772
Native Village of Shungnak	P.O. Box 64 Shungnak, AK 99773
Sitka Tribe of Alaska	456 Katlian Street Sitka, AK 99835
Skagway Village	P.O. Box 1157 Skagway, AK 99840
Village of Sleetmute	P.O. Box 109 Sleetmute, AK 99668
Village of Solomon	P.O. Box 2053 Nome, AK 99762
South Naknek Village	P.O. Box 70029 South Naknek, AK 99670

Stebbins Community Association	P.O. Box 71002 Stebbins, AK 99671
Native Village of Stevens	P.O. Box 74016 Stevens Village, AK 99774
Village of Stony River	P.O. Box SRV Birch Road Stony River, AK 99557
Sun'aq Tribe of Kodiak (formerly the Shoonaq' Tribe of Kodiak)	312 West Marine Way Kodiak, AK 99615
Takotna Village	P.O. TYC Takotna, AK 99675
Native Village of Tanacross	P.O. Box 76009 Tanacross, AK 99776
Native Village of Tanana	P.O. Box 130 Tanana, AK 99777
Tangirnaq Native Village (formerly Lesnoi Village)	3349 East Rezanof Drive Kodiak, AK 99615
Native Village of Tatitlek	P.O. Box 171 Tatitlek, AK 99677
Native Village of Tazlina	P.O. Box 87 Glennallen, AK 99588
Telida Village	P.O. Box 9104 Nikolai, AK 99691
Native Village of Teller	P.O. Box 567 Teller, AK 99778
Native Village of Tetlin	P.O. Box 797 Tok, AK 99780
Central Council of the Tlingit & Haida Indian Tribes	9097 Glacier Highway Juneau, AK 99801
Traditional Village of Togiak	P.O. Box 310 Togiak, AK 99678
Tuluksak Native Community	P.O. Box 95 Tuluksak, AK 99679
Native Village of Tuntutuliak	P.O. Box 8086 Tuntutuliak, AK 99680
Native Village of Tununak	P.O. Box 77 Tununak, AK 99681
Twin Hills Village	P.O. Box TWA Twin Hills, AK 99576
Native Village of Tyonek	P.O. Box 82009 Tyonek, AK 99682

Ugashik Village	2525 Blueberry Road, Suite 205 Anchorage, AK 99503
Umkumiut Native Village	P.O. Box 90062 Nightmute, AK 99690
Native Village of Unalakleet	P.O. Box 270 Unalakleet, AK 99684
Native Village of Unga	P.O. Box 508 Sand Point, AK 99661
Village of Venetie (See Native Village of Venetie Tribal Government)	P.O. Box 81119 Venetie, AK 99781
Native Village of Venetie Tribal Government (Arctic Village and Village of Venetie)	P.O. Box 81080 Venetie, AK 99781
Village of Wainwright	P.O. Box 22 Wainwright, AK 99782
Native Village of Wales	P.O. Box 549 Wales, AK 99783
Native Village of White Mountain	P.O. Box 84090 White Mountain, AK 99784
Wrangell Cooperative Association	P.O. Box 2021 Wrangell, AK 99929
Yakutat Tlingit Tribe	P.O. Box 418 Yakutat, AK 99689
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Coeur D'Alene Tribe	P.O. Box 408 Plummer, ID 83851
Kootenai Tribe of Idaho	P.O. Box 1269 Bonners Ferry, ID 83805
Nez Perce Tribe	P.O. Box 305 Lapwai, ID 83540
Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho	P.O. Box 306 Fort Hall, ID 83203
Oregon	
Burns Paiute Tribe	100 Pasigo Street Burns, OR 97720
Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians of Oregon	1245 Fulton Avenue Coos Bay, OR 97420
Confederated Tribes of the Grand Ronde Community of Oregon	9615 Grand Ronde Road Grand Ronde, OR 97347
Confederated Tribes of the Siletz Reservation	201 S.E. Swan Avenue PO Box 549 Siletz, OR 97380

Confederated Tribes of the Umatilla Indian Reservation	Nixyaawii Governance Center 46411 Ti'míne Way Pendleton, OR 97801
Confederated Tribes of the Warm Springs Reservation of Oregon	P.O. Box C Warm Springs, OR 97761
Coquille Indian Tribe	3050 Tremont Street North Bend, OR 97459
Cow Creek Band of Umpqua Tribe of Indians	2371 NE Stephens Suite 100 Roseburg, OR 97470
Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation (Nevada and Oregon)	P.O. Box 457 McDermitt, NV 89421
Klamath Tribes	P.O. Box 436 Chiloquin, OR 97624
Washington	
Confederated Tribes of the Chehalis Reservation	P.O. Box 536 Oakville, WA 98568
Confederated Tribes of the Colville Reservation	P.O. Box 150 Nespelem, WA 99155
Confederated Tribes and Bands of the Yakama Nation	P.O. Box 151 Toppenish, WA 98948
Cowlitz Indian Tribe	P.O. Box 2547 Longview, WA 98632
Hoh Indian Tribe	P.O. Box 2196 Forks, WA 98331
Jamestown S'Klallam Tribe	1033 Old Blyn Highway Sequim, WA 98382
Kalispel Indian Community of the Kalispel Reservation	P.O. Box 39 Usk, WA 99180
Lower Elwha Tribal Community	2851 Lower Elwha Road Port Angeles, WA 98363
Lummi Tribe of the Lummi Reservation	2665 Kwina Road Bellingham, WA 98226
Makah Indian Tribe of the Makah Indian Reservation	P.O. Box 115 Neah Bay, WA 98357
Muckleshoot Indian Tribe	39015 172nd Avenue, SE Auburn, WA 98092
Nisqually Indian Tribe	4820 She-Nah-Num Drive, SE Olympia, WA 98513
Nooksack Indian Tribe of Washington	P.O. Box 157 Deming, WA 98244

Port Gamble S'Klallam Tribe	31912 Little Boston Road, NE Kingston, WA 98346
Puyallup Tribe of the Puyallup Reservation	3009 East Portland Avenue Tacoma, WA 98404
Quileute Tribe of the Quileute Reservation	P.O. Box 279 La Push, WA 98350
Quinault Indian Nation	P.O. Box 189 Taholah, WA 98587
Samish Indian Nation	P.O. Box 217 Anacortes, WA 98221
Sauk-Suiattle Indian Tribe of Washington	5318 Chief Brown Lane Darrington, WA 98241
Shoalwater Bay Indian Tribe of the Shoalwater Bay Indian Reservation	P.O. Box 130 Tokeland, WA 98590
Skokomish Indian Tribe	80 North Tribal Center Road Shelton, WA 98584
Snoqualmie Indian Tribe	P.O. Box 969 Snoqualmie, WA 98065
Spokane Tribe of the Spokane Reservation	P.O. Box 100 Wellpinit, WA 99040
Squaxin Island Tribe of the Squaxin Island Reservation	10 SE Squaxin Lane Shelton, WA 98584
Stillaguamish Tribe of Indians of Washington	P.O. Box 277 Arlington, WA 98223
Suquamish Indian Tribe of the Port Madison Reservation	P.O. Box 498 Suquamish, WA 98392
Swinomish Indian Tribal Community	11404 Moorage Way LaConner, WA 98257
Tulalip Tribes of Washington	6406 Marine Drive Tulalip, WA 98271
Upper Skagit Indian Tribe of Washington	25944 Community Plaza Way Sedro Woolley, WA 98284

APPENDIX E.DETERMINATION OF BUILDING OCCUPANCY

D. Determination of Building Occupancy

The following terms should be used to determine the appropriate occupancy classification:

1. Single-Family Dwelling

This is either:

- a. A residential single-family building in which the total floor area devoted to non-residential uses is less than 50% of the building's total floor area, *or*
- b. A single-family residential unit within a 2–4 family building, other-residential building, business, or non-residential building, in which commercial uses within the unit are limited to less than 50% of the unit's total floor area.

This includes a residential townhouse/rowhouse, which is a multi-floor unit divided from similar units by solid, vertical, load-bearing walls, having no openings in the walls between units and with no horizontal divisions between any of the units.

NOTE: Commercial uses within the unit are offices, private schools, studios, or small service operations within a residential building.

2. 2–4 Family Building

This is a residential building, including an apartment building, containing 2–4 residential spaces and in which commercial uses are limited to less than 25% of the building's total floor area. This category includes apartment buildings and condominium buildings. This excludes hotels and motels with normal room rentals for less than 6 months.

3. Other Residential Building

This is a residential building that is designed for use as a residential space for 5 or more families or a mixed-use building in which the total floor area devoted to non-residential uses is less than 25% of the total floor area within the building. This category includes condominium and apartment buildings as well as hotels, motels, tourist homes, and rooming houses where the normal occupancy of a guest is 6 months or more. Additional examples of other residential buildings include dormitories and assisted-living facilities.

APPENDIX F. INSTALLMENT PLAN PAYMENT OPTION: ECONOMIC IMPACT ASSESSMENT

Under this sub-element of Alternatives 2, 3, and 4, FEMA would

Phase out subsidies on certain pre-FIRM properties at a rate of 25 percent premium rate increases per year. Specifically, this would affect the following pre-FIRM properties: non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property.

- (1) Phase out subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15%, per risk classification, with no individual policy exceeding an 18% premium rate increase. This would affect all policies not already subject to 25% rate increases or immediate removal of subsidies. (The latter instance occurs when lapsed policies are reinstated.) Based on the range of policy types encompassed by the first component of Alternative 2, this second component primarily affects primary residence policies.

Baseline

For this particular sub-element of Alternatives 2, 3, and 4, flood insurance premiums are to be gradually, and continuously, increased on all currently subsidized “Pre-FIRM” policies until either the full risk rates are charged, or, where the full risk rate is not already known, until an elevation certificate could be provided by the insured policyholders. In order to assess the societal impact of this component of these increases, we must first establish the current practice—or in this case, as the changes have already been put into effect—the baseline practice before the change was implemented.

- a. For some pre-FIRM policies (those in AH, AO, Unnumbered V and D zones), elevation data is not required to determine a full-risk rate, which is generally known. A comparison is made between the pre-FIRM subsidized total amount, and the full-risk total amount; the lower of the two applies.¹ Elevation data would not benefit these policyholders. There are **1,384** pre-FIRM buildings rated in Unnumbered V or D zones.
- a. There are **42,516** pre-FIRM buildings with unknown elevations (AH or AO zones). Elevation data may benefit some unknown portion of these who are not already paying full-risk rates.
- b. There are **42,573** contracts covering pre-FIRM buildings (rated in zones Unnumbered A, AE, A1-A30, VE, and V1-V30) that have a lowest floor elevation below the base flood

¹ Because the pre-FIRM subsidized rates tend to be lower on the basic coverage limit (the first \$60,000), pre-FIRM property owners with lower coverage will tend to be subsidized. Properties with higher coverage will tend to be full-risk. If a policyholder changes coverage mid-term, the classification from subsidized to full-risk or vice-a-versa can change (though the instances where this occurs will continually decrease over time as subsidy is phased out).

elevation (BFE); indicating greater exposure, and by extension, a greater current subsidy over the full risk rate alternative. These contracts are mostly pre-FIRM subsidized. As with the categories above, as subsidy continues to be phased out, more and more of these would be automatically switched to full-risk rates when the full-risk rate becomes cheaper than the pre-FIRM subsidized alternative. No new Elevation Certificate would be required.

- c. Finally, there are **718,321** contracts covering pre-FIRM buildings rated with unknown elevation data (rated in Zones Unnumbered A, AE, A1-A30, VE, and V1-V30). These are all pre-FIRM subsidized, and would require receipt of the data from an Elevation Certificate in order to determine a full-risk premium rate. This group is also subject to indefinite annual premium increases until an Elevation Certificate is provided.

Therefore, we have a total of **804,794** “contracts in force” or insured properties that are currently pre-FIRM subsidized and subject to incremental annual rate increases as a result of BW-12, and this consequent rulemaking. The contracts, based on the above actuarial zone categorizations would have differing caps or end points to their annual premium increases, and some are required to submit elevation certificates to precipitate these caps, while others would have their increases automatically concluded when they reach the full-risk alternative.

Table 1

	Pre-FIRM Proportion of NFIP Total	Breakdown of Pre-FIRM Proportion	Breakdown of Pre-FIRM Contracts
	20.5	4.88%	804,794
Non Primary Single	5.5	26.83%	215,920.34
Primary Single	9.5	46.34%	372,953.32
SRL	0.2	0.98%	7,851.65
Other	5.3	25.85%	208,068.69
TOTAL	20.5	100%	804,794.00

We know, based on data on premium assessment over time, that of all the contracts currently in existence, 20.5% are currently pre-FIRM subsidized. Comprising that 20.5%: 5.5% are Non-Primary Single (and therefore subject to 25% increase in premiums), 9.5% are Primary Single (subject to 5-15% premium increase under BW-12), and

0.02% are Severe Repetitive Loss (SRL) properties (also subject to the 25% increase). 5.3% are categorized as “Other,” including Condos and Multi-Family dwellings (which share the effective average increase of up to 15% per annum). To apply the proportional distribution, with the 804,794 contracts representing the 20.5% of all NFIP contracts in effect, there are a total of 215,920 non-primary single contracts, 372,953 primary single, 7,851 SRL and 208,068 contracts categorized as “other,” as shown in **Table 1**.

Under baseline conditions, the combined number of subsidized contracts would be subject to the naturally occurring annual premium increases that the rest of the full risk contracts undergo, and the implicit subsidy would continue to threaten the fiscal health of the NFIP and burden taxpayers.

To better assess the impact of these premium rate increases, we would need to quantify and project both these “naturally occurring” future premium rates as well as the total premiums collected by Pre-FIRM subsidized policyholders over a period of ten years. To do this, we would need to extend back at least five years before the 2013 rates that reflected the initial impact of BW-12. Shown in **Table 2**, the average increase in all Pre-FIRM subsidized rates was 6.82%. We apply this average increase to the average premium rate published for subsidized policies in 2012 (\$1,316), and carried the rate increase through to 2016 (\$1,405, \$1,501, \$1,604, \$1,713, respectively).

Table 2

	Pre-Firm Premium Growth Rate
2008	7.5%
2009	9.7%
2010	2.7%
2011	5.2%
2012	9.0%
TOTAL	6.82%

Despite their subsidized premiums, Pre-FIRM contracts are still far larger on average than their full-risk counterparts. Therefore, we assume there to be a “switch rate” that should be applied, that would estimate the rate at which current subsidized policyholders seek refuge from the naturally occurring rate increases that further inflate their NFIP premiums by way of the only avenue available short of policy cancellation; the proactive procurement of an elevation certificate that would establish their actual flood risk.

Cost Burdens

As subsidies are phased out over time, FEMA would automatically switch policies with elevation certificates to full-risk rates when the full-risk rate becomes cheaper than the pre-FIRM subsidized alternative (FEMA, 2016b). However, for the vast majority (over 89%) of pre-FIRM subsidized policies, FEMA lacks the building-specific elevation data needed to determine the appropriate full-risk rate. FEMA cannot automatically switch these policies to full-risk rates. This creates the potential for premiums to “balloon” to very high levels. (FEMA, 2017a) (FEMA, 2017b). A key feature in this projection of increased premiums and the resulting accelerated revenue collection, is the ability of policyholders to stem the ballooning rates by procuring an elevation certificate, thereby establishing to the NFIP the heretofore unknown full-risk premium that would accurately correspond to the subsidized policyholder’s actual risk.

Elevation Certificates

A community must have an official record that shows new buildings and substantial improvements in all identified Special Flood Hazard Areas (SFHAs) are properly elevated. This elevation information is needed to show compliance with the floodplain management ordinance. This is often contracted and conducted by a private sector service provider, not unlike one would hire a property surveyor, roofer or electrician. As such, the associated rates would depend heavily on local conditions and market considerations.

For example, a recent delegation from Alaska insisted that \$2,000 was the rock bottom price in the entire state charged to the applicant by the private sector professional completing the elevation certificate, because there are so few benchmarks and so much work required. Similar prices have also been reported in sparsely populated states like the Dakotas. In Louisiana and Florida, in the more urban areas with lots of benchmarks and lots of competition, rates of around \$150 may be common. Anecdotal evidence had been reported from South Carolina, where rates varied considerably; in Charleston, they were around \$200 or \$300, but inland and up in the mountainous regions, rates could reach up to \$3,000 or more. In California, even where there is a dense population with benchmarks and competition, contractors can charge between \$800 and \$1,000 on average. In New York City and the Jersey shore, there were no consistent average for current rates whatsoever, with considerable variation from one borough to the next, and even from one side of the borough to the other—any estimate shared among the tri-state area has in the past had the effect of price setting and therefore unduly influencing the market.

Nevertheless, a somewhat recent FEMA estimate of the cost burden on respondents arrived at the amount of \$350 per Elevation Certificate (EC). This rough average was achieved in previous years by contacting about 9 surveyors and asking what they charge to do an EC for an average building in their area—once again offering as a disclaimer that some surveyors charge more or less depending on their location and the complexity of the surveying job. There is no one cost for an Elevation Certificate; the cost varies. This figure was also submitted to OMB last year as the cost estimate of the Elevation Certificate to the applicants for flood insurance.

Benefits

Under a consistent set of assumptions as to the total effects of the mandated premium increases on currently subsidized policyholders, we are able to derive the calculated benefits to the affected subset of policyholders. As we discussed above, the affected parties are likely to undertake an associated burden as a result of this rule, in the form of expenditures on elevation certificates to help determine their full-risk rates, in addition to the transfers collected in the form of the increased premiums themselves. While no set of benefits would offset the increased premiums, none are required as these increases are simply a gradual application of what is due for their accurate level of risk to the NFIP. We do hope to offset the private sector outlays that the rule requires of the policyholders, to make such novel and identifiable costs a worthwhile one.

We estimate that the policyholders opting to switch out of the increase schedule in any given year, are the very policyholders that would absorb the costs of obtaining an elevation certificate to do so, would be saving themselves, at the very least, one year's worth of impending premium increases. This would amount to the estimated "consumer surplus" of sorts, or direct cost saving to the individual affected subsidized policyholder. Note that all policyholders subject to the 25%

per year premium rate increase may be expected to switch from subsidized rates to actuarial full-risk rates far more aggressively than primary residence policyholders.

However, as discussed above, not all elevation certificates would effectively terminate future premium increases. An unknown proportion of switching policyholders would discover their full-risk rate to be in fact greater than their current rate, no matter where on the schedule they find themselves in any given year. This kick back rate, discussed previously, would place the subset of policyholders back into the relatively less expensive rate until their newly-determined full-risk rate coincides with the scheduled rate.

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APPENDIX G. AFFORDABILITY OF NATIONAL FLOOD INSURANCE PROGRAM PREMIUMS: REPORT 1

AFFORDABILITY OF NATIONAL FLOOD INSURANCE PROGRAM PREMIUMS

R E P O R T 1

Committee on the Affordability of
National Flood Insurance Program Premiums

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Division on Earth and Life Studies

Board on Mathematical Sciences and Their Applications
Division on Engineering and Physical Sciences

Committee on National Statistics
Division on Behavioral and Social Sciences and Education

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Summary

The National Flood Insurance Program (NFIP), established in 1968 and housed within the Federal Emergency Management Agency (FEMA), offers insurance policies that are marketed and sold through private insurers, but with the risks borne by the US federal government. In July 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act (Biggert-Waters 2012, or BW 2012), which was designed to initiate several changes within the NFIP. A core principle of the 2012 legislation was to move toward an insurance program with NFIP risk-based premiums that better reflected expected losses from floods at insured properties.¹ This entailed eventual removal of discounts from NFIP policies known as “pre-FIRM subsidized” (pre-Flood Insurance Rate Map) and “grandfathered” policies. Paying the claims for such policies contributed in part to the NFIP having to borrow from the US Treasury to pay for claims after Hurricane Katrina and late storms. That debt was also a motivation for provisions in BW 2012 that directed FEMA to consider actions that had the potential to improve the financial foundation for the program through premium increases that would better reflect flood risks.

BW 2012 Section 100236 called for an “affordability study” from FEMA that would include “methods to aid individuals to afford risk-based

¹Some of the terms used in this report may be unfamiliar to the reader or may have been used in inconsistent ways in writing and testimony about the NFIP through the years. Terms specific to the NFIP were taken from FEMA to the extent possible, but other terms were developed by the committee to ensure their consistent use throughout the report. A List of Terms is included at the end of this report for the reader’s convenience.

premiums under the National Flood Insurance Program through targeted assistance rather than generally subsidized rates, including means-tested vouchers.” The study was to inform the development of an affordability framework by FEMA to help inform NFIP policy decisions. However, implementation of BW 2012 rate increases was expected to take effect without awaiting the study and the development of an affordability framework, including an assistance program (see Appendix A for full language of BW 2012 Section 100236).

As BW 2012 went into effect, constituents from multiple communities expressed concerns about the elimination of lower rate classes, arguing that it created a financial burden on policyholders. Some concerns reflected the reality that purchase of the more expensive insurance was in some instances mandatory. Other concerns were based on expectations that higher premiums would depress home values, and on the question of whether higher premiums would thwart attainment of a long-standing objective of the NFIP to expand the number of properties covered by flood insurance. In response to these concerns, Congress passed the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014). The 2014 legislation changed the process by which pre-FIRM subsidized premiums for primary residences would be removed and reinstated grandfathering. In addition, Section 9 of HFIAA 2014 once again called on FEMA to report to Congress with a draft affordability framework. Specifically, the legislation stated

the Administrator shall prepare a draft affordability framework that proposes to address, via programmatic and regulatory changes, the issues of affordability of flood insurance sold under the National Flood Insurance Program, including issues identified in the affordability study required under Section 100236 of the Biggert-Waters Flood Insurance Act of 2012.

Section 100236 of BW 2012 mandated that both the aforementioned FEMA affordability study and a study from the National Academy of Sciences (NAS) to provide input into FEMA’s work. In response, the National Research Council (NRC)² convened the Committee on the Affordability of National Flood Insurance Program Premiums. The statement of task guiding this NRC committee calls for two reports and explains the content of and distinctions between them:

The first report, due in February 2015, will discuss the underlying definitions and methods for an affordability framework and describe the affordability concept and applications, and program policy options.

²The National Research Council is the working arm of the National Academies. The National Academies is the collective entity that includes the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), the Institute of Medicine (IOM), along with the National Research Council. For more information, see <http://nationalacademies.org>

The second report, due in September 2015, will propose alternative approaches for a national evaluation of affordability program policy options, based in part on lessons gleaned from a proof-of-concept pilot study to be guided by the NRC committee.

See Box 1-1, Chapter 1, for the full statement of task.

Consistent with its statement of task, Chapter 6 describes alternatives for determining when the premium increases resulting from BW 2012 would make flood insurance unaffordable and describes key design decisions and policy options for creating an assistance program. Chapter 7 discusses policy alternatives that may lower the cost of flood insurance for eligible households. To set the stage for Chapters 6 and 7, Chapter 2 describes the history of the NFIP emphasizing the effects of that history on premium setting prior to BW 2012. Chapter 3 describes the NFIP pricing practices that were in place when BW 2012 was passed and how BW 2012 might increase premiums. Chapter 4 describes the demand for insurance and offers findings about the challenge of increasing the purchase of flood insurance policies, a long-standing objective of Congress for the NFIP. Chapter 5 identifies places in the nation where the effects of BW 2012 may be most pronounced.³

NATIONAL FLOOD INSURANCE PROGRAM HISTORY

Original proposals for a national flood insurance program date back to the 1950s. The original 1968 legislation that established the program, and implementation of the NFIP over the years that led up to passage of BW 2012, reflected an intent to make flood insurance part of a multifaceted national program for flood risk management. That intent, in turn, affected NFIP premium-setting practices that were used prior to BW 2012. The following findings are based on a review of that history.

- **From the inception of the NFIP, and continuing until BW 2012, Congress sought to achieve multiple objectives for the program. The objectives have been to (1) ensure reasonable insurance premiums for all, (2) have NFIP risk-based premiums that would make people aware of and bear the cost of their floodplain location choices, (3) secure widespread community participation in the program and substantial numbers of insurance policy purchases by property owners,**

³This report does not attempt to specify programs or actions to promote flood insurance affordability, nor does it advise on how national flood risks might be reduced through insurance or other actions.

- and (4) earn premium and fee income that, over time, covers claims paid and program expenses. These objectives, however, are not always compatible, and at times may conflict with one another.
- The premium-setting practices and procedures that were in place before Biggert-Waters 2012 reflected the multiple objectives of the NFIP, and in some cases reflected premium-setting practices that were put in place when the NFIP was created. BW 2012 increased the emphasis on setting NFIP rates that reflected flood risk, and on charging premiums that would cover claims paid and other related expenses.

NATIONAL FLOOD INSURANCE PROGRAM POLICY PRICING AND EFFECTS OF BIGGERT-WATERS 2012

Well-established actuarial principles require that the combination of insurance premiums and other income sources yield revenues that will pay expected future claims and insurance program expenses (costs). These principles also hold that premiums for an individual policy, to the administratively feasible extent, should be based on expected claims plus fees for the policy. Further, the principles hold that there should be no cross-subsidy whereby one group of policyholders has higher premiums so that others will have lower premiums. Finally, premiums should be no higher than necessary to ensure that these principles are met; regulation of private insurers is expected to limit premiums to costs of providing coverage plus a competitive return on invested capital. The NFIP, although not a private company, seeks to employ actuarial principles when setting premiums. However, historical precedent and congressional desire for premiums to be reasonable, constrained application of these principles. BW 2012 sought to remove constraints on the NFIP's ability to follow actuarial pricing principles.

As a result, BW 2012 had the potential to increase premiums for three types of NFIP policies: NFIP risk-based, grandfathered, and pre-FIRM subsidized. Pre-FIRM subsidized policies have premiums that are less than those of NFIP risk-based policies for structures that were in place before a local flood insurance rate map (FIRM) was available. The NFIP realizes foregone revenues, relative to NFIP risk-based premiums, for this type of policy. To accommodate that reality, FEMA had adopted a revenue target whereby all premium income would equal claims paid on the historical average loss year (HALY). BW 2012 phases out this policy type; as a result, FEMA no longer uses the HALY in NFIP premium setting. The increases may be especially important for the 20% of properties that are eligible for pre-FIRM subsidized premiums.

The grandfathered premiums within the NFIP allow a given rating class to continue for a property even if a new FIRM may indicate a higher level

of flood risk. To make up for revenue losses due to grandfathering the NFIP loads (adds a charge) to other policies in its policy base. Grandfathering—and as a result the cross subsidy—was phased out by BW 2012. HFIAA 2014 reinstated grandfathering.

The Community Rating System (CRS) is a FEMA program that encourages communities to adopt a variety of measures to help reduce flood risks. It allows discounted premiums for some properties when the community adopts one or more NFIP-prescribed flood risk management actions. CRS-discounted premiums are cross-subsidized by charges levied on all NFIP policyholders and were unaffected by BW 2012. The findings that follow are based on a review and discussion of NFIP pricing and the effects of BW 2012 and HFIAA 2014.

- Prior to BW 2012, the NFIP goal was to offer reasonable premiums, but at the same time premiums were expected to follow actuarial principles and cover claims and expenses over the long term. As a matter of practice, the historical average loss year (HALY) became a total premium revenue target. Rates were set so that the total revenue from all policies was sufficient to replace the premium revenue loss from offering pre-FIRM subsidized policies.
- After BW 2012, use of HALY is to be replaced by charging all pre-FIRM properties NFIP risk-based rates. The increase in cost of insurance for policyholders as a result of phasing out pre-FIRM subsidized premiums and the resulting premium revenue increases to the program, may be significant, but can be estimated only when additional data is available.
- HFIAA 2014 delayed but did not reverse the BW 2012 requirement to eliminate pre-FIRM subsidized rates and to consider changes to NFIP risk-based rate setting practices.
- HFIAA 2014 reinstated grandfathering. Revenue losses caused by offering grandfathered premiums, and by CRS discounted premiums, which continue to be offered, are expected to be offset by increasing premiums for all policies. Whether the revenue earned from these cross-subsidies compensates for the forgone premium income is uncertain. If grandfathering or CRS discounting expands, the result will be that NFIP premiums increasingly violate the actuarial principle that premiums should be related to risk.

INSURANCE DEMAND

A long-standing objective of the NFIP has been to increase purchases of flood insurance policies. The national flood risk management objective of widespread NFIP purchase was one motivation for keeping NFIP premiums

reasonable, with the premise that the level of the premium determines the willingness and ability to purchase flood insurance. However, property owners' decisions to purchase insurance include other considerations and influences unrelated to price. A review of the economics and behavioral sciences literature identified no single strategy that will increase purchase of NFIP policies.

- The original NFIP legislation expected NFIP premiums to be priced at reasonable levels to promote voluntary purchase of NFIP policies. Empirical studies have found that premium prices may affect takeup rates although the size of that effect is small. The effect of the availability of disaster aid on insurance purchase decisions is uncertain.
- Studies have found that people may use intuitive thinking, as opposed to systematic consideration of the cost of premiums in relation to expected claim payments, when choosing to forego insurance or to cancel an existing policy.
- The combination of acknowledgement of intuitive thinking and the limited effects of premiums on insurance purchase decisions suggests that lower premiums alone will not increase takeup rates substantially.
- Keeping NFIP premiums at reasonable levels can be part of any strategy to maintain compliance with mandatory purchase requirements and increase voluntary takeup rates. A multipart strategy to motivating purchase of NFIP policies can be designed using insights from the behavioral sciences literature.

NATIONAL FLOOD INSURANCE PROGRAM POLICIES: LOCATIONS OF POTENTIAL AFFORDABILITY CHALLENGES

The NFIP policy database can be used to describe the locations of policies and areas of concentration. Knowing the location of all policies, pre-FIRM subsidized policies, and grandfathered policies could aid in formulating alternative strategies to provide assistance to households that find NFIP risk-based premiums to be affordable. Likewise, knowing the location of policies can provide insight into places where takeup rates are low.

- About 60% of the approximately 5.5 million NFIP policies are in three states: Florida, Texas, and Louisiana. The rest are distributed widely throughout the nation. Any effects of BW 2012 therefore will be more concentrated in some places, but will appear throughout the nation.
- Available estimates of takeup rates suggest that they are low, especially outside Special Flood Hazard Areas. Meeting the long-standing

goal of high takeup rates for flood insurance would therefore require a large increase in purchases.

- The extent and location of premium increases that might result from elimination of grandfathering can be determined by further analysis of the policy data, but cannot be estimated now.
- Slightly more than 1 million NFIP policyholders—or 19% of all policyholders—are paying pre-FIRM subsidized rates and will potentially see rate increases if the provisions of BW 2012 remain in effect. Pre-FIRM subsidized policies are found throughout the nation, but there are areas of concentration.

DECISIONS WHEN DESIGNING ASSISTANCE PROGRAMS TO ENHANCE AFFORDABILITY

Both BW 2012 and HFIAA 2014 reflect concerns that NFIP risk-based premiums may be unaffordable for some households. FEMA is directed to review that possibility and suggest policy actions that would make premiums affordable for households that are financially burdened by the cost of flood insurance. If a premium is deemed unaffordable, the household paying that premium might receive assistance. The assistance may offset part of the cost of the premium, may be for mitigation actions that would reduce the risk and in turn the premium, or may be some combination of the two.

HFIAA 2014 suggests that premiums are unaffordable if the premium exceeds 1% of the insurance coverage. Other measures of affordability can be defined by relating household income to the cost of housing or simply be based on when a household income is below a specified level. Whatever measure used, it will be only one consideration in the design of an assistance program. The form and amount of assistance provided, if any, will need to be determined.

- There are no objective definitions of affordability. Although the concept is substantially subjective, the choice of a definition can be informed by research evidence and experience in administering means tested programs that, for example, provide housing and other assistance.
- There are many ways to measure the cost burden of flood insurance on property owners and renters. Policymakers have to select which measure(s) will be used in the NFIP for targeting assistance to enhance flood insurance affordability. This decision is not amenable solely to technical analysis.
- To design a program that provides assistance in making flood insurance more affordable to NFIP policyholders, policymakers face several choices, including who will receive assistance, what type of

assistance will be provided, how assistance will be provided, how much assistance will be provided, who will pay for assistance, and how an assistance program will be administered.

- The decisions that must be made in designing an affordability assistance program entail tradeoffs that will have to be resolved by policymakers.

OPTIONS FOR DELIVERING ASSISTANCE TO ENHANCE FLOOD INSURANCE AFFORDABILITY

With passage of BW 2012, Congress asked FEMA to increase rates but at the same time to suggest ways to make premiums affordable through direct assistance programs that are based on ability to pay and means testing. Vouchers in particular were called out for attention. In addition to assistance with paying premiums, means tested assistance can support mitigation that would reduce expected claims and premiums. Proposals for policies that might reduce the burden of premium payments or that might direct mitigation assistance toward households that qualify for assistance have been presented in legislation, in congressional testimony, and in professional literature. The committee reviewed the proposals and concluded the following:

- The NFIP can strive for risk-based premiums while addressing affordability by implementing a combination of policy measures including means tested mitigation grants, mitigation loans, vouchers, and encouragement of higher premium deductibles.
- Reforms to mitigation grant programs can be implemented so that means testing, as a replacement for the current benefit-cost test, is the basis for setting priorities for mitigation grant spending.
- A mitigation loan can make it financially attractive and feasible for low-income residents to invest in mitigation measures without having to rely on mitigation grants.
- Vouchers are an administratively simple way to direct payments to cost burdened policyholders for use in paying premiums or for offsetting mitigation costs.
- The few mitigation measures that result in lower NFIP premiums tend to be expensive, such as elevating homes. As a result of BW 2012, FEMA will consider whether lower-cost mitigation of structures will result in lower premiums. Determining the effect of lower-cost mitigation on NFIP risk-based rates will require additional analyses.
- If Congress authorized supplements from the Treasury to be used for making NFIP claim payments in catastrophic-loss years, this could

allow lower NFIP risk-based premiums and, in turn, less spending for assistance.

- Some policies that have been advanced to lower NFIP risk-based premiums for cost burdened households either will not have that effect, or may not be easily accessed by cost burdened policyholders. These include reducing administrative fees, disaster savings accounts, and income tax credits and deductions.
- Community measures can lower insurance premiums through mitigation actions that benefit clusters of structures and through the CRS. These might be particularly important in mitigation related to multi-family properties.

Choosing among affordability policy options, alone or in combination, requires an evaluation of their effects not only on premiums for households for which NFIP risk-based premiums create a cost burden but on NFIP net revenues, expenditures from federal general revenues, and takeup rates. This committee's second report, to be published later in 2015, will suggest analytical protocols that FEMA might use to evaluate affordability policy options.

Introduction

Floods are natural phenomena in all rivers and river systems in the United States and occur with depths and durations that vary seasonally and annually. Coastal storms and their associated storm surges affect US shoreline locations, especially the eastern and gulf coasts. Riverine flooding and coastal storms are major news items nearly every year in the United States and in the last decade have included Hurricanes Katrina (2005) and Sandy (2012), large floods on the Missouri River and the Mississippi River in 2011, and flash flooding in Colorado's Front Range (2014). Flooding causes property damage and may cause relocations of large portions of communities. Coastal flooding caused by storm surges can damage property along oceans and bays. Given the numerous economic advantages and aesthetic values of habitation and development in floodplains and coastal areas in the United States, many of these areas have large populations and high-value properties. That land settlement pattern is the result of both individual choices and government programs and policies that considered pros and cons of living and working in those areas that have flood risks. Many people who live in areas subject to flood risk do so because of historical, economic, and other circumstances, such as needing or wanting to live close to work, schools, health care, and so on. Some properties in areas of flood risk are second homes. In some locations, flood risk in low-lying areas has depressed property values and resulted in occupation by lower-income households.

The US federal government has adopted policies that seek an appropriate balance between advantages of and risks associated with human occupancy of floodplain and coastal-zone locations. The policies include

the requirement that before a federally funded flood-control project can be authorized and constructed, project benefits must be shown to exceed the costs (see NRC, 1999, 2004). Beginning in earnest in the 1970s, federal policies and programs have sought to encourage state and local governments to adopt floodplain management to manage flood risk (for example, Executive Order 11988: Floodplain Management, 1977¹). Among the policy options for balancing a location's flood risk against its benefits is the availability of federal flood insurance and encouragement of its purchase.² Insurance premiums can help increase property owners' understanding of flood risk. Insurance also can be seen as a replacement for disaster aid, and ideally insurance premiums based on expected flood losses would cause property owners to balance advantages of floodplain location against associated risks as measured by the cost of insurance. For those results to be realized, people would have to purchase the insurance.

The National Flood Insurance Act of 1968 created the National Flood Insurance Program (NFIP), which made flood insurance available to floodplain property owners. After initially being housed in the Department of Housing and Urban Development, the NFIP today is administered by the Federal Emergency Management Agency (FEMA). Beyond setting flood-insurance premiums, issuing policies, and paying for claims, FEMA provides technical knowledge of flood risks to local professional staff and provides risk mapping for premium setting and risk communication purposes. In addition, FEMA has pre-flood mitigation grant programs and post-flood emergency aid and mitigation programs. Many of the programs are linked directly to FEMA's administration of the NFIP. For example, pre-flood mitigation grants are targeted to insured properties that have a history of repetitive damage claims.

Beginning with passage of the Biggert–Waters Flood Insurance Reform Act of 2012 (Biggert-Waters 2012, or BW 2012), NFIP's premium-setting practices have been under intense scrutiny. Understanding the cause of concerns about the NFIP requires understanding its origins. The National Flood Insurance Act of 1968 created the NFIP, in which private insurers would offer policy coverage in partnership with the federal government. Private companies were expected to rate risk and set premiums with NFIP technical assistance and oversight. Private insurers' premiums included charges for administrative costs and profit, as would be the case for any line of insurance. Rather than have the private partners build a reserve fund to

¹E.O. 11988 from 1977, including a summary of its description and intent, is available at <https://www.fema.gov/environmental-planning-and-historic-preservation-program/executive-order-11988-floodplain-management>; accessed December 8, 2014.

²In the early 20th century, a small number of private companies offered flood insurance in the United States. The great Mississippi River floods of 1927 and additional riverine flooding in 1928 essentially terminated the industry as insurers dropped out of the market (King, 2005).

pay claims for this new line of business, the legislation allowed the federal government to make loans, if needed, to honor claims in years when accumulated premium revenues (net of all payments to the private providers) were inadequate and then to have the loans repaid in years when revenues exceeded claims and expenses.

A concern at the time was that the private insurers' premiums be kept at "reasonable" levels. In practice, the desire to keep rates "reasonable" resulted in two NFIP design features that affected premiums. First, a fully risk-based flood premium would need to include the cost to maintain solvency for expected claims from low-probability-high-damage storms that result in widespread damage (catastrophic-loss events). Fully reflecting such a possibility in NFIP policies might result in higher premiums. The legislation stipulated that the US Treasury would be prepared to serve as the reinsurer, and would pay claims attributed to catastrophic-loss events so that private insurers did not need to include that cost in premiums. The result was that an NFIP risk-based premium for a property might not be based on the full risk associated with the property.³

Second, existing properties at especially high risk for flooding might require private insurers to set premiums at extremely high levels. The legislation required the NFIP to determine a reasonable premium for such properties, which would be less than an NFIP risk-based premium. Private insurers would charge the reasonable premium, and the federal Treasury would make annual equalization payments to make up the difference between the NFIP risk-based rate and the lower premium. To qualify for the subsidized premium, a property had to be in a community that was enrolled in the NFIP. A condition of enrollment was that the community would limit new development to areas above the 100-year base flood elevation (BFE), as the BFE was depicted on an NFIP flood-insurance rate map (FIRM) for that location (see the List of Terms, which is included at the end of this report and before the report appendixes, for definitions of these and other technical terms in this report). Once a community was enrolled, these subsidized premiums became available to property owners whose properties were built before the local FIRM was prepared (and referred to as pre-FIRM subsidies). The expectation was that properties receiving pre-FIRM subsidized premiums would eventually be lost to floods and storms and pre-FIRM subsidized premiums would be phased out by that attrition. At that point, the federal role in the partnership would be to provide loans and act as the reinsurer.

³Throughout this report, the term *NFIP risk-based premium* is used to recognize that NFIP premium-setting practices are constrained by legislative and executive-branch decisions (see List of Terms). Design features that affect premium levels are discussed in detail in Chapters 2 and 3.

Within a decade, however, the original concept of partnering with the private sector was replaced by a process whereby the NFIP took responsibility for setting rates, issuing policies, collecting premiums, and paying claims. After that transition, the federal Treasury was expected to make loans to the NFIP as needed to honor claims in high-loss years and be repaid in low-loss years. As will be discussed through this report, NFIP risk-based rate setting practice proceeded as though catastrophic losses would not be paid from premiums. Another rate setting practice that continued was to offer less than NFIP risk-based rates to properties that existed before local FIRMs were issued. Equally important, the fundamental premise that premiums be kept reasonable to encourage purchase retained its level of importance in rate-setting. The agency executing those responsibilities today is the Federal Insurance and Mitigation Administration (FIMA), which is in FEMA. Currently, the private sector's role in the NFIP is to serve as the local agent through which property owners apply for insurance and settle claims (see definition of "Write Your Own" [WYO] agent in the List of Terms).

Despite efforts to keep premiums reasonable, the NFIP has always experienced a low level of insurance-policy purchase, or voluntary takeup rate (see List of Terms). Over time, the desire to increase takeup rates has led to a number of program changes and initiatives. Flood insurance purchase was made mandatory for property owners who have a federally insured or backed mortgage on a property that is in a special flood hazard area (SFHA). Voluntary purchase still applies to properties outside an SFHA that do not have such mortgages. To motivate voluntary insurance purchase, there has been enhanced NFIP marketing of its policies, support for building floodplain-management expertise at the local level, development of the preferred-risk policy (PRP), WYO agent training, and such other reforms as imposing a waiting period to prevent coverage purchase only right before a flood event. Although some 5.5 million policies are in force today, they do not provide coverage for all properties in the nation's 100-year and 500-year floodplains. Among the roughly 5.5 million NFIP policies, in 2013 about 20% of policyholders were eligible to pay pre-FIRM subsidized premiums.

NATIONAL FLOOD INSURANCE PROGRAM REFORM LEGISLATION: BIGGERT–WATERS (2012) AND HR 3370 (2014)

The financial obligation for paying insurance claims after Katrina and other large and catastrophic-loss events in 2005—Hurricanes Dennis, Emily, Rita, and Wilma—was assigned to the NFIP. The claims greatly exceeded any available reserve, so as an accounting matter the NFIP was driven into debt. As of December 31, 2013, FEMA owed the US Treasury

\$24 billion (its borrowing authority is \$30.4 billion; GAO, 2014). The Government Accountability Office concluded that the NFIP “is unlikely to generate sufficient revenue to cover future catastrophic losses or repay billions of dollars borrowed from the Department of the Treasury” (GAO, 2014) and has included the NFIP on its “high fiscal risk” list since 2006. It is worth noting that the intent and design of the NFIP never envisioned burdensome levels of debt in the program.

Concerns regarding long-term NFIP fiscal soundness led to Congress’s passage of the Biggert–Waters Flood Insurance Reform Act of 2012. A goal of the legislation was to transition toward an insurance program whose premiums reflected expected flood losses on all insured properties; all NFIP policies would have risk-based premiums. To that end, BW 2012 directed FEMA to review and report to Congress on reforms to set NFIP risk-based rates that would better reflect possible claims. BW 2012, Section 100236, also mandated the present National Research Council study of affordability of NFIP premiums (Box 1-1).

The legislation also required the elimination of pre-FIRM subsidized premiums and removal of “grandfathered” premiums. The grandfathering practice allowed owners of buildings that were built in compliance with previous FIRMs to maintain their original rating classification even if a new FIRM indicated a greater risk of flooding (see List of Terms). The grandfathering practice also allows structures that were not built in compliance with previous FIRMs, but nevertheless demonstrated compliance with those previous FIRMs, to maintain their demonstrated rating classification as long as continuous coverage of NFIP insurance is maintained. Meanwhile, new FIRMs were being produced for many areas across the nation. Some properties that had been mapped outside the SFHA (and often were built intentionally outside) were remapped as inside the SFHA. Owners of these properties who may not have purchased an NFIP policy may now be required to purchase one; in addition, because they would now be in the SFHA, the properties that have new policies would have higher premiums than properties outside the SFHA.

As the provisions of BW 2012 began to be implemented, there was an outcry from some parts of the nation. News accounts reported on possible premium increases that might be in the thousands of dollars per year (see, for example, New Orleans Times Picayune, 2013; New York Times, 2013). Some households that would lose pre-FIRM subsidized premiums argued that the insurance would become unaffordable. Others argued that households had followed the NFIP rules and made financial plans on the basis of expected insurance premium levels and that because they had followed NFIP rules the sharp increases in premiums would be unfair. That argument was especially important to policyholders who would lose grandfathered premiums and now were having to pay more and to policyholders that had

BOX 1-1

Statement of Task

The Federal Insurance and Mitigation Administration (FIMA) is a component of the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), which operates the National Flood Insurance Program (NFIP). On March 21, 2014, President Obama signed the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 into law. This law repeals and modifies certain provisions of the 2012 Biggert–Waters Flood Insurance Reform Act, and makes additional program changes to other aspects of the program not covered by that Act. One modification regards a study being conducted by the National Research Council of the National Academy of Sciences. HFIAA requires the submission of the Affordability Study by the FEMA Administrator in 18 months from enactment of the Act. FEMA has asked the NAS to provide two reports as part of the NFIP Affordability Study.

The first report, due in February 2015, will discuss the underlying definitions and methods for an affordability framework and describe the affordability concept and applications, and program policy options.

The second report, due in September 2015, will propose alternative approaches for a national evaluation of affordability program policy options, based in part on lessons gleaned from a proof-of-concept pilot study to be guided by the NRC committee.

An ad hoc committee under the auspices of the National Research Council will prepare both reports according to the following statements of task:

First Report

The first report will discuss the underlying definitions for an affordability framework and describe the affordability concept and applications and program policy options.

The first report shall discuss

deliberately built outside the SFHA and now had an unexpected new insurance purchase requirement. In addition, communities where those effects might occur argued that higher premiums might depress real estate values, business profitability, and neighborhood viability. Furthermore, Congress had heard concerns that higher insurance premiums might discourage voluntary purchases and thereby reduce flood insurance takeup rates.

As a result of the vigorously stated concerns about affordability, Congress passed the Homeowner Flood Insurance Affordability Act of 2014

- methods for establishing an affordability framework, including means-tested vouchers, for the National Flood Insurance Program;
- appropriate and necessary assumptions and definitions, including “affordability” and “full risk-based premiums.”

This report shall be delivered by February 28, 2015.

Second Report

The second report will propose alternative approaches for a national evaluation of affordability program policy options. The second report will include lessons for the design of a national study from a proof-of-concept pilot study.

The second report shall discuss

- data issues such as needs, availability, quantity, and quality;
- appropriate analytical methods and related considerations, including models, computing software, and geographic areas to be analyzed;
- a proof-of-concept pilot analysis will be subcontracted as part of the study. This analysis will apply different methods for conducting a flood insurance affordability analysis for a state (North Carolina) in which data on elevations of structures and hydrologic flood hazards are readily available. This analysis will inform the committee’s deliberations and findings regarding the possibilities for a national-level flood insurance affordability study, for which these data on elevations and flood hazards are less readily available;
- national implications from the proof-of-concept pilot results including, but not limited to, possible impacts on participation rates (the analytical work for the proof-of-concept pilot may be carried out by the NRC directly or using subcontractors as necessary).

This report shall be delivered by September 20, 2015.

(HFIAA 2014). One result of HFIAA 2014 was that grandfathering practices that had been phased out under BW 2012 were reinstated. A second result was that pre-FIRM subsidized premiums would not be lost when a property was sold, as was the case with BW 2012. However, HFIAA 2014 introduced a requirement that owners of primary residences, whether the property was sold or not, face rate increases each year of no less than 5%, and as much as 18%, until the NFIP risk-based premium was reached. HFIAA 2014 left unchanged the BW 2012 requirement that pre-FIRM

BOX 1-2
Considerations in Setting
National Flood Insurance Program Premiums:
Affordability, Reasonableness, and Fairness

The present report uses numerous technical terms, many from the NFIP itself and some from the insurance, actuarial sciences, and other fields. Some of the terms may be unfamiliar to readers or may have been used inconsistently in writing and testimony about the NFIP through the years. Key terms are defined in each chapter of this report. The report also includes a “List of Terms” that are specific to the NFIP. To the extent possible, those terms were taken from FEMA Web sites and reports. Terms that were not defined by FEMA are defined in this report to ensure consistency.

A term that warrants particular discussion is *affordability*. This term was used in BW 2012 (Section 100236) that mandated this report. It also is used in HFIAA 2014 (Section 9) to refer to “targeted assistance to flood insurance policy holders based on their financial ability to continue to participate in the National Flood Insurance Program.” Although there is no explicit definition of affordability, use of the phrases *means-testing* and *financial ability* suggests that Congress expected affordability to be defined in relation to an NFIP policy holder’s income or wealth. That is consistent with the understanding of the term in the present report.

At the same time, HFIAA 2014 asks the NFIP to “strive for” premiums that are no more than 1% of the policy coverage, a number that is unrelated to either the income or wealth position of the policy holder. It is not clear whether the suggested 1% cap was offered as a definition of premium affordability or had some other basis (for example, to define when premium levels were “reasonable” or “fair”). (The term *reasonable* had been used to describe the desired level of NFIP premiums during hearings for the original legislation that led to the creation of the NFIP in 1968).

Congress strove to set NFIP premiums that were reasonable for two reasons. First, at the NFIP program’s inception, all purchase was voluntary. A reasonable premium therefore would not be so high that households would be unwilling to purchase a policy. Second, NFIP risk-based premiums could be extremely high for properties in areas mapped as floodplains but built before the flood risk was identified; some households in this situation would not be able to pay a high NFIP risk-based premium. A reasonable premium for properties built before an area had been mapped was therefore calculated by using lower than NFIP risk-based rates.

Although a premium might be affordable if a household’s income were considered, fairness could be a consideration in defining a reasonable premium. A reduced premium would be considered fair because property owners would not be penalized with high premiums if they chose property locations that were consistent with the applicable rules before the NFIP was created. This fairness argument was another reason that lower than NFIP risk-based rates were offered when the program began and is used to justify the practice of grandfathering.

subsidies be phased out through 25% annual increases for nonprimary residences, for properties that made frequent NFIP claims, and others. HFIAA 2014 also added premium surcharges on all policies to help to offset revenue lost to the program from pre-FIRM subsidies that would remain in place until all property owners were paying NFIP risk-based premiums. The HFIAA 2014 legislation expected that all pre-FIRM properties would eventually pay NFIP risk-based premiums; so in the long run, the difference between HFIAA 2014 and BW 2012 would be that grandfathering would be continued. HFIAA 2014 retained the BW 2012 direction that FEMA review its NFIP risk-based premium-setting procedures.

HFIAA 2014, as indicated in its title, reflected concerns about the affordability of flood insurance. Affordability had also been recognized in BW 2012 as a possible concern (Box 1-2 elaborates on the term *affordability* and other related terms central to the present report). Both BW 2012 and HFIAA 2014 contained numerous provisions for assessments and studies, including studies regarding flood-insurance affordability. Both acts mandated studies by the National Academy of Sciences (NAS) and called for related studies by FEMA. BW 2012 called for an “economic analysis” to be conducted by NAS that would, among other things, “compare the costs of a program of risk-based rates and means-tested assistance to the current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage” (PL 112-141; 126 Stat. 957). Appendix A contains Section 100236 of BW 2012, which mandated the NAS study. The charge to NAS was amended in HFIAA 2014, which changed the schedule and resources available for conducting the NAS study; amendments were presented in HFIAA 2014 Section 16 and are listed in the present report in Appendix B). Appendix C contains BW 2012, Section 100236, as amended by HFIAA 2014 Section 16. HFIAA 2014 also called for FEMA to prepare a “draft affordability framework” (Section 9):

SEC. 9. DRAFT AFFORDABILITY FRAMEWORK.

(a) IN GENERAL.—The Administrator shall prepare a draft affordability framework that proposes to address, via programmatic and regulatory changes, the issues of affordability of flood insurance sold under the National Flood Insurance Program, including issues identified in the affordability study required under section 100236 of the Biggert–Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957).

(b) CRITERIA.—In carrying out the requirements under subsection (a), the Administrator shall consider the following criteria:

(1) Accurate communication to consumers of the flood risk associated with their properties.

- (2) Targeted assistance to flood insurance policy holders based on their financial ability to continue to participate in the National Flood Insurance Program.
- (3) Individual or community actions to mitigate the risk of flood or lower the cost of flood insurance.
- (4) The impact of increases in risk premium rates on participation in the National Flood Insurance Program.
- (5) The impact flood insurance rate map updates have on the affordability of flood insurance.

NATIONAL RESEARCH COUNCIL REPORTS

A key consideration throughout the history of the NFIP has been to offer policy alternatives that would be affordable to floodplain and coastal residents. In response to BW 2012 and HFIAA 2014 legislation for NFIP reform, and in response to a request from FEMA, the National Research Council⁴ formed a volunteer expert committee in 2013 to address a task statement (Box 1-1) and to issue two reports in 2015.

Like most National Research Council committees, this committee was guided by its statement of task (Box 1-1). When reading this report, it is important to recognize that the language from Section 100236 of BW 2012 as amended in HFIAA 2014 (see Appendixes A, B, and C) differs from the language in the committee's statement of task. The language in the statement of task was discussed and agreed on by FEMA and the National Research Council with consideration of the resources available to the NRC and the needs of FEMA.

This document is the first of two reports from this committee. In keeping with the statement of task, this report offers and discusses alternative definitions of affordability, provides a framework for policymakers to use in designing assistance programs to make flood insurance more affordable, identifies options that in principle may make flood insurance more affordable, and describes possible benefits, drawbacks, and implications of the policy options for addressing affordability concerns. The report does not attempt to design programs or actions to promote flood insurance affordability, nor does it describe how risks associated with floods might be reduced through insurance or other actions. The report does not address how levees affect floodplain development and NFIP insurance rates; this topic was covered in detail in NRC (2013), which was prepared for FEMA. The present report naturally refers often to floodplains and floodplain ar-

⁴The National Research Council is the working arm of the National Academies. The National Academies is the collective entity that includes the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council. For more information see <http://nationalacademies.org>.

eas; unless otherwise specified, *floodplain* refers to an area inundated by a 100-year (1% annual) flood (see also Appendix E for further discussion of NFIP floodplain designations).

The committee's second report will include alternative analytic procedures for FEMA to consider when it designs a national-level flood-insurance affordability analysis. It will discuss metrics for evaluating affordability policy alternatives described in the present report and possible computational procedures for estimating the effects of policy actions on each of the metrics. The second report will inform FEMA on costs of data collection and implementation of analytic protocols, including a sampling strategy for FEMA to use in implementing a national study. Implications for data and analytic needs for a national study of flood-insurance affordability will be inferred via a case study (or "proof-of-concept" exercise) in applying different analytic processes to available data that have been compiled by the North Carolina Department of Public Safety and that constitutes one of the nation's extensive datasets of locations of structures in floodplains and coastal areas.

During the writing of this first report, the committee held four meetings that were devoted generally to topics under the rubric of "affordability." Meetings were held in January, March, July, and November 2014, all in Washington, DC. In the course of its work, the committee spoke with numerous guest speakers who provided invaluable information for the committee's deliberations about the content of its report. Appendix D lists all those who spoke with the committee during open public sessions of its meetings.

This report contains eight chapters. Chapter 2 provides an overview of the NFIP history and its legacy leading up to BW 2012, focusing on NFIP pricing practices before BW 2012. Chapter 3 explains the process for setting NFIP risk-based premiums and the constraints that the NFIP had to adhere to in setting them. With that understanding, distinctions among NFIP risk-based, pre-FIRM subsidized, grandfathered premiums, and Community Rating System discounted premiums can be explained, as can the reforms called for by BW 2012 and HFIAA 2014. Chapter 4 discusses the demand for insurance and the factors other than price that determine the willingness of floodplain-property owners to buy an NFIP policy. Chapter 5 uses NFIP policy data to locate the areas of the nation where there are concentrations of pre-FIRM policies that would increase to NFIP risk-based premium levels as a result of recent policy reforms. Chapter 6 first describes three alternative concepts of affordability that can be used to define when NFIP full-risk premiums might create a cost burden for homeowners and renters. Chapter 6 also describes potential eligibility criteria and other decisions that need to be made in designing an assistance program, such as the amount of assistance to be provided to eligible households. Chapter 7 describes

policy options that have been suggested by others or that the committee has developed that might make flood insurance more affordable. Some of the options are proposed as ways to lower premiums through mitigation actions that lower risk; others would directly reduce the amount paid for insurance by either cost-burdened groups of property owners and renters or all policy holders. Inasmuch as this is the first of two reports, Chapter 8 describes briefly the objectives of the second report and its relationship to the findings of the present report.

The audience for this report includes FEMA; other relevant federal agencies, such as the Department of Housing and Urban Development; Congress and congressional staff; governors of states that have flood-prone communities; mayors and citizens of flood-prone communities, especially NFIP policy holders; university faculty and other experts in the fields of natural hazards and flood insurance; local and state officials who have NFIP implementation responsibilities; and private sector experts, including insurance companies, mapping companies, and other firms that advise on flood insurance and floodplain management issues.

National Flood Insurance Program History and Objectives

This chapter begins with discussion of the history leading up to the 1968 legislation that created the National Flood Insurance Program (NFIP). It is important to recognize that the original concept for the NFIP was a risk-sharing partnership with the private sector. With this history as background, this chapter discusses the enabling NFIP legislation and specific financial roles for the NFIP in the partnership. The changing nature of that partnership helps explain the motivation for provisions in BW 2012 and Homeowners Flood Insurance Affordability Act of 2014 (HFIAA, 2014).

INITIAL PROPOSALS FOR A NATIONAL PROGRAM OF FLOOD INSURANCE

Flood insurance was offered by private insurers between 1895 and 1927, but losses incurred from the 1927 Mississippi River floods and additional flood losses in 1928 led insurers to stop offering flood policies (Brown and Halek, 2010). In the absence of private insurance, post-flood financial aid took the form of flood disaster relief. Over time, the federal government was increasingly asked to provide aid to flood victims as a humanitarian action (Moss, 1999). It was in that context that President Truman proposed a national program of flood insurance. Initially, when requesting aid to victims of Midwest floods in 1951, Truman also asked Congress to “establish a national system of flood disaster insurance” (Truman, 1951a). Truman conceived of a flood insurance program “based upon private insurance with reinsurance by the Government,” and if such insurance were available,

“there should be no need in the future for a program of partial indemnities” (Truman, 1951a). Truman submitted draft legislation to Congress in 1952 that envisioned a central role for the private sector, noting that the program “should not compete with private insurance companies” and furthermore, the proposed legislation prohibited federal flood insurance where it was available privately at “reasonable rates” (Truman, 1952). Congress could create a reinsurance fund to “. . . make it possible for private companies to write flood insurance at reasonable rates” (Truman, 1951b) and he noted that rates could be lowered by a “nationwide pooling system” (Truman, 1951b). The proposed bill also put a cap on coverage and hence premiums, imposed a 10 percent deductible, and authorized federal agencies that guaranteed mortgage loans to require the purchase of flood insurance. Thus, as originally conceived, a federal program for flood insurance was designed to replace disaster aid and make private sector insurance more affordable by capping rates, pooling risks geographically, and offering reinsurance to private companies. However, no legislation was passed.

After the 1955 hurricane season, President Eisenhower proposed the creation of an “indemnity and reinsurance program, under which the financial burden resulting from flood damage would be carried jointly by the individuals protected, the States, and the Federal Government” (American Institutes for Research, 2005). That wording suggests that Eisenhower was especially interested in homeowners sharing future disaster aid costs with the government. Congress responded by passing the Federal Flood Insurance Act of 1956, which created the Federal Flood Indemnity Administration and established a flood insurance program, a reinsurance program, and a loan contract program. In 1957, specific implementation proposals were put before Congress, but Congress found them impractical and did not appropriate any funds. The Federal Flood Indemnity Administration was terminated on July 1, 1957.

Following Hurricane Betsy in 1965, Congress passed the Southeast Hurricane Disaster Relief Act. President Johnson pointed out that it was the “sixth law passed in 18 months for the specific purpose of broadening Federal aids for the victims of the unusually severe succession of disasters experienced since the spring of 1964” (Knowles and Kunreuther, 2014). In addition to relief, Congress called for “immediate initiation of a study . . . of alternative permanent programs which could be established to help provide financial assistance in the future to those suffering property losses in floods and other natural disasters, including but not limited to disaster insurance or reinsurance” (Knowles and Kunreuther, 2014).

In August 1966, President Johnson transmitted a task force report to Congress that was to set the stage for broad reforms to the federal role in flood risk management. The task force’s report, *A Unified National Program for Managing Flood Losses*, described multiple strategies for

managing flood risks. One section addressed “. . . steps toward a national program for flood insurance” and concluded that flood insurance was “feasible” and could “promote the public interest” and could be used both to help victims bear the risk of floods, and discourage “unwise occupancy of flood-prone areas.” Other subjects of reform included improving knowledge about flood hazards, coordination and planning for new development in floodplains, technical services to floodplain managers, and adjustment of flood control policy based on “sound criteria” (Task Force on Federal Flood Control Policy, 1966).

The report argued that the choice to locate in a floodplain might be an individual choice, and that those who chose to locate in floodplains should understand the risk and bear the full costs of their decision.¹ That sentiment was endorsed and elaborated upon in a report from the Secretary of Housing and Urban Development (HUD) issued in the same year. That report stated the following:

If the new occupant of such areas bears the full cost of flood insurance premiums, then he has to balance up the advantages and the costs of such occupancy. In some circumstances, it may be economic to occupy an area with relatively high hazard of flood damage, because the advantages more than offset the unavoidable costs. This may often be true for summer homes along the coast. . . . In many situations, however, the full costs of occupying high-hazard areas are simply greater than the probable advantages. Under those circumstances, flood insurance premiums which place the full costs on those benefiting from the location can operate to keep unwarranted occupancy to a minimum (U.S. Department of Housing and Urban Development, 1966).

In accordance with earlier proposals, that report argued that flood insurance should be offered in partnership with the private sector. Congressional testimony by HUD, and ultimately the original NFIP legislation, was based on the findings of that report and its appendices.

¹The 1966 report described this “occupancy charge” as an ideal policy instrument, but for practical reasons recommended a program of flood insurance. It further stated that “The full costs of flood plain occupancy would be shifted to the prospective occupants themselves through the imposition of mandatory, risk-related, annual occupancy charges. The charge would be equivalent to the occupant’s estimated annual damages plus any costs his occupancy causes others. These payments would be made to an indemnification fund which would be used to compensate those suffering flood damages.”

THE NATIONAL FLOOD INSURANCE PROGRAM: A BRIEF HISTORY

The National Flood Insurance Act of 1968 (Public Law 90-448) created the National Flood Insurance Program, which was to be administered by HUD. Although modified many times, the act remains the legislative foundation of the NFIP. In creating the NFIP, Congress identified two primary objectives: to encourage state and local governments to use land-use adjustments to constrict development of land exposed to flood hazards and guide future development away from such locations, and provide flood insurance through a cooperative public-private program with equitable sharing of costs between the public and private sectors (42 US Code, Section 401 Congressional Findings and Statement of Purpose). With respect to insurance, the law provided that local communities limit new development in some areas of the floodplain, which later were known as Special Flood Hazard Areas (SFHAs; see Appendix E). Once a community agreed to such limits, its citizens would be able to purchase flood insurance policies offered by private insurers in a partnership with the federal government. The mechanism for the partnership was the flood insurance risk pool. The Senate Committee on Banking and Currency described the pool as follows (U.S. Senate Committee on Banking and Currency, 1967):

Insurance industry pool

The insurance pool authorized by this bill will be an association of private insurance carriers formed to make flood insurance available. It will be open to all qualified companies licensed to write property insurance under the laws of the separate States who meet minimum requirements prescribed under the bill. Relations between the Government and the insurance pool will be governed by an agreement which will set forth in detail the conditions of operation.

Participation in the pool by private companies can take the form of risk capital participation. Some companies can elect to operate as fiscal agents for risk-taking members of the pool. The significance of this arrangement is that small companies with limited capital resources will not be prevented from participating.

Operation of the pool

Participating member companies of the pool, either as risk bearers or as fiscal agents, will sell and service policies in much the same way as they now sell insurance against fire and other perils. Their relationship with the pool will be governed by an agreement, the conditions of which will be subject to approval by the Secretary of Housing and Urban Development. As fiscal agents they will be paid fees for selling and servicing of policies. As risk bearers, they will share in the aggregate profits or losses of the pool's operation for a particular accounting period. Risk-bearing member

companies will be jointly liable for the payment of claims by insolvent members. The Government-pool relationship will be governed by an agreement setting forth financial and other arrangements.

The agreement governing the pool partnership would make private risk-bearing possible, but would at the same time be designed to keep premiums reasonable.² In practice, the desire to keep rates “reasonable” resulted in two NFIP design features. First, the legislation gave the NFIP authority to borrow from the US federal Treasury, which allowed it to make loans to the pool so it would be able to honor claims for noncatastrophic events. Such loans would be repaid in years when premium revenues exceed claims. That was especially important in the early years of the program before a reserve had been built up. More importantly, as a financial matter, the legislation designated the federal Treasury as the reinsurer and allowed it to bear the cost of catastrophic-loss events; these are low-probability—high-damage storms that result in widespread damage and total claims that greatly exceed the reserves (in the case of the NFIP the borrowing authority) available to pay claims. Because the Treasury was to be the reinsurer once claims in a given year exceed a specified level, an NFIP risk-based premium would not need to include expected claims from catastrophic-loss events, thus keeping NFIP risk-based premiums at reasonable levels.³

Second, premiums would be based on less than NFIP risk-based rates for some properties. At the time of the legislation, structures had been constructed in the nation’s floodplains with little understanding of or regard for flood risk, in part because flood risks had not been adequately delineated by public agencies and in part because many local governments had not enacted zoning or other regulations to take flooding into consideration when providing permits for new construction. NFIP risk-based premiums for those existing structures would have been extremely high. The legislation deemed such premiums to be unreasonable and created two rating systems for setting premiums. Owners of buildings constructed in the floodplain after flood insurance rate maps (FIRMs) were issued would pay NFIP risk-based rates to the private member of the pool that offered policies. A second rate structure would be used for pre-existing development so that the owners of existing structures would pay less than NFIP risk-based rates. The expectation was that these properties eventually would be lost to floods and storms, and that the need for premiums lower than NFIP risk-based rates would phase out by that attrition.

²See Chapter 1, Box 1-2, for elaboration of the term “reasonable” in the NFIP policy premium context.

³The financial rules governing the pool could result in some premium receipts being paid for reinsurance, but as a practical matter reinsurance was being offered at no charge to the pool.

The same 1967 report from the Senate Committee on Banking and Currency explained the pool's financial arrangement:

Financial arrangements with Government

Testimony of witnesses at the hearings developed the fact that, for a number of months, discussions had been going on between the Department of Housing and Urban Development and industry as to the financial arrangements which could be made for operating the proposed joint flood insurance program. An understanding has been reached on the broad features of expenses, losses, and profits.

Among the broad features of the financial arrangements which have been discussed, one key feature is that the Government and the industry will both share in expenses and losses of the insurance operation. The basis for this sharing will be the same as the sharing in the risk.

The sharing in risk will be measured by the relationship between chargeable premiums—that is the premiums which policyholders pay—and the estimated risk premiums—that is, the premium needed to cover the actuarial risk plus operating costs and allowance. The Government will assume that proportion of the risk represented by the difference between these policyholder-paid premiums collected and the estimated (actuarial) premium amounts for all policies written and in force under the program.

In practice, at the end of each year the federal Treasury would make a subsidy payment to the pool equal to the difference between the revenue that would have been earned from sale of NFIP risk-based premiums and the premium charged for existing properties. Once properties eligible for pre-FIRM rates were no longer part of the portfolio, the only payments from the Treasury to the pool would be for loans, or in the event of a catastrophic loss. Taken together, those two provisions provided the underlying financial structure for ensuring that premium revenues would equal claims paid plus expenses over time. The 1967 report of the Senate Committee on Banking and Currency stated:

As the program develops, it can be expected that the industry's risk and share of losses will become greater. This is because existing properties will be substantially improved or replaced by new properties, and therefore, more and more of the chargeable premiums will become full cost premiums. At some time in the future, therefore it is possible for the chargeable premiums to equal the estimated premiums. At that time, the Government will have no liability for expenses or losses, except with respect to reinsurance that may be needed against catastrophic losses. This feature of the proposed arrangement seems to the committee to be desirable from the standpoint of the Federal Government, the private insurance industry, and the public as a whole.

Within a decade, however, the original concept of partnering with the private sector was replaced by the NFIP taking full responsibility for rate setting and risk bearing. In 1979, President Carter signed an order creating the Federal Emergency Management Agency (FEMA). The Federal Insurance Administration (FIA) and the NFIP were moved from HUD and placed under the aegis of FEMA. FEMA almost immediately took action to provide technical floodplain management assistance in communities that had no state or local offices equipped for such work.

FEMA moved to implement the NFIP without a private risk-sharing partner. Instead, it engaged private “write your own” (WYO) companies to act as NFIP policy servicing agents. The WYO program allowed insurance companies to sell and manage flood insurance policies in their own names, which encouraged sales. The companies also would process claims but would not bear any risk or set rates. Even though the risk pool and private partnerships were no longer in effect, communities still had to take the floodplain management actions required to enroll in the program before property owners could purchase insurance.

Eligibility in the program required a community’s flood exposure and probabilities to be assessed by the U.S. Army Corps of Engineers in order to create FIRMs and flood hazard boundaries, with FEMA calculating the insurance rates. Significantly, the imperative to keep premiums low for existing properties carried over to the NFIP in its new role. With the pool no longer in place, however, the Treasury had no obligation to transfer funds each year to the NFIP (instead of to the pool) to make up for revenues foregone by offering some properties less than NFIP risk-based rates. Revenues from the former fund transfer were replaced by a process of implicitly adding a charge to premiums on all policies (see Chapter 3 for discussion of the historical average loss year). Equally important, the fundamental premise that premiums should be kept reasonable to encourage purchase retained its level of importance in the federally administered NFIP.

Another provision that carried forward was that a loan from the Treasury was taken to pay claims in high-loss years and was paid back in low-loss years. Hurricane Katrina and other storms in 2005 resulted in unprecedented NFIP payments to settle claims. In fact, the NFIP paid out more claims from 2005 than it had paid over the life of the program to that point (Kousky and Kunreuther, 2014), and this required substantial borrowing. Hurricane Ike in 2008 and Hurricane Sandy in 2012 further deepened the debt. Figure 2-1 shows debt peaking in 2009 and falling to less than \$18 billion by the end of 2011. As of December 31, 2013, however, debt had risen again to \$24 billion. The increase in debt stimulated congressional debate and led to the BW 2012 reform legislation that in part focused on the revenue adequacy of NFIP premiums.

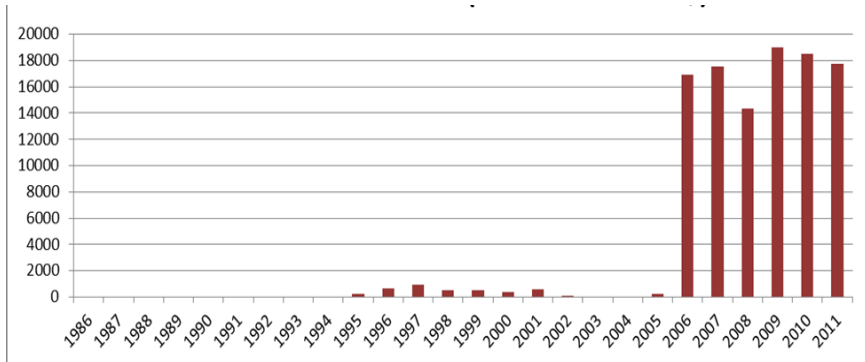


FIGURE 2-1 NFIP cumulative debt (millions nominal \$).
SOURCE: King, 2013.

LEGISLATIVE CHANGES: BIGGERT-WATERS 2012 AND HOMEOWNER FLOOD INSURANCE AFFORDABILITY ACT OF 2014

Through a number of specific provisions, BW 2012 emphasized the need to have premium revenues and associated fees eventually cover payouts for claims and NFIP program expenses. To that end, FEMA was directed to change the premiums it was charging to reflect more fully the risks for all classes of policyholders. FEMA was to replace the lower rates for existing properties (which FEMA had called pre-FIRM subsidized rates) that had been offered since the beginning of the program with NFIP risk-based premiums.

The practice of grandfathering had been introduced by FEMA to allow property owners who met specific conditions to keep a lower rate in the event that an updated FIRM showed that they were at a greater flood risk than originally believed. Under BW 2012, following a change to a local FIRM, grandfathered rates were to be phased into NFIP risk-based rates over five years. Other provisions of BW 2012 directed FEMA to review and report on reserves and purchase of private reinsurance presumably with the costs to be recovered by adding to NFIP risk-based premiums.

BW 2012 acknowledged concern for whether NFIP risk-based premiums for all would make premiums unaffordable for some in Section 100236, which called on FEMA to conduct an affordability study. The FEMA study was to be concurrent with implementation of the rate-increasing reforms; thus, the reforms moved forward with no program of assistance in place for policyholders who were required to purchase a policy and might face an unaffordable premium increase.

As implementation of BW 2012 began, the premium increases became a topic of testimony and letters that argued that the proposed changes would result in premiums that were unaffordable to many, and possibly cause economic disruption in communities across the nation. In response, Congress passed HFIAA 2014, which repealed or modified many (but not all) of the rate reform changes that had been enacted in BW 2012. Notably, HFIAA 2014 reinstated the policy of grandfathering premiums. It did not change the sections of BW 2012 that directed FEMA to review aspects of its program that might affect NFIP risk-based rates. A concern expressed in HFIAA 2014 was that the higher premiums would no longer be reasonable, and they would be so high as to discourage purchase of NFIP policies. Section 9 of HFIAA 2014 expressed a concern about “The impact of increases in risk premium rates on participation in the National Flood Insurance Program.”

TAKEUP RATES: A CONTINUING CONCERN

The original intent of the NFIP was to set premiums and have rules for insurance purchase that would serve the nation’s broad flood risk management goals. The NFIP was expected to minimize taxpayers’ costs of disaster recovery by substituting insurance payouts for aid. One NFIP objective was to encourage community floodplain management. The NFIP also sought to advance public understanding of flood risks through risk mapping and risk communication programs. NFIP risk-based insurance premiums were going to help households understand the flood risk at particular locations (or at least the cost of living in such locations), and ensure that the floodplain occupant bore the cost of locating in places that had appreciable flood risks. In order for those goals to be realized, however, the insurance needed to be purchased.

Therefore, in designing the NFIP to help attain these broad flood risk management objectives, Congress always has emphasized the need for high takeup rates, and one means to that end is to keep NFIP premiums reasonably priced. As the NFIP was being created, Congress presumed that once communities learned about the low-cost premiums for existing homes, they would adopt the regulations needed to join the program, and allow residents to purchase coverage under the NFIP. It also was presumed that homeowners and small businesses in eligible communities would enroll eagerly in the NFIP.

Hurricanes in 1969 (Camille) and 1972 (Agnes), however, revealed that only a few communities at risk of flooding had enrolled in the program. When Hurricane Agnes caused extensive damage to Pennsylvania and other East Coast states in June 1972, few parties had purchased insurance, and the NFIP paid \$3 million in claims of a total of \$3 billion of estimated dam-

ages (Anderson, 1974). To encourage additional NFIP policy purchases, in 1973 Congress passed the Flood Disaster Protection Act (FDPA), which required property owners who were receiving mortgages from federally backed or regulated lenders and whose properties were located in a 100-year floodplain (the SFHA) to purchase flood insurance. Further, to ensure eligibility for all forms of disaster assistance, the new law required communities to participate in the NFIP. The same act reduced the rates for existing properties for the following 7 years in the hope of encouraging participation in the program.

Nonetheless, in 1993, after large floods on the Missouri and Mississippi Rivers, it was found that less than 20% of the flooded structures had been insured (Galloway, 1995). That low takeup rate was part of the impetus for passage of the National Flood Insurance Reform Act of 1994. Provisions of that bill (and which continue today) that were expected to increase enforcement of the mandatory purchase requirement included the following: coverage now is required over the life of a loan, lenders must escrow flood insurance payments when they require escrows, lenders need to obtain flood insurance policies if borrowers do not, and failure to comply with the mandatory purchase requirement can result in the fining of lenders. In addition, to prevent last-minute purchase only when flooding is imminent, the time between purchase of flood insurance and its going into effect was increased to 30 days. The law also prohibited further flood disaster assistance for any property for which flood insurance was not maintained after having been mandated as a condition for receiving disaster assistance. The latter measure was added in recognition of the fact that loan or grant programs, to the extent that they parallel the insurance mechanism, can undermine the ability of the insurance program to operate efficiently and equitably (Hayes, 2003; Knowles and Kunreuther, 2014).

SUMMARY

Throughout its history, the NFIP has been asked to set premiums that are simultaneously “risk-based” and “reasonable.” Different administrations and successive sessions of the U.S. Congress have placed varied emphases and priorities on those goals for premium setting. The tensions between these goals are noted in a comment from FEMA that reflect on the early years of the NFIP (Hayes and Neal, 2011):

Providing certain statutory amounts of insurance at less than full-risk rates was justified as public policy for the following reasons:

- (1) Lower premiums for existing construction made it easier to convince communities to join the NFIP. It was very important in the early years of the NFIP to increase community participation so that sound floodplain

management was implemented and the nation's exposure to flood would thereby be slowly but significantly reduced.

(2) It was anticipated that very high premiums would cause great resistance to insurance purchase. However, with reasonable premiums, property owners purchasing insurance at less than full-risk rates would still be funding at least part of their recovery from flood damage. This was considered preferable to the previous arrangement of disaster relief that came solely from taxpayer funding.

(3) In the public policy discussions leading to the authorization of the NFIP, it was determined to be undesirable to potentially force, through high flood insurance premiums, the abandonment of otherwise economically viable buildings.

- From the inception of the NFIP, and continuing until BW 2012, Congress sought to achieve multiple objectives for the program. The objectives have been to (1) ensure reasonable insurance premiums for all, (2) have NFIP risk-based premiums that would make people aware of and bear the cost of their floodplain location choices, (3) secure widespread community participation in the program and substantial numbers of insurance policy purchases by property owners, and (4) earn premium and fee income that, over time, covers claims paid and program expenses. These objectives, however, are not always compatible, and at times may conflict with one another.
- The premium-setting practices and procedures that were in place before Biggert-Waters 2012 reflected the multiple objectives of the NFIP, and in some cases reflected premium-setting practices that were put in place when the NFIP was created. BW 2012 increased the emphasis on setting NFIP rates that reflected flood risk, and on charging premiums that would cover claims paid and other related expenses.

National Flood Insurance Pricing, Policies, and Premiums

When the private–public partnership within the National Flood Insurance Program (NFIP) dissolved in 1978, the NFIP took on the role of pricing policies and bearing risks. The congressional goals for the NFIP of high takeup rates and reasonable premiums, however, continued to influence the pricing of NFIP policies from that time until the passage of Biggert-Waters 2012 (BW 2012). This chapter describes pre-BW 2012 NFIP pricing policies, and in so doing provides a basis for explaining the BW 2012 reforms and the reasons for congressional interest in premium affordability.¹ Because the reforms in BW 2012 were intended to move the NFIP closer to actuarial pricing, this chapter is organized around a discussion of the principles of actuarial pricing.

NATIONAL FLOOD INSURANCE PROGRAM PRICING AND POLICY TYPES

Actuarial Pricing Principles

Insurance requires individuals to pay premiums that are greater than the expected loss (the product of probability multiplied by the amount of

¹The Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014) changed some provisions of Biggert-Waters 2012. The committee recognized these changes, but its task called for a focus on changes made by BW 2012. HFIAA 2014 can be considered from that perspective as a pause in implementing some of the BW 2012 reforms until the Federal Emergency Management Agency completes an affordability framework, and an affordability study.

damage). Insurance is a contract that transfers the financial burdens of a generally low-probability—high-consequence event from the buyer (the insured) to another party (the insurer) in return for stable and predictable periodic payments—the premiums. If an event that is covered by the insurance contract occurs, payment by the insurer indemnifies the insured for their loss up to a maximum amount specified in the policy (the policy limit) in a manner consistent with other contractual terms such as the deductible amount and proof of loss. Thus, insurance is a hedging instrument against the financial consequences of a loss, and the value of this hedge to the insured is realized only if there is a covered loss. Insurance does not alter the probabilities of a loss if an event occurs. Rather, insurance transfers the loss to another entity that is willing and able to accept it. Insurance protects the insured financially if losses could not be borne out of current income or borrowing, and it can speed recovery after the event.

Not all risks can be insured, and several authors have identified ideal conditions of insurability (Swiss Re, 2005; Charpentier, 2008; Kousky, 2013). The conditions include the risk's being uncertain, random, and out of the control of the insured. Individual policyholder risks ideally are independent (not correlated in space or time). In the case of flood risks, those conditions will not hold (Baranoff et al., 2009), as evidenced by the history of private insurance company efforts to offer flood insurance (Moss, 1999). Recognition of that reality was behind the private-public partnership originally envisioned for the NFIP.

The price paid for insurance will include the expected loss, the costs of writing the policy, and processing of claims. It will account for uncertainty and will provide a rate of return to the insurer. In the United States, an important public-sector role, which is executed through state regulation, is to ensure that the insurer uses proper actuarial principles in setting premiums for specific losses covered by a policy. Those principles also are used to structure the explanation of NFIP pricing. In fact, the Federal Emergency Management Agency (FEMA) publishes an annual report called the *Actuarial Rate Review* that documents NFIP pricing practices (see Box 3-1 for additional discussion of the setting of premiums in the NFIP).

The Casualty Actuarial Society (1988) defines four principles of actuarial rating (NRC, 2013).

1. A rating should reflect the expected value of future claims.
2. A rating should provide for all costs associated with the provision of the insurance (accepting the transfer of the risk).
3. A rating should provide for the costs associated with individual risk transfer (no cross-subsidization among policyholders).
4. A rating should be reasonable and not excessive, inadequate, or unfairly discriminatory.

BOX 3-1

Ratings and Premiums

The premium charged for insurance is product of the rate charged per dollar of coverage and the level of coverage chosen by the insured. For the NFIP, the private sector insurance agent who writes the NFIP policy (also known as a write your own [WYO] agent) uses an NFIP-issued flood insurance manual, issued new each year, to find the price per \$100 of coverage. Based on tables provided in the manual, the agent needs to obtain information about the property from the owner (for example, the presence of a basement) and an elevation certificate prepared by a certified surveyor. With an elevation certificate, the agent can locate the property within a zone of the special flood hazard area (SFHA), or identify as outside an SFHA. Then, using the flood insurance rate map (FIRM), the agent can calculate the difference between the lowest floor and the Base Flood Elevation (BFE) on the FIRM. With that difference and other factors, the rate per \$100 of coverage for the property can be established. The process includes determining which rating table applies to the property in question.

How and whether those principles apply to the NFIP is the initial focus of this chapter.

The first of the principles states that the insurance premium needs to account for the mathematical expectation of the loss of the property being insured. This expected loss often is referred to as the “pure premium.” In the case of flood insurance, the pure premium would be this expected loss of the insured property. The pure premium is a forward looking estimate of the cost of this loss over the contract period of the policy. The second principle requires the premium to cover all the costs of risk transfer so that the insurance company can be financially sound. The costs that are added to the premium are for administrative and operational costs, amounts to account for possible errors in assessing (underestimating) risk, and the cost of obtaining a reasonable rate of return for investors in the company. The third principle calls for each risk to be priced for itself and for there to be no cross-subsidization among insureds to the extent possible. When necessary, risk classes may be defined and rates set for the broad group if data is not available or administrative costs would be too high to set rates for individual risks; setting rates for classes of insured is common practice. Finally, if rate making follows the first three principles, it should meet the fourth: to be reasonable and not excessive, inadequate, or unfairly discriminatory.

As is clear from those principles, determining when a premium is actuarially sound can be subject to interpretation, and rate setting must be a

compromise between the ideal and what is administratively possible. The Casualty Actuarial Society (1988) notes several practical considerations when setting actuarial rates. These include the need for having homogeneous groupings of risk, the need to consider historical costs and claims over time, the need to be prepared to pay for catastrophic losses (losses to many of the insured at the same time) via reinsurance, and a regulatory environment that may require cross-subsidies. For example, it might be mandated that automobile insurance policies cannot vary on the basis of age, sex, or race, even if these variables have been shown to be predictors of risk; in this case, rates are still considered actuarially sound, but to be within the confines of the law (Witt and Hogan, 1993).

National Flood Insurance Program Policy Types

National Flood Insurance Program Risk-based Premiums

FEMA defines a risk-based premium as one “charged to a group of policies that results in aggregate premiums sufficient to pay anticipated losses and expenses for that group.”² That definition calls for actuarial principles that the rates reflect expected losses and other costs of risk transfer and that there not be cross-subsidies across the risk groups. To calculate NFIP rates, FEMA models expected losses for groups of structures that are similar in flood risk and key structural aspects, and then adds to the rates to account for various expenses. The same rate is applied to all the policies in a group or class.

More specifically, for Special Flood Hazard Areas (SFHAs; see Appendix E), FEMA sets rates by using a hydrologic model that includes flood events of various probabilities and relates these events to potential damages. The damage estimates for the different flood events used are checked against claim experience and can vary by factors such as type of basement and number of stories (see Box 3-2 for more detail). Outside SFHAs, rates have been based on actuarial and engineering judgments derived from the results of the rate model and historical experience; the cost of developing detailed analysis of frequency-magnitude relationships would be higher than the value of the information for rate setting that would be gained from such analysis (Garcia-Diaz, 2014; Kousky and Shabman, 2014). This is especially the case for events more rare than a 500-year return period (0.2% probability).

Premiums then are adjusted by several factors. First is a loss-adjustment factor, which covers the costs of loss adjusters and special claims investi-

²See <https://www.fema.gov/national-flood-insurance-program/definitions>. Accessed December 17, 2014.

gations. Second is a deductible offset. Third is an underinsurance factor, which accounts for the fact that many policyholders do not insure to value and therefore lower claims are likely. Finally, an expected-loss ratio adjustment adds to rates to account for agents' commissions and other expenses. The NFIP classifies the first \$60,000 of building coverage for single-family homes and \$25,000 of contents coverage as the "basic limit" and charges higher rates for coverage under this amount because losses are likely to be under it; rates for coverage beyond the basic limit are lower (Garcia-Diaz, 2014; Kousky and Shabman, 2014). Basic limits are higher for commercial properties.

FEMA maintains that the NFIP risk-based group is rated in accordance with actuarial principles but points out that other objectives for the program constrain the application of the principles. In its 2011 Rate Review, FEMA noted that the price of insurance should provide financial soundness to the program, be fair by allocating costs in proportion to risk, and allow economic incentives to operate and encourage availability of coverage. Those objectives depart somewhat from those noted by the Casualty Actuarial Society. The Rate Review further notes that "the system of insurance and pricing must further the purposes of the Act," which includes encouraging floodplain management, encouraging take up through affordable rates and rates that are acceptable to the public (Hayes and Neal, 2011).

On a more technical level, a 2008 Government Accountability Office (GAO) report raised concerns that some of the data used in the modeling was outdated or inaccurate. FEMA has been updating FIRMs and making other improvements, but some items, such as probability estimates of floods, had not been updated recently (Kousky and Shabman, 2014). In its response to GAO, FEMA—through the Department of Homeland Security (DHS)—agreed with some of the GAO report. It is perhaps most telling that the DHS letter stated at the outset that "while GAO raises valid concerns, DHS believes that the analysis does not grasp some of the generally accepted principles of insurance and actuarial rate setting" and referred to such matters as the need for grouping and recognizing other program objectives in setting rates (GAO, 2008). FEMA has since been engaged in such activities as improving map accuracy.

Preferred Risk Policies

For policies outside the 100-year and 500-year floodplains, FEMA has two rate classes: X zone rates and preferred risk policy (PRP) rates.³ X zone rates follow a process similar to that for full risk-rated properties in the SFHA as discussed above. PRPs are low rates for structures that are in an

³Appendix E contains details of FEMA's SFHA classifications.

BOX 3-2 Estimating Flood-Damage Relationships

In the notation of FEMA, at a given location and for a given structure type the probability of flood water reaching an elevation I , $PELV_i$, is multiplied by the “loss severity” that would occur at the structure if flood waters reached this elevation (that is, damage based on water depth in a given structure). This is referred to as damage by elevation, $DELV_i$ (NRC, 2013). These products are summed over all possible water elevation levels to arrive at an expected loss:

$$\text{Expected Loss} = \left[\sum_{i=\text{Min}}^{\text{Max}} (PELV_i \times DELV_i) \right]$$

This calculation is for properties that have similar risk-related covariates (flood risk, elevation, zone, etc.), and a common rate is given to all properties in the class nationwide.

FEMA’s process for determining PELV and DELV components in the above expected value calculation is as follows: For PELV at a given location, this collection of probability curves (called PELV curves) is used to describe the probability of water elevation relative to the 1% percent flood stage at that location. These PELV curves yield flood stage probabilities up to the 0.2% event (flood recurrence once in 500 years). To evaluate flood events that have water inundation higher than that specified for the 0.2% flood, the NFIP doubles the 0.2% inundation level and assumes a “catastrophic” flood occurs. Because this “catastrophic” flood has a very low probability, and because there is assumed to be a relatively small incremental increase in damages incurred between the 0.2% inundation level, and double this inundation, it is believed that this approximation will have little effect on the rate that is ultimately determined.

The damage as a function of the flood stage (DELV) is the second component in the expected-value calculation. In a given rating zone, FEMA bases the DELV on historical damage data at different flood stages in the zone, and it varies with structure content and location. When, on the number and variability of claims, the NFIP’s historical damage data is sufficiently credible, the NFIP data is used

X zone (no grandfathering is allowed; see below) and have favorable loss history. Specifically, a property cannot have had any of the following: two claims of more than \$1,000 each; three or more claims of any amount; two federal disaster-aid payments of more than \$1,000 each; three federal disaster aid payments of any amount for separate occurrences; or, one insurance claim and two federal aid payments of more than \$1,000 each.

Exceptions to NFIP Risk Based Policies

Before passage of BW 2012, the NFIP had three main classes of policyholders that were offered coverage at less than their risk-based rates: pre-

to develop the damage estimate. When there is no NFIP historical damage data, damage data from the U.S. Army Corps of Engineers is used. When there is NFIP historical data available, however, or when it is not itself fully credible, the NFIP blends the NFIP damage data with the Corps of Engineers damage data by using credibility formulas to determine the DELV entry. That is consistent with standard casualty actuarial practice in private insurance.

After the expected damage value has been calculated, it must be “loaded” to obtain the rate for the NFIP to use. That is done by using this formula:

$$\text{Rate} = \left[\sum_{i=\text{Min}}^{\text{Max}} (\text{PELV}_i \times \text{DELV}_i) \right] \times \frac{\text{LADJ} \times \text{DED} \times \text{UINS}}{\text{EXLOSS}}$$

where LADJ is a load factor that reflects damage adjustment expenses, and DED is a load factor that can be thought of as adjusting the DELV to account for the deductible amount (because the damage actually paid by the NFIP reflects the deductible amount).

The factor UINS makes a further adjustment to account for the underinsurance amount since not all properties can (or do insure) for the full potential damage that might be incurred at their property in a flood, and this effects the amount that must be paid by the NFIP. The value of the UINS factor is estimated by FEMA via a review of historical insurance claims. Incurred losses constitute a nonlinear function of the actual damage severity; most damages are smaller and relatively few are much larger (that is, the damage distribution is skewed). UINS adjusts the DELV to account for this nonlinearity. In 2012 the value used for LADJ was 1.05 and the value used for DED was 0.98 (FEMA, 2013a). In the denominator of the above expression, the factor EXLOSS accounts for the expected damage ratio and a risk contingency factor that differentiates between the structure's being or not being in a velocity zone. EXLOSS adjusts the rate to accommodate commissions, acquisition costs, and other costs in such a way that the product of the rate times the expected damage ratio is sufficient to cover the expected damage when damage adjustment expenses and idiosyncratic choices by the purchaser of the deductible and underinsurance amount are accounted for.

FIRM properties; grandfathered properties; and properties in communities that participate in the community rating system (CRS) program. Each will be discussed in turn.⁴

⁴In addition, included in the 5.5 million NFIP policyholders are other small groups that receive lower rates: (1) those in a V zone with a structure built before 1981 and before maps that consider wave height were adopted in setting flood insurance rates (roughly 7,500 policyholders); (2) those structures in an AR or A99 SFHA with levees in the course of reconstruction or construction but given rates as though full protection were in place (roughly 25,000 policyholders); and (3) policyholders that participate in a Group Flood Insurance Policy (GFIP) (see Appendix E for explanation of FEMA SFHA designations).

Pre-Flood Insurance Rate Map (FIRM) Subsidized Policies

Pre-FIRM properties are those built before FEMA mapped flood risk in a community (Kousky and Shabman, 2014). The pre-FIRM subsidy rate applied only to basic limits of insurance (for buildings, the first \$60,000 of coverage). It was a lower rate than risk-based for that amount of coverage and was not set according to the height of the first floor relative to the base flood elevation (BFE; see List of Terms), as is done for risk-based properties in SFHAs. As a result, no elevation certificate (see List of Terms) was required to be eligible for pre-FIRM subsidized rates. Offering rates below risk-based levels violates actuarial principles.

As was explained in Chapter 2, however, such rates were offered to properties that were built before a community joining the program. Recall that when the NFIP public-private partnership was in place, the federal Treasury made annual payments to reimburse the pool as needed. This was done to compensate the private sector for offering premiums below risk-based prices. With the pool gone, the annual cash payments from the Treasury to the program were not continued. Instead, in the 1980s the decision was made to set pre-FIRM subsidies at a level that allowed the combined revenue from pre-FIRM and NFIP full-risk premiums to cover losses for the historical average loss year (HALY), which was calculated as the mean annual loss over the life of the program (Kousky and Shabman, 2014). That had the effect of replacing the direct Treasury subsidy to pre-FIRM policyholders with a cross-subsidy from all policyholders.

The HALY was based on a program claims experience that consisted of high-loss years and low-loss years, but it did not include any catastrophic-loss years. The program borrowed from the Treasury in high-loss years, and returned the funds in years that had lower claims. As noted previously, however, Hurricane Katrina and other storms for 2005 resulted in unprecedented payments by the NFIP. In fact, the NFIP paid out more claims for 2005 than it had paid over the life of the program to that point (Hayes and Neal, 2011; Kousky and Kunreuther, 2014). The 2005 storms and claims payouts were offered by Congress as a loan to the program, and this sent the program deeply in debt to the Treasury.⁵ Hurricane Ike in 2008 and Hurricane Sandy in 2012 deepened the debt further.

The debt was so large that paying it back would have led to large rate increases—a step that FEMA did not want to take without explicit support of Congress. In fact, there was congressional instruction that rates were not to increase by more than 10% in any year. Furthermore, the pre-FIRM

⁵As of December 31, 2010, the program had paid \$18.5 billion in losses and loss-adjustment expenses and more than \$2.4 billion in interest payments because of storm events in 2005. The program carried \$17.75 billion in debt with the US Treasury and has repaid \$1.8 billion since 2005.

subsidy rate was required by legislation. Thus, although it violated the actuarial principle that the rate should reflect expected future costs, it was not something that the NFIP was willing to change without consent of Congress (Hayes and Neal, 2011). As a result of that reluctance, subsequent claims paid for those high-loss years were not fully incorporated in defining the Historical Average Loss Year.

Grandfathered Policies

Grandfathered properties are ones that were either built in compliance with the local FIRMS in effect at the time of construction, or demonstrated compliance with a FIRM and maintained continuous coverage after FIRM changes are allowed to maintain a lower rate if a new FIRM reclassifies the property into a higher risk zone (Kousky and Shabman, 2014). Zone grandfathering is the most common form of rate grandfathering, and it occurs when a policyholder once was paying a lower rate because of classification as outside the SFHA, but now, because of the new map, is included in the SFHA. Here, the zone-grandfathered policies going from non-SFHA to SFHA do not pay the lower non-SFHA preferred risk policy (PRP) rate but instead pay an average rate, called the X zone standard rate for policies outside SFHAs but without the favorable loss history of the PRPs. Another way in which zone grandfathering occurs is when a new map reclassifies an insured structure from a lower-risk zone to a higher-risk zone. In this case, the grandfathered structure will pay the lower AE zone rate instead of the newer, higher VE zone rate (see Appendix E for more information on distinctions among these flood hazard zones).

Elevation grandfathering occurs when a new map increases the elevation of the mapped 1% flood, but without changing the zone itself. As an illustration, a property that was mapped previously as being 4 feet above the 1% flood elevation but is now, according to the revised map, only 1 foot above it, would still be allowed to use the rate associated with a property 4 feet above the 1% flood elevation.

Although FEMA does not have an estimate of how many properties are paying grandfathered rates, the program tries to recoup lost revenue from the lower rates by charging higher rates for other policies in the SFHA. That is an explicit cross-subsidization between grandfathered properties and all other properties in the SFHA. It is not clear, however, whether the NFIP is increasing other SFHA policy premiums by an amount equal to the discount from NFIP risk-based rates that are being paid by the grandfathered properties.

Community Rating System Discounts

The CRS program rewards policyholders with premium discounts if their communities adopt specified risk mitigation measures. Discounts begin at 5% and reach a maximum of 45% (note, however, that only one U.S. community has reached the highest discount level). These discounts apply to policies in the areas both inside and outside the SFHA, but the premium discounts differ by area. PRP policies are not given a discount in CRS communities. CRS discounts are accounted for by adjusting all premiums upward so that aggregate revenue to the program is enough to cover expected claims that will continue to occur at properties that have a CRS discount.⁶ The expected discount for the April 1, 2014 rate changes was 11.8%, which translates to a 13.4% percent load.⁷ The lower rates introduce explicit cross-subsidies into the program given that the rate reductions granted to communities are not constrained to be equal to the change in claims to the program. Again, these are violations of the third actuarial principle, but this was intended to promote wise flood risk management policies and actions by local governments (another NFIP objective). As with cross-subsidies for grandfathering, it is unclear whether the increased rates for other SFHA properties are enough to offset the lower CRS discounted rates.

Administrative Costs

One actuarial principle states that a rate should provide for all the costs of risk transfer. That includes all costs of operating the program. NFIP expenses will differ from the private insurance sector, but including whatever the appropriate costs are in the rate is in line with actuarial pricing principles. Most administrative costs to write policies and process claims are captured in the fees paid to Write Your Own (WYO) companies. The NFIP has voluntarily agreed to pay state insurance taxes and these are included in rates. A \$20 policy fee is charged to cover the costs of flood insurance studies, floodplain management activities, and some administrative costs of the program (Kousky and Shabman, 2014). A private company also would load rates to earn a reasonable return on investment, something that the NFIP is not required to do as a public program.

The WYO allowance, as a percentage of written premiums, is roughly

⁶There are some useful community-based actions for which FEMA allows for lower rates, even though they will not necessarily reduce claims from existing properties. For example, publishing flood risk rate maps in a local library may increase general flood risk awareness in the community, but it may not lead directly to reductions in claims by policy holders.

⁷In the insurance sector, *load* is a cost that is built into the cost of the premium. In general, it covers the insurer's operating costs, the chance that the insurer's losses for that period will be higher than anticipated, and any changes in interest earned from the insurer's investments.

15% agent commissions, 2.3% voluntary payment of state premium taxes, and 12.5-13.5% company expenses. The company-expense percentage is based on a 5-year industry average of the expense ratio for multiple property insurance lines and an additional 1% for costs of a federal program. Companies also receive compensation for processing claims, which varies with the size of the claim. WYO companies get a bonus for expanding the policy base of the NFIP (up to 2% of written premiums). In 2008, FEMA used actual expense data to modify the way it handles payments for claims processing because of very large payments to WYO companies in 2004 and 2005 (GAO, 2009; Kousky and Shabman, 2014).

BIGGERT-WATERS 2012 AND THE HOMEOWNERS FLOOD INSURANCE AFFORDABILITY ACT OF 2014

Through a number of specific provisions, BW 2012 directed FEMA to change the premiums it was charging to reflect more fully the risks for all classes of policyholders. In effect, they applied actuarial pricing principles more fully.

Remove Pre-Flood Insurance Rate Map Subsidized Rates

To be consistent with actuarial principles, FEMA was to replace pre-FIRM subsidized rates with NFIP risk-based rates. The replacement would occur more quickly for some properties than for others, but eventually all would pay NFIP risk-based rates. For some properties, effective on July 1, 2012, pre-FIRM subsidized premiums were to be increased at up to 25% per year, and this would continue until the NFIP risk-based rate was achieved. Properties affected by that increase included non-primary residences (such as second homes), severe repetitive loss (SRL) properties,⁸ business properties, and homes that after BW 2012 implementation had substantial damage or improvements (of over 30% of the market value of the property). Properties that were primary residences and had pre-FIRM subsidies would be allowed to keep those subsidies until flood insurance was allowed to lapse, the property was sold, the primary residence property sustained substantial flood damage amounting to 50% or more of the property value; or the property was substantially improved.

⁸Biggert-Waters 2012 provided a definition of severe repetitive loss properties as those properties which have “incurred flood-related damage (i) for which 4 or more separate claims payments have been made under flood insurance coverage under this title, with the amount of each claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or (ii) for which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the value of the insured structure.”

To implement these changes, beginning with policy renewals in October 2013, elevation certificates were required for all pre-FIRM policies whose subsidies were removed to allow the application of the NFIP risk-based rating tables. Because the rating table used for calculating pre-FIRM subsidized premiums did not rely on elevation data and because elevation certificates result in landowner expenses, there was little incentive for landowners to have such a certificate. The result was that in the absence of elevation data, it was not possible for FEMA to make an accurate estimate of premium increases for individual policyholders or for the effect on total revenue to the program if NFIP risk-based rates replaced pre-FIRM subsidized rates. One approximation of the effect on total revenues developed by FEMA concluded that increasing the premium for subsidized policyholders while leaving the remaining policyholders unchanged would cause the aggregate premium for the entire NFIP to increase. That assessment, however, is based on data from a limited study that today is over fifteen years old. Recent efforts to make such estimates have been hampered by this lack of data (GAO, 2014).

Cease Grandfathering

To be consistent with actuarial principles, BW 2012 called for the replacing of grandfathered rates with NFIP risk-based rates. The effect of that provision on total program revenues or on individual policies cannot now be estimated. In any year, calculating the effect on any individual premium would require knowing the zone that the policy is currently rated for, the zone it was in before the map change, and any changes in base flood elevation between the two maps. The change in premium could then be calculated for the given coverage. In some cases, the premium might increase. In other cases, households might realize a premium cost saving if they bought a policy based on the new map if the newer map classified them in a lower risk zone. As a result, the effect of eliminating grandfathering on total premium revenues would be difficult to estimate, especially when it is recognized that if grandfathering were eliminated, the current NFIP practice of adding a charge to all other policies to cross-subsidize grandfathering would cease and that revenue source would be lost.

National Flood Insurance Program Risk-Based Rates

To be consistent with actuarial principles, sections of BW 2012 directed FEMA to review the basis on which it was setting NFIP risk-based rates, with specific attention to ensuring that catastrophic-loss years would be fully incorporated into the NFIP calculation of the HALY. The HALY concept, however, was developed to accommodate the premium revenue loss

caused by offering pre-FIRM subsidized rates. With that rate class no longer available under BW 2012, the HALY concept would not be used by FEMA for setting premiums each year. Nonetheless, the BW 2012 language reflects a concern that NFIP income from premiums would fall short of claims paid and expenses over time. The act therefore requested a report to Congress on the feasibility of purchasing private-sector reinsurance and on the effect of such purchase on premiums and the financial condition of the NFIP. Further reflecting a concern about the ability to pay claims, the act directs the NFIP to build a reserve fund equal to 1% of the sum of potential exposure of all outstanding policies. Finally, with respect to the financial condition of the NFIP, BW 2012 requested a report on what would be required to repay the debt within 10 years. It is currently not possible to estimate accurately how much those provisions would increase NFIP risk-based rates (and in turn premium income), but it is possible to conclude that the combined effects of all provisions would substantially increase NFIP risk-based rates across the board.

Affordability of Premiums after Biggert-Waters 2012

Chapter 2 explained that from the beginning of the NFIP and through the passage of BW 2012, Congress and FEMA sought to maintain premiums at “reasonable” levels. The practical effect was to justify limits on what factors were considered in setting NFIP risk-based rates and to justify pre-FIRM subsidized rates, and grandfathering. BW 2012 implicitly rejected that historical attention to reasonableness when setting rates: all rates were to be changed, and as a result increased, to better reflect actuarial principles. BW 2012 acknowledged a concern about the affordability of premiums when it called for an affordability report and study in Section 100236 (Appendix A). The report would allow FEMA to propose programs of assistance for policyholders whose income or wealth was such as to make it difficult to pay increased premiums. Note that affordable premiums and reasonable premiums are defined differently. Affordability was defined in relation to each policyholder’s ability to pay after consideration of his or her income and wealth.

It is worth noting that the premium increasing provisions of BW 2012 were to go into effect on passage of the bill—before any assistance program was studied, let alone put into place. As implementation of BW 2012 began, the resulting premium increases became a focus of intense political and public attention. In particular, Congress received testimony and letters arguing that the proposed rate changes for the pre-FIRM subsidized structures and grandfathered policies would result in premiums that were unaffordable for many persons who had mandatory purchase requirements, and could cause economic disruption in communities around the nation. In

response, Congress passed the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014).

HFIAA 2014 eliminated the triggers that would have led to the immediate and full loss of pre-FIRM subsidized rates when a property was sold or a new policy purchased. For primary residences, HFIAA 2014 replaced the premium increases that would occur at the time of sale or when a policy lapsed with an increase that would begin immediately and was to be 5-15% annually within a single risk class, but no more than 18% annually. This increase would be imposed annually until the premium reached its NFIP risk-based rate. Non-primary residence increases were not affected by HFIAA 2014; as required by BW 2012, annual premium increases of up to 25% would take place until premiums reached their full-risk rate. If a property was sold, the increase took place at the time of sale. The result was still that pre-FIRM subsidized premiums eventually will be gone, as was the case with BW 2012.

HFIAA 2014 reinstated the policy of grandfathering of properties. As noted earlier, some premiums will increase as maps change, and others may decrease. Because the NFIP is likely to continue cross-subsidizing, the effect on NFIP revenues will be muted. The long-term effect of grandfathering, however, will be that increasing numbers of policies violate the actuarial principle that rates should reflect risk. The NFIP is increasingly adding a cost to non-grandfathered premiums to account for the revenue lost (cross-subsidy), so it is causing those premiums to be more expensive (less affordable) and is decoupling those properties' premiums from their risk. It is not possible to say how big a problem this is or will become without a more complete analysis than is possible with the existing NFIP database.

HFIAA 2014 called for a report on an affordability framework for the NFIP that further stressed the BW 2012 request for an evaluation of programs that could provide aid to persons who were burdened by the cost of flood insurance. HFIAA 2014 was clear that any assistance should be offered in consideration of a policyholder's income or wealth; Section 9 called for "targeted assistance to flood insurance policy holders based on their financial ability to continue to participate in the National Flood Insurance Program."

SUMMARY

Restrictions that prevented the NFIP program from strictly following actuarial principles before passage of BW 2012 were aimed at achieving the NFIP goal of reasonably priced premiums. The rising NFIP debt stimulated congressional reform legislation that focused in part on whether NFIP premium setting practices were applying actuarial principles. BW 2012 acknowledged and HFIAA 2014 reemphasized a concern about whether

changes called for by BW 2012 would cause premiums to be unaffordable for many policyholders.

- Prior to BW 2012, the NFIP goal was to offer reasonable premiums, but at the same time premiums were expected to follow actuarial principles and cover claims and expenses over the long term. As a matter of practice, the historical average loss year (HALY) became a total premium revenue target. Rates were set so that the total revenue from all policies was sufficient to replace the premium revenue loss from offering pre-FIRM subsidized policies.
- After BW 2012, use of HALY is to be replaced by charging all pre-FIRM properties NFIP risk-based rates. The increase in cost of insurance for policyholders as a result of phasing out pre-FIRM subsidized premiums and the resulting premium revenue increases to the program, may be significant, but can be estimated only when additional data is available.
- HFIAA 2014 delayed but did not reverse the BW 2012 requirement to eliminate pre-FIRM subsidized rates and to consider changes to NFIP risk-based rate setting practices.
- HFIAA 2014 reinstated grandfathering. Revenue losses caused by offering grandfathered premiums, and by CRS discounted premiums, which continue to be offered, are expected to be offset by increasing premiums for all policies. Whether the revenue earned from these cross-subsidies compensates for the forgone premium income is uncertain. If grandfathering or CRS discounting expands, the result will be that NFIP premiums increasingly violate the actuarial principle that premiums should be related to risk.

The Insurance Purchase Decision

Achieving high rates of flood insurance purchase has been a challenge for the National Flood Insurance Program (NFIP). Congress therefore requested FEMA to consider the effect of premium increases on purchase of flood insurance when proposing an affordability framework (HFIAA 2014). That possibility was also to be part of the analysis called for in BW 2012, Section 100236. This chapter discusses the decision to purchase insurance, focusing mainly on the effect of premiums on purchase decisions. The chapter contrasts a standard model of choice found in the economics literature with behavioral models of choice. These two choice models provide the necessary context for reviewing empirical data on factors that affect insurance purchase decisions. Insights that can be useful for FEMA's efforts to make flood insurance purchase more attractive to households are presented on the basis of this literature review.¹

RATIONAL ACTOR MODEL OF CHOICE

The rational actor choice model (well known in the economics literature) posits that insurance buyers estimate the probability of events, such as flooding, and their adverse consequences. With an assessment of possible adverse consequences in mind, the individual considers whether to pay a particular premium each year to avoid the adverse consequences if the event occurs. As part of this thought process, the individual will consider

¹Household reluctance to purchase flood insurance is not surprising, given the reluctance to purchase other lines of insurance (Kunreuther et al., 2013).

different deductibles and coverage limits. There are important exceptions to this simple model; one is risk aversion. People who are averse to risk might be willing to purchase insurance at a premium that exceeds the annual expected loss. To illustrate, suppose a risk-averse consumer is willing to pay an annual premium of \$12 to insure against a loss of \$100 that has a 1 in 10 chance of occurring in any year. The expected loss in this scenario is \$10. The additional \$2—the risk premium—reflects the amount above the expected loss that the individual is willing to pay for insurance.

Risk aversion still requires the rational actor to understand insurance. It is necessary for individuals to take time and effort to evaluate options and related financial considerations. This “deliberative thinking” is assumed by the rational actor model (see Kahneman, 2011; Kunreuther and Pauly, *in press*). Deliberative thinking involves systematic and effortful behavior that often requires complex computations and the use of formal logic.

The rational actor model is most often used to formulate and test hypotheses about the role of prices in decision making. In the flood insurance purchase decision, the price would be the premium paid. The hypotheses are that higher premiums will affect the amount of coverage purchased or the decision to purchase at all. Another hypothesized influence on purchase would be the price of a substitute; in this case, one substitute for having an insurance claim paid is receiving disaster aid. Although the price of insurance is the premium paid for a selected level of coverage, the price of disaster aid is zero. The expected amount of disaster aid, however, depends on an individual’s perception of the generosity and timeliness of aid. Even if the price of aid is zero, low expectations of aid may make it an imperfect substitute for insurance. If an individual expects aid to be generous, however, it may discourage purchase of insurance.

Effects of Premiums on Purchase of Flood Insurance

Despite conceptual difficulties,² many investigators have attempted to estimate how a change in the price of insurance coverage (the premium)

²Specifying a price variable can be a particularly difficult process. The most easily obtained data are for the average premium per household. Because of the rating structure, however, the average premium is much larger than the marginal premium for most households, and not in a predictable way. Furthermore, a particular household is assigned a premium on the basis of various structural features, the rating zone, first-floor elevation relative to base flood elevation (BFE), and the chosen deductible amount. That means that any price variable is probably colinear with other variables in the demand function, and this biases any measure of a price effect. Although the marginal, rather than average, premium may seem less afflicted with statistical biases, it is more difficult to obtain at a household level and relevant only to questions about the amount of insurance coverage purchased, rather than about whether insurance is purchased at all.

might affect the decision to purchase insurance or the amount of insurance to purchase. The metric for this effect is the price elasticity of flood insurance purchase decisions. In 1983, the U.S. General Accounting Office (GAO; now the Government Accountability Office) developed an econometric demand function for number of policies issued as a function of several variables, including average premium paid after adjustments (GAO, 1983a). Data was obtained for the years 1978–1982. The result was an estimate of elasticity of policies in force with respect to average premium of -0.38 . That defines a relatively inelastic relationship, in which an increase in premium of 1.0% will result in a decrease in the number of policies equal to 0.38%.

Later, Price Waterhouse Coopers LLP (PWC), after searching the existing literature on price effects, reviewed the 1983 GAO study (PWC, 1999). It was noted that the GAO data covered premiums of \$41.50–\$88.00 during the 1978–1982 period (roughly \$114–\$241 in 2014 dollars). PWC adopted the -0.38 elasticity reported by GAO for premiums in that range but then assumed (without evidence) that the price effect would increase for larger premiums, eventually reaching an elasticity of -0.76 .

A 1999 study estimated elasticity of policies in force with respect to average price at -0.32 , similar to that in the 1983 GAO study (Browne and Hoyt, 2000). It also modeled total insured amount and found it to be considerably more price elastic than policies in force (-1.22). A 2000 report examined data on a sample of 11,000 properties drawn from 18 coastal counties (selected by FEMA) and estimated price elasticity by using an expected utility maximization framework (Landry and Kriesel, 2000). The model had the fraction insured properties as a dependent variable and derived estimates in two ways: using weighted least squares and using maximum likelihood. Neither approach produced a statistically significant relationship between the average premium and the probability of purchasing insurance.

A RAND Corporation study used a national sample of 5,472 single-family homes in a logistic model to estimate flood insurance purchase (Dixon, et al., 2006). On the basis of results of the model, the elasticity of the probability of purchasing insurance with respect to price was estimated to be -0.06 ; in this case, price is defined as the premium cost per \$100, averaged over the total coverage for a property.

A 2008 study collected data on 1,692 properties in two coastal counties of North Carolina and used the data in a Tobit model to estimate flood insurance coverage elected (Landry and Jahan-Parvar, 2008). The formulation is able to recognize the fact that flood insurance coverage is a bounded variable: it cannot be less than zero or greater than \$250,000. Two sets of marginal insurance premiums were estimated by using different assumptions for deductible amounts and level of coverage with respect to

replacement cost. The authors also considered the effect of premium subsidies, where they existed, and responses to a household survey designed to elicit more possible explanatory variables. Price elasticities were computed for various combinations of the data sets. On the basis of the high-premium models and the largest data set, price elasticity of insurance coverage was estimated at -0.26 for nonsubsidized properties and -2.09 for subsidized properties. Introducing the household level data from the survey reduced the nonsubsidized elasticity to -0.12 . For the low-premium alternative, three model specifications were used for each set of marginal premiums. For the high-premium alternative, price elasticities ranged from -0.12 to -0.49 . For the low-premium alternative, all results are somewhat more elastic, although the authors cautioned that these are upper bounds on the true effect.

A 2014 study use a Tobit model of insurance coverage purchased, including two alternative measures of marginal premium (high and low) among the explanatory variables (Howard, 2014). This analysis of insurance demand included estimates of consumer surplus. No price elasticities were reported.

Another 2014 study collected 32 years of data for 153 counties in Georgia (Atreya et al., 2014). The study is notable for several things, such as the inclusion of county-level data on race, education, and age. The dependent variable is policies in force per 1,000 of population; the price variable is average premium cost per \$1,000 of coverage (in 2010 dollars). All data are county-level aggregates or averages. Two model specifications and three estimation methods were used, for a total of five sets of results. Price elasticity values ranged from -0.14 to -0.31 . The most inelastic value (-0.14) reflects explicit correction for serial autocorrelation. It also was noted that flood insurance purchases increase with educational attainment, with increased proportion of black households, and with age.

Only a few conclusions can be drawn from the literature:

- Overall, the probability of insurance purchase is quite inelastic with respect to either the average cost of coverage (Dixon, et al., 2006) or the marginal cost of coverage (Landry and Jahan-Parvar, 2008). Results of various studies yielded elasticity values in the range of -0.38 (GAO, 1983b) to -0.06 (Dixon et al., 2006); results in the vicinity of -0.10 were more common.
- Subsidized policy-holders may be much more responsive to changes in marginal price than those with full risk premiums (Landry and Jahan-Parvar, 2008).
- Total coverage purchased may be considerably more elastic with respect to average premium cost than the probability of purchasing insurance (Browne and Hoyt, 2000).

- The probability of insurance purchase by households subject to the mandatory insurance provision is slightly less responsive to the average premium than the probability of purchase by households not subject to the requirement (Dixon, et al., 2006). Mandated-insurance households also purchased slightly more coverage than other policy holders (Landry and Jahan-Parvar, 2008).

Effect of Expectations for Future Disaster Aid on Demand for Flood Insurance

Some major flood events lead to presidential declarations and trigger the availability of federal disaster aid. Publicity surrounding such aid often sends a message that large amounts of money are being distributed and may create an impression that a substantial fraction of households flood losses will be compensated. A widely shared perception of generous postdisaster aid might depress the demand for flood insurance (Kousky and Shabman, 2015). The implication of generous post-disaster grants might lead many to view post-disaster aid as a substitute for flood insurance. In reality, federal disaster aid is limited to specific events, is uncertain, is modest in scale, is mostly for repair of public infrastructure or for protection against future damages, and offers little to households that are not insured (*ibid.*); thus, it may not fully substitute for insurance. It is still possible, however, that a widely shared perception of generous post-disaster aid depresses the demand for flood insurance (Kousky and Shabman, 2012).

An empirical demonstration of this effect may be difficult to obtain. A 2000 paper included previous disaster assistance as an explanatory variable and hypothesized that past experience with high levels of disaster aid would reduce the demand for insurance (Browne and Hoyt, 2000). The result was a small, but statistically significant, positive relationship between disaster aid and insurance purchases. The authors attributed that unexpected result to collinearity: both disaster aid and insurance purchases are thought to positively correlate to the level of risk. Another 2000 study found no evidence of demand suppression by disaster aid (Landry and Kriesel, 2000). Although examined in other contexts (e.g. Herring, 2005; Brown and Finkelstein, 2008), there are few empirical findings on disaster assistance in the United States. One examination of insurance purchases after receipt of federal disaster aid for flood events in Florida found that receipt of individual assistance had a crowding-out effect on flood insurance purchases (Kousky and Michel-Kerjan, 2014). A 2006 study found only a small relationship between insurance takeup rates and disaster aid and only for compensation with respect to damaged property (Dixon et al., 2006). The authors noted, however, that this finding could be because those who

receive assistance do not have the means to purchase insurance coverage or because much disaster assistance is for losses not covered by insurance.

None of the reviewed studies directly investigated property owners' perceptions regarding the future availability of disaster aid, so there is no basis for ruling it in or out as a factor in the demand for insurance. Several laboratory experiments and surveys have asked individuals if they consider disaster aid when making insurance decisions; these have the benefit of assessing how perceptions before a disaster can influence the purchase decision, but there is also concern that answers to surveys may not reflect real-world purchase decisions. Results vary in the literature. Usually, if individuals are told about assistance, it will lower their willingness-to-pay for insurance; but without such a prompt, they may not consider disaster aid when making insurance decisions (Kunreuther et al., 1978; van Asseldonk, Meuwissen, and Huirne, 2002; Botzen and van den Bergh 2012; Petrolia et al., 2013; Raschky et al., 2013).

The rational actor model would suggest that the possibility of disaster aid will discourage the purchase of insurance, but there is no consistent or persuasive empirical evidence of this effect. At best, the effect of perceptions of aid on the flood insurance purchase decision remains an open question.

BEHAVIORAL MODEL OF CHOICE

Behavioral models of choice argue that nonfinancial considerations and intuitive thinking can be used to understand choices. Intuitive thinking relies on mental shortcuts when foregoing, purchasing, or canceling insurance on the basis of such reactions as anxiety or regret; it uses simple decision rules (heuristics) that are influenced by personal experience with events, such as a flood and its consequences. The heuristics require less effort in making a decision than the detailed analyses implied by the deliberative rational actor decision process.

Nonfinancial Considerations

Whether to purchase insurance is a risk management decision, but it may not be based solely on financial considerations (Krantz and Kunreuther, 2007). For example, a homeowner may buy insurance to reduce anxiety about suffering a large uninsured loss (and thus to provide peace of mind) or to avoid regret when a flood occurs about not having purchased a policy. There is an extensive literature on how nonfinancial considerations influence individuals' risk management decisions (e.g., Finucane et al., 2000; Loewenstein et al., 2001). For example, some people claim that they refuse to fly not because they fear a crash, but because they anticipate and dislike feeling anxious about a crash while they are on a plane; however, people

who cannot avoid anxiety about a loss may still find opportunities to reduce this emotion by taking protective measures. That may partially explain the demand by the few who purchase flight insurance. Similarly, individuals might pay more for insurance if they fear a specific event (for example, home damage from a flood) than if they are not concerned about the event even if the actual expected losses are the same. Regret and disappointment are different from anxiety, as they are experienced mainly after a loss rather than before, but anticipation of these emotions also can influence decisions.

For example, consider this common behavior: homeowners purchase flood insurance after suffering damage in a flood and then cancel their policies when several consecutive years pass without experiencing any flood damage. One explanation of this behavior is that reducing anxiety in anticipation of a flood and reducing regret if a flood occurs are both important goals immediately after suffering water damage; the cause of the loss is deeply etched in the purchaser's recent memory. Buying insurance is easy to justify to oneself and others because a flood has just occurred. Several years later, many people may find that the prospect of a flood no longer intrudes on their peace of mind, so they are less anxious about its consequences.

Mental Shortcuts

A second departure from the rational actor model is the process by which individuals consider risk information. This process has been termed intuitive thinking. The literature describing intuitive thinking is vast and at times uses different terms to describe the same phenomenon. Three select findings from the literature on insurance purchase decisions are presented in this section: *prospect theory*, *status quo bias* (a reluctance to consider alternatives to the current condition), and *availability heuristic* (considering the most recent event that occurred most recently to be the most likely).

Prospect Theory

Kahneman and Tversky (1979) proposed prospect theory to explain how individuals make choices when outcomes are characterized by a probability distribution. Prospect theory argues that individuals misperceive probabilities, having a tendency to underweight small probabilities and overweight larger ones. If the probability of an event is perceived to be extremely low, the likelihood is considered to be zero. Empirical studies reveal that individuals tend to experience the pain of a loss twice as strongly as the enjoyment of the gains of the same magnitude. Stated simply, individuals tend to be loss-averse relative to their reference point (Tversky and Kahneman, 1991). For example, a controlled laboratory experiment found that many individuals bid zero for insurance coverage against low-

probability events, apparently viewing the probability of a loss as so small that they are not interested in protecting themselves against it (McClelland et al., 1993).

Status Quo Bias

A flood insurance purchase decision is made when a homeowner buys a house in the floodplain and is considering whether to purchase flood insurance for the first time or when a policy expires and a homeowner has to decide whether to renew it. There is evidence that many individuals are reluctant to depart from the status quo (not having insurance, or holding a policy that is expiring) even though there may be substantial benefits to them from doing so (Samuelson and Zeckhauser, 1988). With respect to consumer insurance decisions, changes in laws in Pennsylvania in 1990 and in New Jersey in 1988 provided an opportunity to examine the impact of the status quo as a reference point on the choice of automobile policies. Insurance laws in the two states differed with respect to the status quo (that is, the default option). In New Jersey, motorists had to change their existing insurance policy to acquire the full right to sue that would result in a higher premium. In Pennsylvania, the status quo was the full right to sue and motorists had the opportunity to reduce their insurance premium by giving up some of their rights to sue. When offered the choice between these two policies, only about 20% of New Jersey drivers chose to acquire the full right to sue. In Pennsylvania, 75% of the insured population retained their current policy, which gave them the full right to sue (Insurance Information Institute, 1992). Similar results were obtained in a hypothetical study with 136 university employees. Interestingly, the effect was even larger in the real world than in the controlled experiment (Johnson et al., 1993).

Availability Heuristic

In some situations, individuals assess the probability of an event on the basis of the ease with which they can imagine its occurrence (Tversky and Kahneman, 1973). The availability mental shortcut implies that individuals are more interested in buying insurance coverage after a disaster because it is highly salient. Indeed, it has been found that takeup rates of flood insurance policies in the United States increase right after a disaster event and then slowly decline (Gallagher, 2014). The flood insurance market offers more striking empirical evidence on that point. A 2012 study examined the number of new policies issued by the program and their durations through 2009 for those residing in both Special Flood Hazard Areas (SFHAs) and non-SFHAs by using the entire portfolio of the NFIP over the period 2000–2009 (Michel-Kerjan et al., 2012). Of the 841,000 new policies in

2001, only 73% were still in force 1 year later; after 2 years, only 49% of the original 2001 policies were still in place; and in 2009, only 20% were still in place.

Although some of these individuals may have sold their homes and cancelled their policies because they moved, the large percentage decrease in the policies in force can be only partially explained by migration patterns. Data from the annual American Community Survey over the period covered by the flood insurance dataset revealed that the median length of residence was 5-6 years—somewhat higher than the median tenure of flood insurance of 2-4 years.

That finding of higher insurance purchase after catastrophe is often true even when premiums increase (unlike NFIP policies). A prime example is the purchase of earthquake insurance after a major seismic event. Surveys of owner-occupied homes in counties in California that were affected by the 1989 Loma Prieta earthquake showed a significant increase in coverage (Palm, 1995): just before the disaster, 22.4% of the homes had earthquake coverage; 4 years later, 36.6% had coverage—a 63% increase. The possibility of a future earthquake was now more salient, so many individuals decided to purchase insurance to gain peace of mind.

The availability of mental shortcuts also implies that before a disaster, the perceived likelihood of another disaster is perceived to be much lower than estimated by experts (Tversky and Kahneman, 1973). For example, consider floods in August 1998 that damaged property in northern Vermont, an area that had not experienced a recent major natural disaster. Of the 1,549 victims of this disaster, FEMA found that only 16% of homeowners who were in flood-prone areas had insurance, even though 45% were required to purchase it (Tobin and Calfee, 2005; Michel-Kerjan et al., 2012). These findings imply that lenders were not enforcing the regulation or that property owners were finding ways to avoid lender enforcement. In the case of Hurricane Sandy in 2012, only about 20% of New York City households that were inundated had flood insurance at the time of the disaster (NYC, 2013).³

Framing

Framing refers to the way in which outcomes are described as gains or losses relative to a reference point, which can either be the status quo or another value (Kunreuther and Weber, 2012). One way to encourage individuals to invest in protection is to reframe the probability of risk so that people perceive potential future disasters as above their threshold level of

³Many areas inundated by Hurricane Sandy and the associated surge were outside of then-designated SFHAs.

concern. Research shows that simply adjusting the time frame can have a significant effect on the perception of risk. For example, people were more willing to buckle their seatbelts when they were told that they had a one-in-three chance of an accident over a 50-year lifetime of driving, rather than a 0.00001 chance in each trip (Slovic et al., 1978; Kunreuther et al., 2013). Similarly, describing flood probabilities in terms of the number of “1 in 500 year” possible floods during the 30-year life of a mortgage may have greater meaning than telling someone that there a 0.2% chance of a flood in any year.

Suppose that a person is provided with a concrete scenario highlighting the damage to property from a future flood and that this question is posed “How would you fare financially if you did not have insurance and suffered a future loss from a storm similar to Hurricane Sandy?” Individuals at risk may decide that they should purchase coverage rather than regret not being financially protected if they suffer a severe loss. More generally, calling attention to the benefits of insurance by focusing on a specific event such as Hurricane Sandy, is likely to be more effective in increasing takeup rates than framing a general message in terms of reducing damage from future floods or hurricanes. Even before 9/11, controlled experiments revealed that consumers are willing to pay more for insurance against a plane crash caused by terrorists than for flight insurance against any event, a counter-intuitive finding in that by definition “any event” includes a terrorist attack (Johnson et al., 1993; Kunreuther et al., 2013).

IMPLICATIONS FOR ENCOURAGING PURCHASE

Deliberative Thinking

The concept of deliberative thinking is a process that aims to provide concrete and meaningful comparisons in helping people understand a given risk, and removing misperceptions that people may have about that risk. People generally have difficulty in evaluating low-probability risks, but often form more accurate perceptions when numbers are presented in the context of familiar situations. A raw probability number, such as 1 in 1 million, may be an abstract concept, but people can more readily interpret such a number if it is compared with the risk of an automobile accident (1 in 20), or the risk that lightning will strike one’s home on one’s birthday (less than 1 in 1 billion).

Misperceptions of the likelihood and generosity of aid may influence an NFIP purchase decision. This suggests that decisions on whether to purchase insurance could be affected by providing accurate information on the limits of federal aid. Another example of a misperception is the view of insurance as an investment. Some insured individuals do not feel justified

in continuing to pay premiums when they do not collect on their policies. They view insurance as a poor investment rather than recognizing the fact that they have not suffered any losses for the last few years (Kunreuther et al., 1978). Insurance is a risk-management mechanism, however, and a person should value not having a loss rather than thinking that money was wasted in the premiums. People who view insurance as an investment misunderstand its purpose.

FEMA has prepared a two-page brochure that illustrates this comparison (FEMA, 2012a). Support for deliberative thinking might include expanding the material into a broader educational effort. Expanded educational materials might explain not only the limits of aid but also the uncertainty of the aid being secured. In a broader context, educational materials might increase understanding of the purpose of insurance. In fact, FEMA's FloodSmart program represents a significant effort to inform the public of the benefits of purchasing flood insurance (FEMA, 2014a). In addition, a user-accessible financial decision support tool to help persons to compare the financial consequences of purchasing with those of not having insurance and relying on aid. Dissemination and use of these materials might also be considered. One possibility might be to make such materials available to the community floodplain managers and to write your own (WYO) agents who can work with property owners to assess the merits of aid versus insurance for their particular situation.

Choice Architecture

Households have many financial decisions to make and limited time in which to make them. Some households will use some of the time for a deliberative process when making an insurance purchase decision. Others may use mental shortcuts. In recognizing that some (maybe many) households will use mental shortcuts, the goal of increasing purchase may be served by paying attention to "choice architecture" (Thaler and Sunstein, 2008). The authors of this 2008 article argued that people's choices often depend on how options are presented. For example, consider the situation regarding the NFIP mandatory purchase requirement. There has been continuing attention to enforcement of the mandatory purchase of flood insurance for properties in SFHAs that have federally insured mortgages. As in the past, the focus has been on the lending sector, but there is still less than full compliance. Efforts to increase enforcement of mandatory purchase by focusing on the borrowing sector have been only partly successful. An analysis of the sequence of decisions that includes the property owner who may be reluctant to purchase any form of insurance (for the reasons discussed), the WYO agent, whether the commission for each policy purchased is enough to encourage following up when a policy is dropped, the lender, and who-

BOX 4-1

Multi-year Flood Insurance

To reduce the likelihood that policies will be cancelled the NFIP could introduce multi-year insurance (MYI) to the homeowner. The tendency to maintain the status quo should increase the likelihood that insured individuals will maintain a multi-year policy for the length of the contract whereas they may decide not to renew an annual policy after it expires. Premiums for MYI policies would still be paid on an annual basis, ideally be risk-based and fixed for a specified period (such as 5 years), and undergo periodic scientific review to determine whether the flood risk has changed.

Those not required to purchase flood insurance would have a choice between purchasing a single-year policy or a multi-year policy. If they decide to cancel a multi-year policy before it expires, they would be charged a cancellation fee unless they were moving to another location. A 2015 paper discusses a Web-based experiment with adults in the United States who had the choice of purchasing annual or multi-year policies or being uninsured against damage from hurricane-related losses (Kunreuther and Michel-Kerjan, 2015). The results indicated that there was demand for MYI.

MYI could also directly address the affordability issue and be accompanied by a multi-year home improvement loan to encourage investment in mitigation. Low-income homeowners residing in flood-prone areas could be given a means-tested insurance voucher to cover a portion of the insurance premium and the cost of a mitigation loan. The costs to the homeowner and the federal government would probably be lower than the costs of providing vouchers that cover only the insurance premium (as will be detailed in discussion of mitigation loans in Chapter 7). Well enforced building codes and seals of approval would provide additional rationale for undertaking these loss reduction measures.

ever owns the mortgage over time can identify possible reasons for failures to maintain insurance and suggest policy actions to increase compliance. The focus appropriately would be on the household decision because if households do not choose to drop insurance in the first place, enforcement will be less of a challenge.

An illustration suggests how choice architecture might result in people's buying and maintaining flood insurance policies. An analysis of the entire portfolio of the NFIP revealed that more than half of all NFIP policies (mandatory and voluntary) were canceled between 2-4 years after purchase (Michel-Kerjan et al., 2012). This illustration applies equally to voluntary and mandatory purchase. Currently, the choice context is for households to purchase insurance on an annual basis; that is, they need to evaluate each year whether to renew. If there has not been a flood in the preceding year, the availability heuristics (discussed above) may work against a decision

to renew. If the renewal choice were for multiple years, however, the effect of availability heuristics might be minimized and presenting the choice as a multiyear purchase might take advantage of the status quo heuristic (see Box 4-1).

SUMMARY

A long-standing objective of the NFIP has been to increase purchases of flood insurance. Household decisions on whether to purchase insurance can be understood through different models of choice that in turn have been the foundation for empirical studies of the insurance purchase decision. A conclusion from a review of this literature is that no single strategy will increase purchase of NFIP policies. As FEMA improves its efforts to increase takeup rates through risk communication and other efforts, the literature reviewed here may offer insights that can improve the effectiveness of these programs (Kousky and Shabman, 2015).

- The original NFIP legislation expected NFIP premiums to be priced at reasonable levels to promote voluntary purchase of NFIP policies. Empirical studies have found that premium prices may affect takeup rates although the size of that effect is small. The effect of the availability of disaster aid on insurance purchase decisions is uncertain.
- Studies have found that people may use intuitive thinking, as opposed to systematic consideration of the cost of premiums in relation to expected claim payments, when choosing to forego insurance or to cancel an existing policy.
- The combination of acknowledgement of intuitive thinking and the effects of premiums on insurance purchase decisions suggests that lower premiums alone will not increase takeup rates substantially.
- Keeping NFIP premiums at reasonable levels can be part of any strategy to maintain compliance with mandatory purchase requirements and increase voluntary takeup rates. A multipart strategy to motivating purchase of NFIP policies can be designed using insights from the behavioral sciences literature.

Locations of Potential National Flood Insurance Program Affordability Challenges

Before passage of Biggert-Waters 2012 (BW 2012), the National Flood Insurance Program (NFIP) used different premium setting practices for different groups of policies: NFIP risk-based (including preferred risk), grandfathered, pre-flood insurance rate map (pre-FIRM) subsidized, and Community Rating Service discounted (CRS discounted). BW 2012 would replace pre-FIRM subsidized and grandfathered premiums with NFIP risk-based rates. The removal of subsidies, and the move toward risk-based rates, can raise premiums for pre-FIRM subsidized and grandfathered policies. BW 2012 also directed FEMA to report on the feasibility of purchasing private reinsurance, to pay down the debt to the Treasury, and to take actions to build up the NFIP reserve fund. Those actions may require FEMA to increase NFIP risk-based premiums, and this would affect all classes of policies.¹

As premiums increase, the changes in premiums may make insurance unaffordable to some households. There may be locations where increases have adverse effects on a community if premiums increase for a large number of its residents. Before detailed discussion of how *affordability* might be defined (Chapter 6), and how aid programs might be developed if there are affordability concerns (Chapter 7), this chapter discusses the geographic distribution of policies for each policy group. The result is to provide a perspective on the location and extent of potential affordability challenges if all

¹The Homeowner Flood Insurance Affordability Act of 2014 reinstated grandfathering. The present committee's task statement, however, which was derived from BW 2012, presumes that all premiums eventually would be NFIP risk-based, which is the presumption of this chapter.

provisions of the BW 2012 legislation were implemented. This information has important implications for decisions regarding national level affordability policy design. For example, if a large portion of the potential premium increases was concentrated in a few counties, affordability policy options might be different from what they might be if the potential increases were spread across the entire nation.

This chapter presents several maps that describe the spatial distribution of policy groups. The data used to generate these maps was as follows:

- *FEMA Flood Insurance Policy Database.* This database contains the location of all the flood insurance policies as of October 2013. It provides such information as the address of the policy, the current premium, and the zone in which the policy was rated. This restricted dataset cannot be released to the public because of privacy issues. Results are reported in such a way that privacy is protected.
- *U.S. Census Geographical Area.* This dataset provides the geographic boundaries of approximately 220,000 census-block groups from the 2010 census that form the area of the United States and all territories.
- *FEMA National Flood Hazard Layer.* This dataset has the flood boundaries of all the digital maps that exist in FEMA's inventory as of 2010.

Maps, tables, and data compilations in this chapter were prepared by the AECOM firm, which used FEMA 2013 data that it acquired under a separate contractual agreement (AECOM, 2014). The data above were combined to create the maps in this chapter. Data analysis generally was performed within a spreadsheet, and the results were mapped with a geographic information system (GIS). For example, to show locations of policies, a spreadsheet is used to summarize the Flood Insurance Policy Database, and the summary is then imported into a GIS to be mapped. The spreadsheet used for the present report is Excel 2010 and the GIS used was ArcGIS10.2.2.

The chapter first describes the current NFIP policy portfolio. The geographic distribution of policies included in each policy group is then reported. That reporting is at the state, county, or US Census block group of aggregation as needed to understand the location of a policy group.

NATIONAL FLOOD INSURANCE PROGRAM POLICIES IN FORCE: AN OVERVIEW

Overview

The NFIP had 5,544,629 standard policies in force² as of October 2013. A FEMA standard flood insurance policy³ can be issued for several types of properties:

- Single family housing units, which account for 3,793,421 of the policies in force
- Properties that contain two to four housing units, which account for 264,650 of the policies in force
- Properties that contain more than five housing units, such as apartment buildings and assisted living facilities, which account for 1,192,402 of the policies in force
- Nonresidential properties (buildings for businesses) and residential facilities, such as hotels with short-term guests; Residential Condominium Building Association Policy properties (this applies to condominium complexes whose individual units are separately owned), which account for 294,156 of the policies in force.

Those distinctions are important in understanding the policy database and the presentation of the data in this chapter. Note that a policy may be for a property that has more than one housing unit; an example would be an apartment building.

For residential properties, a further distinction is made concerning whether the property is a primary or non-primary residence. “FEMA defines a primary residence as a building that will be lived in by an insured or an insured’s spouse for more than 50% of the 365 days following the policy effective date.”⁴ Also, a separate category of properties—Severe Repetitive Loss (SRL) properties—are ones that have had four or more separate claim

²The information and maps describing NFIP policies in this chapter are derived from data provided to the committee by FEMA. This is the most recent detailed data (October 2013; see FEMA, 2013b) available on flood insurance policies. FEMA policies in force vary from year to year so policy counts made at other times may differ from the counts reported here. The basic unit of consideration for representing the location of these policies is the housing unit, defined by the US Bureau of the Census as follows: “A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from the outside of the building or through a common hall.”

³NFIP Flood Insurance Manual, General Rules Section, p. GR-2, 1 June 2014.

⁴Source: NFIP Flood Insurance Manual, Definitions Section, p. DEF-7, 1 June 2014.

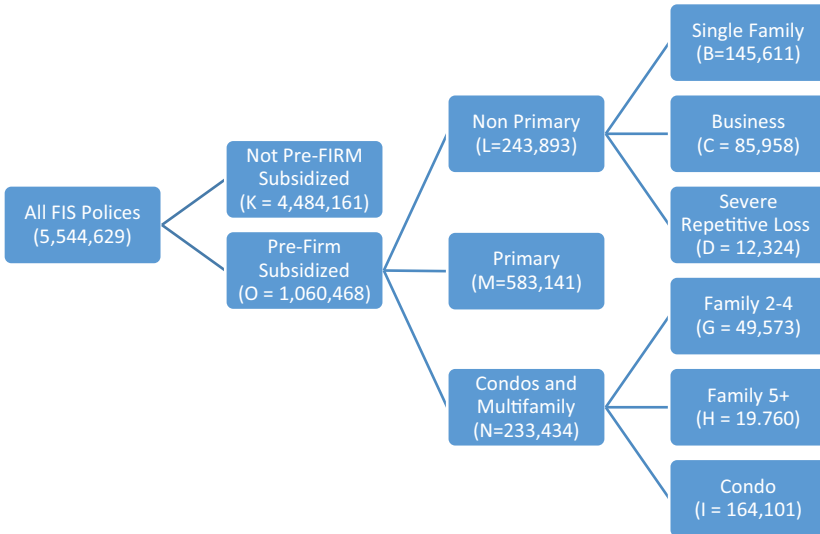


FIGURE 5-1 Classification of flood insurance policies.
SOURCE: AECOM, 2014.

payments that each exceed \$5,000 or two or more separate claim payments, the total of which exceeds the current value of the property.⁵

Figure 5-1 depicts a classification of these types of policies. The total number of policies in force in the NFIP portfolio is divided into “not pre-FIRM subsidized” and “pre-FIRM Subsidized.” Included in the not pre-FIRM subsidized group are NFIP risk-based policies, grandfathered policies (discussed separately below), and CRS discounted policies. About 20% of the policies are subject to pre-FIRM subsidized premiums.

Figure 5-1 subdivides pre-FIRM subsidized policies into categories. Non-primary properties (designated by L) consist of single family homes (B), businesses and nonresidential buildings (C), and severe repetitive loss properties (D); $L = B + C + D$. L properties cover policies that under BW 2012 would see increases in rates of 25% per year until the NFIP risk-based premium was paid; the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014) did not change that BW 2012 requirement.

⁵Source: NFIP Flood Insurance Manual, Severe Repetitive Loss Section, p. SRL-1, 1 June 2014.

The second category of policies is for primary residences (M), which total 583,141 policies. This is the category of policies that under BW 2012 would have seen increases in rates of the NFIP risk-based premium when the property was sold. However, HFIAA 2014 replaced that provision by requiring that rates increase by 5-18% per year until the NFIP risk-based premium was being paid. HFIAA 2014 also allowed the NFIP risk-based premium to phase in over time even if the property was sold.

The third category of policies is for multifamily residences (N), which total 233,434. It includes residences with two to four housing units (G), five or more housing units (H), and Residential Condominium Building Association Policy (RCBAP) units (I); $N = G + H + I$. The condominium category includes units that are owner-occupied and rental properties; most of the condominium units that have pre-FIRM subsidized policies (150,226) are not primary residences. The total number of properties with pre-FIRM subsidized policies that would be affected by BW 2012 is $O = L + M + N$. This total of 1,060,468 is displayed later in discussions of pre-FIRM subsidized policies.⁶

All National Flood Insurance Program Policies

Figure 5-2 shows the distribution of all 5.5 million policies throughout the nation by county. As the figure shows, NFIP policies are distributed widely, but there are areas of high concentration.

Table 5-1 lists the numbers of NFIP policyholders throughout the nation by state or territory. The table shows the concentrations of policyholders in select areas of the United States. For example, Florida contains 40% of the policies, and Texas and Louisiana together contain 20% percent of the policies.

BW 2012 would affect premiums levels for all these policy types in all these places and in different and undetermined ways. Thus, its effects may be concentrated in some states but be present throughout the nation.

The roughly 5.5 million policies in force today are both in and outside the FEMA-mapped Special Flood Hazard Areas (SFHA; 1% floodplain), but not all the properties in SFHAs have purchased insurance. Estimating takeup rates is difficult because of the lack of data on households and policies in floodplains around the country. It appears that takeup rates are particularly low in areas where purchase is voluntary, but it also seems that many people who are required to purchase the coverage do not. The RAND

⁶Although those distinctions are important for understanding the changes that HFIAA 2014 made in BW 2012, the focus of this report is the NFIP premiums charged to all policyholder under the rating and premium-setting process before BW 2012 and under the rating and premium-setting process after BW 2012.

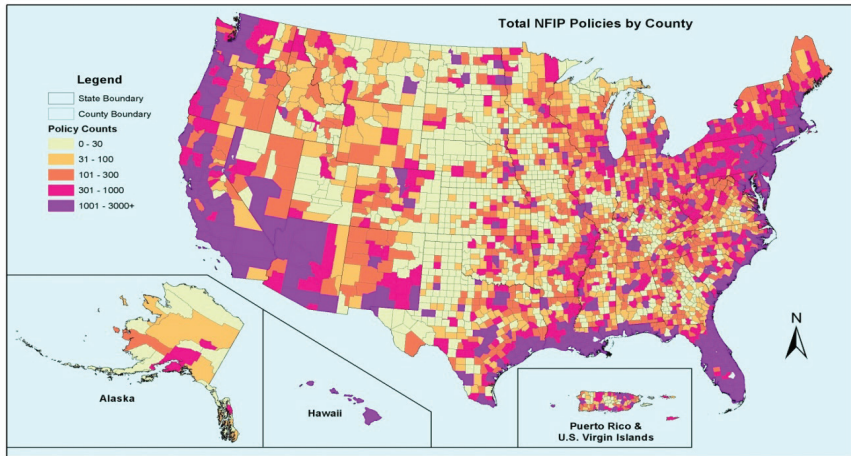


FIGURE 5-2 NFIP policies in the United States by county.
SOURCE: AECOM, 2014.

Corporation estimates that about half a random sample of single-family homes in 100-year floodplains across the country have flood insurance, but this masks high regional variation; the Midwest has the lowest takeup rates—20-30%—and the South and West having takeup rates closer to 60% (Dixon et al., 2006). An examination of coastal properties estimated takeup rates at 50% (Kriesel and Landry, 2004). And a calculation of takeup rates in census tracts (not only in floodplains) along the New Jersey and New York coasts immediately before Hurricane Sandy suggests that market penetration was in the range of 50%, with a few tracts along the coast having rates up to 75% (Kousky and Michel-Kerjan, 2012).

In July 2014, FEMA reported to Congress that 4.9 million housing units are in the riverine or SFHA floodplain (or 1% floodplain) and 3.8 million in the coastal SFHA, for a total of 8.7 million housing units in floodplains (Doug Bellomo, 2014, Federal Emergency Management Agency, personal communication). About 5.5 million NFIP policies are in force in and outside the SFHA; given that over 11 million housing units are in the SFHA alone, it appears that many of the housing units in the nation's floodplains do not have flood insurance. These analyses based on available data suggest that meeting the long-standing goal of high takeup rates for flood insurance would require a significant increase in insurance policy purchases.

TABLE 5-1 NFIP Policies by State or Territory

STATE	NUMBER OF POLICIES
Alabama	58,256
Alaska	3,014
American Samoa	2
Arizona	34,885
Arkansas	21,065
California	273,339
Colorado	22,913
Connecticut	43,400
Delaware	25,585
District of Columbia	2,361
Florida	2,029,025
Georgia	96,872
Guam	253
Hawaii	59,315
Idaho	6,937
Illinois	49,232
Indiana	29,573
Iowa	16,410
Kansas	12,867
Kentucky	25,051
Louisiana	483,218
Maine	9,319
Maryland	73,995
Massachusetts	59,773
Michigan	25,185
Minnesota	12,093
Mississippi	74,095
Missouri	26,206
Montana	5,876
Nebraska	12,709
Nevada	14,611
New Hampshire	9,489

continued

TABLE 5-1 Continued

STATE	NUMBER OF POLICIES
New Jersey	246,498
New Mexico	16,200
New York	196,717
North Carolina	139,121
North Dakota	13,755
Northern Mariana Islands	10
Ohio	41,676
Oklahoma	17,742
Oregon	34,085
Pennsylvania	73,950
Puerto Rico	43,959
Rhode Island	16,101
South Carolina	206,611
South Dakota	5,456
Tennessee	32,780
Texas	629,862
US Virgin Islands	2,090
Utah	4,511
Vermont	4,579
Virginia	115,481
Washington	44,804
West Virginia	20,915
Wisconsin	16,104
Wyoming	2,506
(Records Missing Geocoding)	2,192
Grand Total	5,544,629

SOURCE: AECOM, 2014.

Grandfathered Policies

Grandfathered policies⁷ are created when a new version of the FIRM is released and current policyowners want to be rated on the basis of the map that was in effect when the policy was initially purchased. For example, consider a homeowner whose house has a first-floor elevation of 52 ft. In 2008, the owner purchased flood insurance, and the maps show the 100-year flood at an elevation of 53 ft on the basis of a map dated 1983. The homeowner is charged an insurance rate for a first floor that is 1 ft below the 100-year base flood elevation. In 2012, a new FIRM shows a 100-year flood elevation to be at 55 ft, or 3 ft above the first-floor elevation of the house. The policyowner can keep the lower rates of first floor elevation 1 ft below (vs 3 ft below) the 100-year flood elevation if specific conditions exist. Thus, rates may increase, and the design of an affordability framework would be well served if the number and location of grandfathered policies were known.

The FEMA policy database does not contain information on whether a current policy is grandfathered. It does contain the zone that was used at the time the policy was purchased; if the elevation of the structure was obtained, that information is also in FEMA's database. In addition, FEMA maintains a National Flood Hazard Layer (NFHL) for areas where the paper map inventory has been converted to a digital format. NFHL are available for communities that include approximately 88% of the US population and approximately 60% of the land area of the continental United States (see NRC, 2009 for further discussion of FEMA floodplain mapping modernization). The NFHL is the combination of all the community flood hazard information into one database layer in which digital flood maps exist. FEMA also has addresses of policies. The flood policies can be geocoded and intersected with the current map to determine the current flood zone of properties. The following indicators can then be used to determine whether a policy is grandfathered:

- Policy is rated as a Zone X (outside the 100-year floodplain) and now is shown in Zone A (inside the 100-year floodplain).

⁷“Under NFIP administrative grandfathering, post-FIRM buildings in the Regular Program built in compliance with the floodplain management regulations in effect at the start of construction will continue to have favorable rate treatment even though higher Base Flood Elevations (BFEs) or more restrictive, greater risk zone designations result from Flood Insurance Rate Map revisions. Policyholders who have remained loyal customers of the NFIP by maintaining continuous coverage (since coverage was first obtained on the building) are also eligible for administrative grandfathering” (FEMA, 2014b).

- Policy is rated as a Zone X (outside the 100-year floodplain) and now is shown in Zone V (inside the 100-year floodplain and in an area of high wave action).
- Policy is rated as a Zone A (inside the 100-year floodplain) and now is shown in Zone V (inside the 100-year floodplain and in an area of high wave action).

In addition, grandfathering occurs when the flood map elevation increases. The current elevation of the 100-year flood map can be determined with available information. A calculation to locate and map grandfathered premiums was beyond the data and time resources available to the committee for the present report. FEMA has, however, made preliminary estimates of grandfathering and has concluded that, at a national level, approximately 10% of all policies (excluding pre-FIRM subsidized) are grandfathered (Andy Neal, Federal Emergency Management Agency, personal communication, 2014).

Policies Other Than Pre-FIRM Subsidized

BW 2012 called on FEMA to report to Congress on the possibility of making changes that might raise NFIP risk-based premiums. Figure 5-3 maps the distribution of all policies other than pre-FIRM subsidized, according to US Census block group;⁸ these are policies that might be affected by changes in premiums even if they are not currently paying pre-FIRM subsidized premiums.

Although there are areas of concentration these policies in this group (purple in Figure 5-3), policies in this group are found in large numbers in census block groups around the nation (pink and red shading in Figure 5-3).

Pre-FIRM Subsidized

Holders of pre-FIRM subsidized policies may see significant increases in premiums. The spatial pattern of significant premium increases for NFIP pre-FIRM subsidized policies is shown by state in Figure 5-4. The states that have the largest populations—California, Texas, New York, and Florida—have large numbers of pre-FIRM subsidized policies and high numbers of

⁸A census block group has a population of 600-3,000 people, or an average of 533 housing units. As of 2013, the US population was approximately 316 million, and there were approximately 133 million housing units. To assemble data on the population, counties are assembled or divided into census tracts, of which there are about 74,000. Those are subdivided into census block groups (220,000) and then into census blocks (11 million). A US census block Group contains an average of 600 housing units (for more information see <https://www.census.gov/geo/maps-data/data/tallies/tractblock.html>).

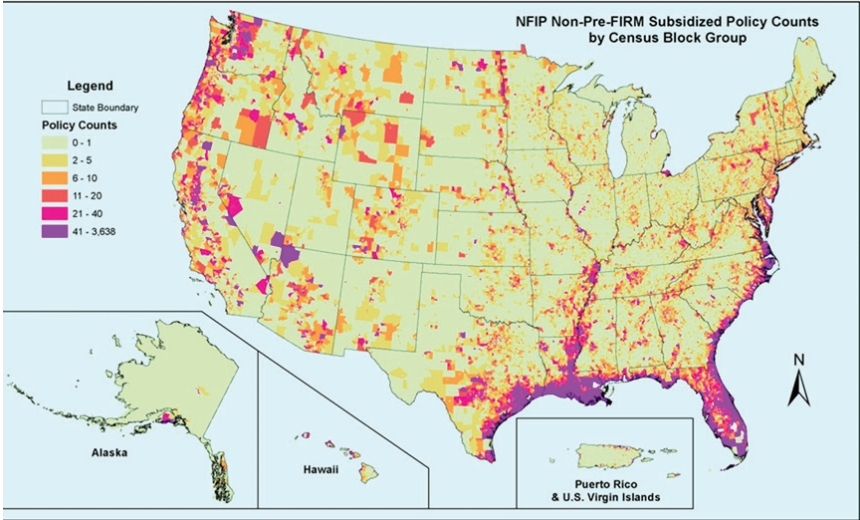


FIGURE 5-3 NFIP non—pre-FIRM subsidized policy counts by US Census block group.
SOURCE: AECOM, 2014.

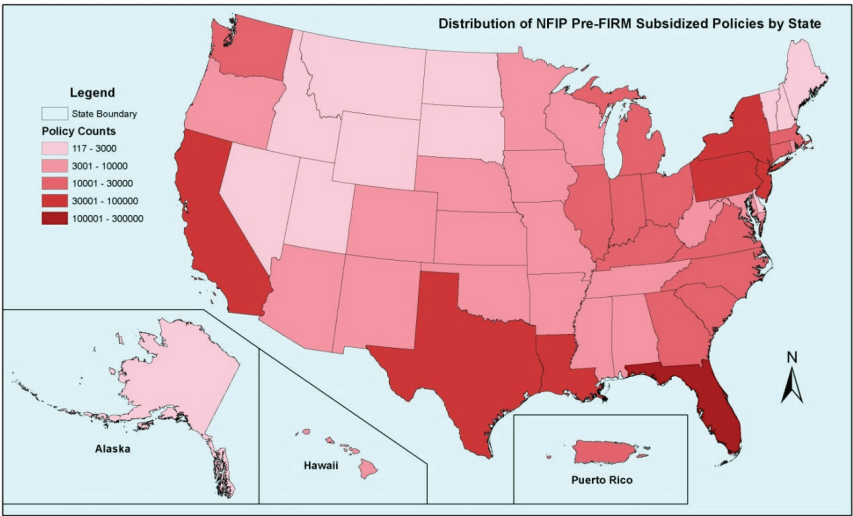


FIGURE 5-4 Distribution of NFIP pre-FIRM subsidized policies by state.
SOURCE: AECOM, 2014.

all policies. Louisiana, New Jersey, and Pennsylvania round out the top seven states of NFIP pre-FIRM subsidized policy numbers.

Another perspective on the location of pre-FIRM subsidized premiums is presented in Figure 5-5. The figure illustrates the spatial pattern of the ratio of pre-FIRM subsidized to total flood policies $[(O/(K+O))]$ in each state. It shows that the Midwest and Great Lakes regions have higher percentages of pre-FIRM subsidized policies, and the South and West regions have lower percentages. That is not surprising inasmuch as the southern and western United States is where population growth is creating newer housing stock (compared to the Midwest and Great Lakes regions), presumably built after the local FIRM was issued. Depending on perspective, possible affordability concerns due to removing pre-FIRM subsidies could be concentrated in different areas of the nation. If both perspectives are used, however, the possible affordability problem appears to be national in scope.

An even finer level of spatial detail can be used by allocating the policies to census block groups and then mapping the distribution of pre-FIRM subsidized policies at the census block group level. The impression from Figure 5-6 is that the pre-FIRM subsidized policies are spread widely, but an important calculation based on the data underlying the map shown is that 80% of NFIP policies are concentrated within 6% of the US census block groups. Focusing on the purple areas suggests that there are

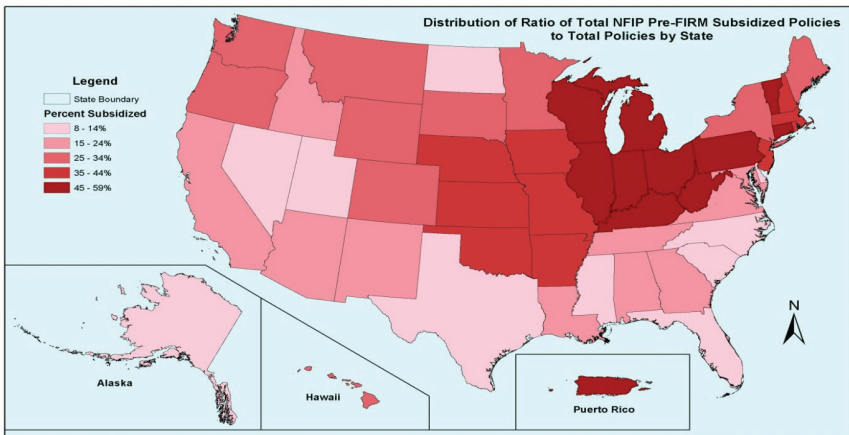


FIGURE 5-5 Distribution of the ratio of total NFIP pre-FIRM subsidized policies to total policies.

SOURCE: AECOM, 2014.

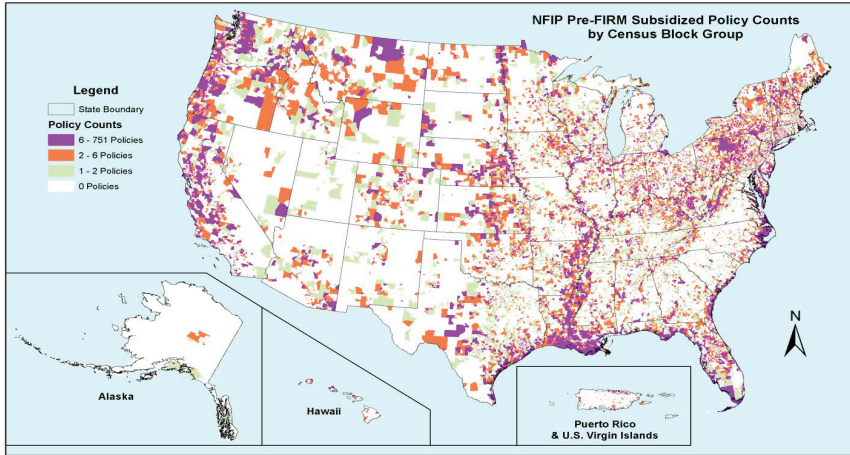


FIGURE 5-6 NFIP pre-FIRM subsidized policy count rankings by US Census block groups.
SOURCE: AECOM, 2014.

small geographic areas (recall that an average census block group contains approximately 600 housing units) in which removing pre-FIRM subsidized premiums may affect a large percentage of households in a single community.

SUMMARY

Determining whether there are concentrations of NFIP policies may be useful for designing a national affordability framework.

- About 60% of the approximately 5.5 million NFIP policies are in three states: Florida, Texas, and Louisiana. The rest are distributed widely throughout the nation. Any effects of BW 2012 therefore will be more concentrated in some places, but will appear throughout the nation.
- Available estimates of takeup rates suggest that they are low, especially outside Special Flood Hazard Areas. Meeting the long-standing goal of high takeup rates for flood insurance therefore would therefore require a large increase in purchases.
- The extent and location of premium increases that might result from elimination of grandfathering can be determined by further analysis of the policy data, but cannot be estimated now.

- Slightly more than 1 million—or 19% of the policyholders—are paying pre-FIRM subsidized rates and will potentially see rate increases if the provisions of BW 2012 remain in effect. Pre-FIRM subsidized policies are found throughout the nation, but there are areas of concentration.

Affordability Concepts and a Framework for Assistance Program Design Decisions

Section 9 of the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014) required FEMA to propose an affordability framework for the National Flood Insurance Program. That legislation requesting this framework asked FEMA to propose options for “Targeted assistance to flood insurance policy holders based on their financial ability to continue to participate in the National Flood Insurance Program.” A similar requirement is found in Section 100236 of the Biggert-Waters Act of 2012 (BW 2012), which called on FEMA to analyze “methods for establishing an affordability framework for the National Flood Insurance Program, including methods to aid individuals to afford risk-based premiums under the National Flood Insurance Program through targeted assistance rather than generally subsidized rates, including means-tested vouchers.”¹

This chapter describes different concepts of affordability and associated ways of measuring the cost burden on a property owner or renter from purchasing flood insurance. Metrics for measuring affordability can be described, but the threshold for defining when an insurance premium creates a cost burden requires making a policy judgment. Given that some affordability criterion is chosen, the chapter presents a decision framework that could be used in the design of targeted assistance programs for flood insurance affordability. This framework presents a list of choices to be made by program designers: who will receive assistance, what type of assistance

¹BW 2012 phased out grandfathered premiums, but HFIAA 2014 reinstated them. For purposes of this chapter and to be consistent with the committee’s task statement, this discussion assumes that all premiums have been raised to NFIP risk-based levels.

will be provided, how assistance will be provided, how much assistance will be provided, who will pay for assistance, and how an assistance program will be administered.

MEASURING THE COST BURDEN OF FLOOD INSURANCE PREMIUMS AND DEFINING AFFORDABILITY

Although a lower insurance premium clearly is more affordable than a higher premium, there is no objective threshold that separates affordable premiums from unaffordable premiums, and thus defines affordability, either for an individual property owner or renter, or for any group of property owners or renters. Instead, there are many subjective concepts of affordability that are influenced by social norms and can be informed by, for example, data on income and expenditure patterns or experience in operating social assistance programs. Those concepts reflect concerns about how premium increases might affect both *willingness* and *ability* to purchase insurance. The concern about the ability to purchase was especially relevant in the BW 2012 and HFIAA 2014 language in light of legal and regulatory provisions that make purchase of insurance mandatory if a property in a Special Flood Hazard Area has a federally backed mortgage.

This section discusses three of the many potential approaches to the concept of affordability: a capped-premiums approach, an income approach, and a housing-cost approach. Those approaches specify different ways of measuring the cost burden on a property owner or renter of having to buy flood insurance. According to each approach and its associated cost burden measure, flood insurance is assumed to become unaffordable when the cost burden becomes excessive. What constitutes “excessive” must be specified by policymakers, who must also choose the affordability concept(s) that will be used for the NFIP. As discussed later, a chosen affordability concept and cost burden measure can be used to establish eligibility criteria for a program that provides financial assistance to make flood insurance more affordable. The cost burden measure also can be used to monitor changes in affordability of flood insurance and differences in affordability of insurance between areas or types of households.²

²Although as discussed in this report, flood insurance is considered to be unaffordable to a household if and only if the household is cost burdened by having to pay for flood insurance, being cost burdened does not necessarily imply that a household would be eligible for financial assistance. Further, a household could be eligible for assistance without being cost burdened, as surely has been the case for some households under NFIP pre-FIRM subsidy and grandfathering provisions.

Capped Premiums Approach

In Section 16 of HFIAA 2014, Congress proposed a capped premiums approach. Under this concept of affordability, a flood insurance premium is defined as not affordable if it is greater than a specified percentage of the coverage of the policy. HFIAA 2014 suggested that this threshold value be 1%. The capped premiums approach does not consider household income, assets, or expenditures on housing, food, medical care or other goods and services in determining whether a flood insurance premium imposes a cost burden.

Income Approach

Many federal and state assistance programs, as well as provisions of the federal income tax code, provide assistance with housing costs and other expenses that is based on household income. For example, eligibility for public housing is limited to low-income and moderate-income households whose incomes do not exceed 80% of the median income in their county or metropolitan area. Housing assistance through rent subsidies (housing vouchers) administered by local housing authorities generally is limited to low-income households (those whose income does not exceed 50% of the median income of the county or metropolitan area in which it is located), and by law, 75% of vouchers must be provided to households whose income does not exceed 30% of the area median income. To be eligible for benefits under the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program), a household—with some important exceptions—is eligible if its monthly gross income is at or below 130% and its monthly net income is at or below 100% of the applicable federal poverty guideline.

On the basis of the concepts underlying the designs of these and other programs, an income approach to affordability assumes that flood insurance imposes a cost burden and is thus unaffordable for any household whose income is below a specified standard. That standard could be based on median income for the area or federal poverty guidelines, for example, and could be set to include not only low-income but also a substantial fraction of moderate-income households among those judged to be cost burdened by the new flood insurance premiums. In any case, the standard chosen would have to be specified by policymakers.³

³Although this discussion refers to a “standard,” the standard could be a set of thresholds that vary by geographic area, household size and composition, and other characteristics.

Housing Cost Approach

This approach considers not only a household's income but also housing costs, and assesses the ratio of housing costs to income when the NFIP premium is added to other housing costs. If the ratio exceeds a specified value, the flood insurance premium is regarded as cost burdensome and deemed unaffordable.

As its name implies, this concept of affordability has been used in research and assistance programs pertaining to housing (Hulchanski, 1995; Tighe and Mueller, 2013). In applying the concept to homeowners, housing costs typically include payments for mortgage principal and interest, property insurance (including flood insurance), property taxes, homeowner association or condominium fees, utilities (fuel for heating and air conditioning, water and sewer, and trash collection), and maintenance. In the case of renters, many of those costs are not paid separately but are combined in landlords' calculations of monthly rent.

To use the housing cost approach for measuring the cost burden of NFIP premiums, policymakers would have to select the threshold—usually expressed as a percentage—at which the ratio of housing costs to income is judged to become burdensome and thus unaffordable. The US Department of Housing and Urban Development (HUD) identifies households that experience housing costs of 30% of income or more as cost burdened and those who pay 50% or more as severely cost burdened.⁴ That affordability standard has been described as follows (Glaeser and Gyourko, 2008):

A consensus seems to have arisen that housing becomes “unaffordable” when costs rise above 30 percent of household income. This is not only the standard used by the Millennial Housing Commission in its recent reports, but also is the basis for a number of U.S. Department of Housing and Urban Development (HUD) policies.

If policymakers were to choose the 30% threshold for the NFIP, for example, a household would be flood insurance cost burdened if its housing costs, including the NFIP premium, exceeded 30% of its income. Under that policy choice and criterion, the size of the burden would be the dollar amount beyond 30% of household income that would be required to pay for housing because of the amount of the flood insurance premium. For a household already housing cost burdened—because its housing costs without flood insurance exceed 30% of its income—the entire NFIP premium would be viewed as a flood insurance cost burden. For a household

⁴According to national Consumer Expenditure Survey data for 2013, the share of income spent on housing is 27.9% for the median homeowner without a mortgage, 34.1% for the median homeowner with a mortgage, and 38.5% for the median renter (<http://bls.gov/cex/2013/combined/tenure.pdf>).

that spends less than 30% of its income on housing, the flood insurance premium would be viewed as affordable as long as overall housing costs remain no higher than 30% of income.

A chosen affordability concept and cost burden measure can be used to monitor changes in the affordability of flood insurance and differences in the affordability of insurance between different areas or types of households. In addition, the concept and measure can be used to establish eligibility criteria for a program that provides financial assistance to make flood insurance more affordable. Choosing an affordability concept and cost burden measure, however, is only one decision that must be made in designing such a program. Additional decisions required of policymakers are discussed next.

A DECISION FRAMEWORK FOR DESIGNING TARGETED ASSISTANCE TO MAKE FLOOD INSURANCE MORE AFFORDABLE

This section discusses decisions that policymakers must make when designing a flood insurance affordability assistance program. These design decisions are as follows:

1. Who will receive assistance?
2. What type of assistance will be provided?
3. How will assistance be provided?
4. How much assistance will be provided?
5. Who will pay for assistance?
6. How will an assistance program be administered? (See Figure 6-1.)

As described below, many of those decisions entail tradeoffs that involve incentives to purchase flood insurance, incentives to undertake mitigation activities, direct costs of assistance to make flood insurance more affordable, and administrative costs of providing such assistance. The present report discusses the nature of these tradeoffs in general terms. Possible analytic methods for assessing the tradeoffs will be described in this committee's second report (which will be issued later in 2015).⁵

⁵Assistance program costs can be paid from general government revenues and can be recovered by charging cross-subsidies as added surcharges on all NFIP policies (such as temporary surcharges put into place by HFIAA 2014) or by raising levels of all premiums as is done to support Community Rating System and grandfathered premiums. There will be limits on general revenues made available, and substantial cross-subsidies that violate actuarial principles may cause concern. For those reasons, the consequences for the size of the required assistance budget will be a constant consideration in how the questions will be answered.

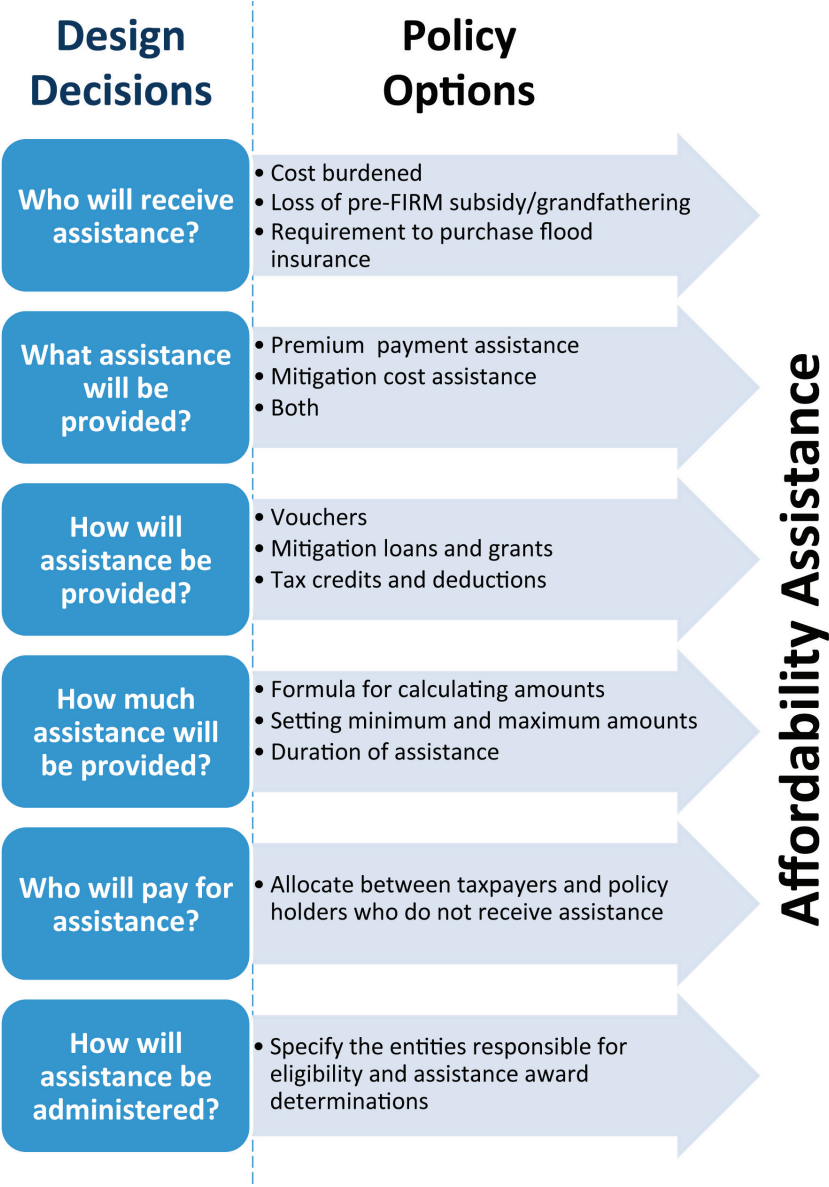


FIGURE 6-1 Considerations and policy options for designing an assistance program for a flood insurance affordability framework.

Decision 1: Who Will Receive Assistance?

In specifying who is eligible to receive assistance, policymakers could initially select an affordability concept and associated measure of cost burden. They could then consider whether to impose additional eligibility criteria. For example, should eligibility be limited to policyholders who previously received assistance through pre-FIRM subsidies or grandfathering? Should assistance be limited to low-income and moderate-income policyholders? Should assistance be considered for households that have experienced dramatic increases in flood insurance policy premiums? Those specific questions and broader issues in the specification of eligibility criteria are discussed next.⁶

Eligibility Based on Being Cost Burdened by Flood Insurance

Three affordability concepts and associated measures of cost burden were discussed in the first section of this chapter. Policymakers could select one of those concepts or measures or some other alternative. Once a concept and a measure have been selected, it will be necessary to define the components of the cost burden measure and specify any applicable thresholds. With the capped premiums approach, the percentage (premium relative to coverage) that identifies burdensome premiums would have to be selected. For the income approach, income has to be defined, and policymakers have to specify the income threshold (or set of thresholds) below which households are considered cost burdened by flood insurance.⁷ The housing cost approach requires a definition of housing costs, a definition of income, and a threshold that identifies the ratio of housing costs to income at which housing costs are considered burdensome.

After a cost burden measure has been selected, its components have been defined, and the applicable thresholds have been specified, whatever data needed to measure a particular household's flood insurance cost burden would have to be obtained and used by the agency that is administering the assistance program to determine whether the household is cost burdened. The housing cost approach could impose substantial reporting burden on households that have to provide data on income and expenses and entail substantial administrative costs to collect, process, and verify the data. That might also be true of the income approach, although it would

⁶This discussion focuses on which households are eligible for assistance, but policymakers also will have to decide which properties are considered when determining a household's eligibility. One option would be to consider only primary residences.

⁷A definition of income specifies the components of income that are counted. Household membership must also be defined. For more information about definitions used to determine SNAP eligibility, for example, see <http://www.fns.usda.gov/snap/eligibility>.

not require data on housing expenses.⁸ In contrast to the income and housing cost approaches, the capped premiums approach requires no additional data beyond what is needed to calculate premiums.⁹ That offers the potential for administrative cost savings. However, unless income is considered as an additional eligibility criterion (as discussed below), the capped premiums approach has no means testing that would target assistance to those who would have the greatest need according to the income and housing cost approaches (the issue of whether assistance should be more specifically means tested and the issue of administrative burden and costs are discussed later in this chapter).

After the selection and full specification of a cost burden measure, several questions remain to be answered by policymakers. Will any households that are not cost burdened be eligible for assistance? If so, how will they be identified? Will all cost-burdened households receive assistance? If not, what additional criteria will be used to target assistance? Additional criteria that could be used to expand or restrict eligibility for assistance are discussed next. As policymakers consider these or other criteria, one issue arises consistently: If funds available for assistance are largely fixed, policymakers who are specifying eligibility criteria face a tradeoff between providing greater assistance on average to a smaller number of eligible households and providing less assistance on average to a larger number of eligible households.¹⁰

Eligibility Based on Loss of Pre-FIRM Subsidized or Grandfathered Premiums

Pre-FIRM subsidies and grandfathering have served as forms of assistance to policyholders, lowering premiums and making flood insurance more affordable. One possible eligibility criterion for a new assistance program would make assistance possible only for those policyholders who previously paid pre-FIRM subsidized or grandfathered premiums (perhaps as of a specified date)—that is, policyholders who previously were receiving assistance. Alternatively, any household that was eligible for a pre-FIRM subsidized or grandfathered premium (as of some date)—regardless of whether it purchased insurance—could be eligible for assistance under a new program. Because pre-FIRM subsidies and grandfathered premiums

⁸The income and housing cost approaches are familiar to housing program administrators and might offer opportunities to link and potentially integrate flood insurance assistance with existing housing assistance programs.

⁹If a household is losing a pre-FIRM subsidy, data on the household's property that had not been previously obtained may be needed to calculate the risk-based flood insurance premium.

¹⁰If funds are not limited, assistance costs may rise as the number of households eligible for assistance grows.

were offered to households without regard to income or housing expenses, limiting eligibility for a new assistance program to households that received or could have received pre-FIRM subsidies or grandfathered premiums would probably prevent some households from receiving assistance even though they would be cost burdened by risk-based premiums according to the income or housing cost approaches.

Although payment of or eligibility for a pre-FIRM subsidized or grandfathered premium might be used as a criterion to reduce the number of flood insurance cost burdened households that are eligible to receive assistance, such a criterion could also be used to expand the number of households that are eligible for assistance. For example, in addition to households that are cost burdened by flood insurance, any households that are not cost burdened but previously paid pre-FIRM subsidized or grandfathered premiums might be made eligible for assistance. A broadening of the eligible pool in this way could be justified by, for example, interpreting a curtailing or elimination of pre-FIRM subsidized or grandfathered premiums as a breach of an implied promise to owners of NFIP-insured properties who had counted on continuation of subsidized or grandfathered premiums (for themselves and for potential buyers of their properties), especially those who were subject to the mandatory purchase of flood insurance.¹¹

Eligibility Based On Requirement To Purchase Flood Insurance

A household that is subject to mandatory purchase of insurance and that pays a pre-FIRM subsidized or grandfathered premium, has three choices when its premium rises to a new risk-based rate: discontinue compliance with the purchase requirement, continue compliance and pay the higher premium, or purchase a different quantity of insurance to the extent a bank authorizes it (higher deductible and lower limit).

To encourage continued compliance, policymakers might choose to target assistance to households that are flood insurance cost burdened and are required to purchase flood insurance. Such targeting of assistance might encourage compliance of some households that were not previously compliant. At the same time, households that purchased flood insurance voluntarily but are not eligible for assistance might drop their coverage if premiums rise.

¹¹Even with this interpretation, policymakers may choose to limit the duration (and amount) of assistance that would be provided to such households. Policymakers may also specify that eligibility for assistance based on previous eligibility for pre-FIRM subsidized or grandfathered premiums would cease when a property is sold. Potential restrictions on eligibility for assistance or limitations on assistance amounts based on the duration of assistance are discussed further under “How much assistance will be provided?” (Decision 4).

Eligibility Based on Housing Tenure

Housing tenure refers to whether a household owns its home or rents. As noted previously, the share of income spent on housing by the median renter is over 38% percent, so increases in rent due to higher flood insurance premiums passed on by landlords (or higher premiums for personal property coverage) might create a substantial need for financial assistance to renters. However, targeting assistance only to homeowners has advantages. First, in addition to the immediate costs of higher premiums if pre-FIRM subsidies and grandfathering are eliminated—costs that are borne by homeowners and potentially renters—homeowners are affected when costs of increased premiums are capitalized into property values and lower resale prices.¹² Second, limiting eligibility to homeowners may ease the administration of an assistance program that uses the housing cost approach to measuring the cost burden of flood insurance. It is relatively straightforward conceptually (even though burdensome to policyholders and administratively expensive) to identify flood insurance cost burdens for homeowners.

The targeting of assistance for renters would require developing estimates of the percentage of rent attributable to the cost of flood insurance passed forward to tenants.¹³ It will be especially challenging when renters are residents of multi-family buildings and a single premium is paid for the entire building. There are over 233,000 such buildings across the nation (about 25% of all pre-FIRM policies; see Chapter 5), and there are areas, especially urban locations, where there are likely to be concentrations of such buildings. Although the most straightforward approach would be to base assistance on total rental housing costs, such an approach would probably provide assistance for housing costs that have nothing to do with flood insurance premiums. Some states that have property tax circuit breaker programs¹⁴ provide property tax assistance to renters on the basis of the

¹²Resale prices may reflect the market's assumptions regarding future premium levels. Eliminating a premium subsidy reduces resale value by the increment of value that reflects the subsidy. However, the economic impact on the seller is essentially the same as the impact of the future higher insurance premiums if the property had not been sold. The former is merely the capitalized value of the latter. In short, the so-called asset value shock is not different from the shock of higher premiums extending into the future. In contrast, in the absence of a sale, reduced property value.

¹³Renters can pay directly for flood insurance covering their personal possessions and already pay NFIP risk-based rates for contents coverage. However, they still would be affected by elimination of pre-FIRM subsidized rates and grandfathering provisions if increased premiums on structures were passed along as rent increases.

¹⁴Programs in which state governments provide property tax refunds to those whose property taxes are deemed too high. For more information see <http://www.cbpp.org/cms/?fa=view&cid=51>.

assumption that a portion of their rent (typically 15-35%) is attributable to property taxes paid by landlords (Anderson, 2012). Similar reasoning could be used in providing assistance to ease flood insurance cost burdens borne by renters, but it would still require much analysis to determine the percentage of the rent that is attributable to flood insurance costs.

Eligibility Based on Household Income

As in some of the housing assistance programs described earlier, policymakers designing a flood insurance assistance program might seek to provide greater assistance to households of low or low-to-moderate income. Although policymakers can use the income approach to measuring cost burden to target assistance to any particular income class (such as households whose income is below 50% of the area median), they can do that with the other two cost burden approaches only by making income a separate eligibility criterion or by basing assistance amounts on income (see Decision 4 below: How Much Assistance Will Be Provided?). As noted previously, the capped premiums approach takes no account of household income, whereas the housing cost approach identifies as cost burdened households whose housing costs, including flood insurance, exceed a specified percentage of their income. With both approaches, eligibility for assistance among cost-burdened households could be further restricted to households that, for example, have low-to-moderate incomes.¹⁵

Eligibility Based on Mitigation

FEMA-approved methods of mitigation of flood risks to insured properties could be used to reduce insurance premiums (discussed in greater detail in Chapter 7). To reduce any disincentive to mitigate and, more generally, encourage mitigation, the performance of specified mitigation activities could be a requirement for eligibility to receive flood insurance assistance.¹⁶ As will be discussed in Chapter 7, the reduction in risk attributable to mitigation could be reflected in reduced premiums.

¹⁵If such a provision were adopted, administrative burden and costs could be reduced for some households through the use of adjunctive eligibility, that is, automatic eligibility for flood insurance assistance based on participation in another means tested assistance program, such as SNAP.

¹⁶Assistance for undertaking mitigation activities is discussed under Decision 2: What Assistance Will Be Provided? and in Chapter 7.

Eligibility Based on Community Characteristics

All the eligibility criteria discussed so far pertain to characteristics of individual households—whether the household is cost burdened, whether it has paid a pre-FIRM subsidized or grandfathered premium, and so forth. However, community characteristics also can be considered as eligibility criteria for individual households, restricting or expanding the eligible pool.¹⁷

One criterion that would reflect a concern for the effects of increased premiums on neighborhood vitality would be the prevalence of households whose premiums become cost burdensome when pre-FIRM subsidies and grandfathering are eliminated. Households that benefitted from such subsidies and grandfathering might be especially prevalent in some communities whose vitality could be threatened by the elimination of pre-FIRM subsidies or grandfathering. Policymakers could make all households in a community eligible for assistance if a specified (or higher) percentage of them would likely be eligible on the basis of their individual circumstances. In addition to protecting the vitality of a community, this eligibility criterion could reduce administrative burden and costs by removing the need to establish eligibility of every household, as discussed further under Decision 6: *How Will an Assistance Program Be Administered?*¹⁸

Another potential eligibility criterion could be the engagement of state and local governments in certain mitigation activities. Activities that have been or could be undertaken are discussed in detail in Chapter 7. This criterion could provide an incentive to undertake mitigation and promote cost sharing of efforts to reduce premiums and enhance the affordability of flood insurance (an issue discussed under Decision 5: *Who Will Pay for Assistance?*).

As suggested by this discussion, household and community characteristics can be used jointly to determine eligibility. For example, assistance could be provided to cost-burdened households only if they are in communities where the prevalence of cost-burdened households is high, concentrating assistance where it is judged to be most needed.

¹⁷Availability of NFIP flood insurance to property owners in a community is already conditioned on the community's willingness to adopt and enforce various regulations to reduce vulnerability to flooding (for example, requirements to elevate new construction to the elevation of the 100-year flood).

¹⁸National school meals programs have special provisions that allow districts to serve free meals to all students in schools in low-income areas without certifying the eligibility of individual students for free meals.

Decision 2: What Type of Assistance Will Be Provided?

In addition to specifying criteria for determining whether a property owner or renter is eligible for assistance, policymakers must identify the form(s) in which assistance will be provided. Two broad types of assistance that might be made available to individual property owners or renters are

- *Premium assistance* that directly reduces the amount that a property owner or renter pays for flood insurance,
- *Mitigation assistance* that indirectly reduces the amount that is paid by helping a property owner to finance mitigation activities that reduce risk in ways that will be reflected in a lower insurance premium.

Decision 3: How Will Assistance Be Provided?

Premium or mitigation assistance can be delivered in many ways. Discussion of a variety of options is presented in Chapter 7; the focus here is on application burden and administrative costs of an assistance program. Providing premium assistance at the time of purchase, for example, might ease the application burden on the property owner relative to some other modes of delivering assistance. However, with any mode of delivering assistance, administering premium assistance to a specific group of property owners might entail substantial costs if extensive efforts are required to verify eligibility. That might suggest providing assistance through an existing administrative process. For example, providing premium or mitigation assistance through an income tax credit could rely on existing tax compliance activities but would require changes in the tax code, tax forms, and return processing procedures. It also would impose a burden on property owners who are eligible for assistance but are not otherwise required to file tax returns.

Decision 4: How Much Assistance Will Be Provided?

In addition to determining who is eligible for assistance, policymakers must specify a formula or algorithm for calculating the amount of assistance for which an eligible property owner (or renter) qualifies. Different formulas or algorithms might be specified for premium and mitigation assistance. The methods selected to calculate assistance will reflect normative standards regarding the expected contribution of the property owner toward purchasing flood insurance or paying for mitigation and how the property owner's personal circumstances (such as household income and

housing expenses) affect the amount of assistance provided. Choices also will reflect the consideration of tradeoffs. For example, providing more generous assistance will make flood insurance more affordable and potentially increase takeup rates (see Chapter 4 for further discussion). However, it will also increase the total budget for the assistance program (for a given number of property owners receiving assistance).

The central input into a formula for calculating, for example, the amount of premium assistance might be the same measure of cost burden that is used to determine eligibility for assistance. If so, the amount of assistance could equal the entire cost burden or some proportion of it, where the proportion might vary with the property owner's household income or according to whether the property owner is required to purchase insurance, has undertaken mitigation activities, or is elderly or disabled. Concerns about burden or the administrative costs of providing assistance might lead to the specification of a guaranteed minimum amount of assistance provided to an eligible property owner. The minimum could be a fixed dollar amount, or a percentage of the NFIP risk-based premium. The amount of assistance might also be capped, for example, at a fixed dollar value, a percentage of the NFIP risk-based premium, or the difference between the NFIP risk-based premium and the premium previously paid under pre-FIRM subsidy or grandfathering provisions.

A related design question is the amount of assistance to provide if housing costs excluding flood insurance exceed whatever affordability standard has been adopted (for example, a household is cost burdened if housing costs are greater than 30% of income). In that case, the following questions must be addressed: Will the flood insurance assistance program be responsible for eliminating any of the cost burden that is not due to flood insurance? If a household is cost burdened in the absence of insurance, will the amount of assistance equal the entire NFIP risk-based premium? Or will the amount of assistance be capped if it is determined that the household could afford more expensive housing than the standard? If many households are in this situation, the eligibility criteria and assistance formula could be reviewed to assess, for example, whether the standard is too generous or does not appropriately reflect geographic differences in expenses or whether the measure of income used understates available resources.

In determining the amounts of assistance that will be provided, additional questions that arise pertain to the duration of assistance. Will assistance be provided indefinitely to a property owner who remains eligible under whatever criteria have been specified? Or will assistance be time limited? Will the formula or algorithm for calculating assistance amounts

reflect the number of years for which assistance has been provided to a property owner, potentially reducing the amount of assistance over time?¹⁹

In addition to considering whether to limit eligibility or assistance amounts on the basis of the duration of assistance, policymakers will need to consider how year-to-year variation in the amount of assistance might affect a property owner's decisions to purchase flood insurance and maintain coverage. For example, should the eligibility criteria and formula or algorithm for determining assistance amounts be specified so that the amount of assistance provided to a property owner is relatively stable or, changes in a highly predictable way? In addition, how can such stability or predictability be obtained while maintaining a high degree of accuracy in targeting assistance to those most cost burdened by flood insurance premiums?

In deciding how much assistance will be provided to eligible property owners, an important question is whether premium or mitigation assistance will be an entitlement or will be limited by the amount appropriated by Congress. If assistance is considered to be an entitlement, anyone eligible will receive the full amount of assistance for which they qualify. If assistance is not an entitlement, it may be necessary to limit the amount of assistance provided so that the total for all recipients does not exceed what is available. One possible approach in such a case is a priority system that provides assistance to property owners on the basis of severity of the cost burden, income, whether the purchase of insurance is mandatory, elderly or disabled status, or other household or community characteristics; property owners at higher priority would receive assistance before property owners at lower priority. An alternative would be a pro rata reduction in all assistance awards that is based on the expected shortfall in available funds.

Making decisions about each of those matters may require development of formulas and algorithms that balance the different considerations in offering aid. With such complexity, it can be important to maintain as much "smoothness" as possible in the formula or algorithm (Zaslavsky and Schirm, 2002). Ideally, property owners facing similar circumstances receive similar amounts of assistance, and situations in which one property owner receives substantially less assistance than a property owner who has only slightly less income or slightly higher housing expenses and roughly the same flood insurance premium are avoided.

¹⁹Limitations on the duration of assistance could also be specified through eligibility criteria. For example, a property owner could become ineligible for assistance after a specified number of years or after receiving a specified total amount of assistance.

Decision 5: Who Will Pay for Assistance?

The decision about who pays for assistance entails two main choices. The first is the degree to which costs are borne by federal taxpayers versus NFIP policyholders who do not receive assistance but pay for assistance to others through a cross-subsidy (see Chapter 3). The second is the degree to which aid program costs are borne broadly (for example, nationally) versus more locally (by states, tribal nations, or communities) or are shared by federal and local governments.

One consideration in making the first choice is the capacity of policy holders who do not receive assistance to pay for assistance to other policyholders through premium surcharges or implicit loadings. That capacity will fall as the fraction receiving assistance or the average amount of assistance rises. A consideration is whether some who do not receive assistance might drop coverage if their premiums increase substantially to pay for this assistance. If the federal taxpayer is going to be paying for assistance, such payment will require congressional authorization and appropriation(s).

In determining how much of assistance costs to allocate nationally, versus locally, a relevant consideration is the incentive for local authorities to undertake mitigation efforts that broadly benefit residents in the community. There is a greater incentive to undertake such efforts if a greater share of the assistance costs is to be borne locally, in which case a local government can reduce its costs for assistance by undertaking mitigation activities that reduce premiums and the need for assistance.

Decision 6: How Will an Assistance Program Be Administered?

In administering a program of targeted assistance, policymakers must identify which entities are responsible for determining whether a property owner is eligible and how much assistance that property owner will receive under the established eligibility criteria and assistance formula or algorithm. In addition to the broad decisions that must be made about how to determine, for example, eligibility for assistance, many more detailed decisions will need to be made, including how to define a household, how to define income, how to treat a household's assets in determining its need for assistance, and whether to take into account the effects on unusually high nonhousing expenses (such as medical expenses) on household resources. Policymakers also will have to determine how the necessary data will be obtained from households (for example, through an application for assistance).

To enhance program integrity, policymakers may also specify procedures for monitoring the accuracy of eligibility and assistance award determinations, and designate an entity that will perform such functions.

Candidates for those various administrative activities include FEMA; HUD; state, local, and tribal government organizations; and private insurers that administer the write your own (WYO) flood insurance policy program (see List of Terms).

Another important consideration in determining how to administer one or more assistance programs is the balance between maximizing access among those who are eligible and minimizing administrative costs. Striking such a balance requires the tradeoff between the accuracy of targeting assistance and the cost of administration. Generally, to target means tested assistance, detailed data are needed on income, expenses, and other characteristics of individual households. Obtaining and processing such data are burdensome and costly. These activities can be prone to error, and it might be prudent to verify the accuracy of the data (on at least a sample basis), which entails another administrative cost.²⁰ Strategies that seek to minimize data needs include community eligibility options and homeowner eligibility based on extant public data.

One community eligibility option would be to make all homeowners in a community eligible for assistance if, for example, the community's poverty rate is sufficiently high, the median income is sufficiently low, or many homeowners that previously paid pre-FIRM subsidized or grandfathered premiums.²¹ This approach will sacrifice some accuracy in targeting, providing assistance to homeowners who are not flood insurance cost burdened based on the basis of their individual circumstances and failing to provide assistance to cost-burdened homeowners in communities that are not eligible for assistance.²² In addition, even if a community eligibility approach identifies exactly the homeowners to whom policymakers wish to provide assistance, a remaining challenge is to determine the amount of assistance that will be provided to each individual homeowner without data specific to each homeowner. Community eligibility also raises the issue of whether to define a community on the basis of census geography (described in Chapter 5) or jurisdictional boundaries. If, instead, eligibility were based on publicly available data on characteristics specific to individual homeowners, such

²⁰For SNAP, a quality control system has been developed to monitor the accuracy of eligibility and benefit determinations. See <http://www.fns.usda.gov/snap/quality-control>.

²¹For such a community, it is assumed that the eligibility rate of individual homeowners would be sufficiently high to make it cost-effective to dispense with individual eligibility determinations; that is, the administrative cost savings would exceed the costs of providing assistance to the relatively few homeowners who would not be eligible on the basis of their own circumstances. As noted previously, national school meals programs have special provisions that allow districts to serve all students in schools in low-income areas without certifying student eligibility. This practice allows the districts to process fewer applications and thereby reduces administrative costs.

²²If an entire community is ineligible for assistance, eligibility could be determined household by household, which would incur higher administrative costs.

as assessed property values, a homeowner could be eligible for assistance if their property values were less than a specific dollar amount or below a particular percentile for the community. Of course, if that criterion does not reflect a given homeowner's flood insurance cost burden and thus the need for financial help, assistance will not be accurately targeted.

Clearly, strategies that seek to minimize data needs have limitations. Nonetheless, some consideration of those approaches is warranted if for no other reason than to provide context for considering limitations of and justification for using more complex and costly approaches. In addition, it might be possible to use streamlined eligibility procedures in some areas, and more complex procedures elsewhere to strike a balance between the objectives of targeting and the goal of minimizing administrative costs.

SUMMARY

This chapter discussed concepts of affordability and presented a decision framework for designing assistance programs to make flood insurance more affordable—the affordability framework called for by recent legislation. The discussion of affordability describes three potential measures of the cost burdens imposed on households by NFIP premiums. In HFIAA 2014, Congress proffered a capped premiums measure, and suggested that a premium exceeding 1% of the insurance coverage is burdensome and thus unaffordable. A second measure of cost burden uses an income test, and identifies a flood insurance premium as unaffordable for any household whose income is below a specified threshold. A third measure considers not only a household's income but also its housing costs, and assesses the ratio of housing costs to income when the NFIP premium is added to other housing costs. If the ratio exceeds a specified value, the flood insurance premium is regarded as cost burdensome and therefore unaffordable. Those three measures reflect different subjective judgments about the cost burden of flood insurance premiums and about whether such premiums are affordable. More generally:

- There are no objective definitions of affordability. Although the concept is substantially subjective, the choice of a definition can be informed by research evidence and experience in administering means-tested programs that, for example, provide housing and other assistance.
- There are many ways to measure the cost burden of flood insurance on property owners and renters. Policymakers have to select which measure(s) will be used in the NFIP for targeting assistance to enhance flood insurance affordability. This decision is not amenable solely to technical analysis.

Choosing a cost burden measure, however, is not the only policy choice in designing a financial assistance program. The many considerations, and some policy options, in designing a means tested assistance program for an affordability framework are summarized in Figure 6.1.

- To design a program that provides assistance in making flood insurance more affordable to NFIP policyholders, policymakers face several choices, including who will receive assistance, what type of assistance will be provided, how assistance will be provided, how much assistance will be provided, who will pay for assistance and how an assistance program will be administered.

Not surprisingly, tradeoffs arise in making policy choices. For example, providing assistance to more policyholders will require cutting the average amount of assistance provided if the total cost of the assistance program is to be held steady. If instead, more generous assistance is provided, insurance takeup rates might increase, but the total cost of the assistance program might also increase and incentives to mitigate might decrease. As another example, in specifying eligibility criteria for assistance, more specific and accurate targeting of assistance based on policyholders' characteristics will require policyholders to provide more personal data, and this will increase the burden on policyholders and raise administrative costs of processing and verifying data provided.

- The decisions that must be made in designing an affordability assistance program entail tradeoffs that will have to be resolved by policymakers.

Policy Alternatives for an Affordability Strategy

This chapter begins with the premise that some households will face National Flood Insurance Program premiums that would be unaffordable if they had to pay NFIP risk-based premiums. As a result, some or all of those households might receive financial assistance. Whereas Chapter 6 discussed the full range of decisions that must be made by policymakers in designing assistance programs, this chapter focuses mainly on how assistance will be provided. It reviews three broad policy options for providing assistance:

- Direct financial assistance to policyholders. This could be for mitigation actions that reduce the cost of flood insurance or for the cost of premiums directly. The households would need to meet predefined eligibility and assistance criteria (as discussed in Chapter 6) before assistance is offered.
- Additional NFIP reforms, which could reduce the cost of flood insurance for all policyholders through changes to NFIP structure and requirements.
- Community-based programs.

DIRECT FINANCIAL ASSISTANCE TO POLICYHOLDERS

Assistance policies for individual policyholders can be related to implementing mitigation measures that lower premiums, directly subsidizing the annual cost of flood insurance premiums, or a combination of the two. The specific property owners receiving assistance would be determined by the

defined eligibility criteria and the amount of assistance received may vary among those eligible (see Chapter 6). The direct assistance options are discussed below, recognizing that an affordability program may include several of them simultaneously.

Targeted Mitigation Grants

Even if mitigation could be implemented by policyholders to reduce premiums, the cost of such actions may be a barrier to their adoption. Existing mitigation grant programs, paid for from general federal revenues, might be modified to overcome that barrier. Federal grant programs currently support mitigation (see Box 7-1). Two of them provide funding for

BOX 7-1 **Programs for Mitigating Flood Damages**

Two grant programs fund mitigation before a flood: the Pre-Disaster Mitigation (PDM) program and the Flood Mitigation Assistance (FMA) program. Annual funding for the PDM program since 2002 has ranged from \$25 million (in 2002 and 2013) to \$150 million (in 2003 and 2004). In FY 2014, \$63 million was available for the program. The FMA program supports elevation, relocation, floodproofing (only for commercial structures), as well as demolition and rebuilding of property that received significant damage from a severe flood.

The FMA was created in 1994 to reduce insurance claims under the NFIP and is funded by the National Flood Insurance Fund.¹ In 2006 and 2007, FEMA received funding requests for the PDM that were 3 three times greater than funds available (McCarthy and Keegan, 2009). In 2013, FEMA received applications for more than twice the appropriations received for the FMA program (Garcia-Diaz, 2014).

There are two primary post-flood disaster programs: the Hazard Mitigation Grant Program (HMGP) administered by FEMA and the Community Development Block Grant Disaster Recovery (CDBG-DR) administered by HUD. Both programs require a presidential disaster declaration, and the CDBG-DR program requires a supplemental appropriations bill. For large disasters or multiple events in a single year, the HMGP usually receives supplemental funds to augment annual appropriations.

Following a disaster declaration, states and local governments can receive a portion of the total FEMA aid through the HMGP to fund long-term mitigation measures. If states have adopted a FEMA-approved Enhanced Mitigation Plan, they can receive a larger share of funds. The HMGP requires a 25% state match (CDBG dollars can be used for this purpose).

¹See <http://www.law.cornell.edu/uscode/text/42/4017> for details on the purposes and operation of the National Flood Insurance Fund.

mitigation before a disaster event occurs and two are targeted at areas that have experienced disasters by incorporating mitigation in the post flood rebuilding process. In all programs, states, tribes, or territories apply for the funding and if approved, funds are disbursed to local government or agency sub-applicants for use at individual properties. Reforms to target funds toward securing NFIP premium affordability for cost burdened households may be necessary.

Three ways of reforming mitigation grant programs to address affordability can be identified. First, mitigation projects must pass an engineering feasibility test and show that the benefits in the form of reduced future claims, net of premiums paid, exceed the costs of the mitigation. In 2013, FEMA issued a memorandum, which was based on review of 11,000 previous mitigation investments, that said that elevation or acquisition of structures (buyouts) in a Special Flood Hazard Area that cost less than \$175,000 or \$276,000, respectively, can be automatically considered to pass the benefit–cost test (memorandum from David Miller, FEMA Associate Administrator, Federal Insurance and Mitigation Directorate, to Regional Mitigation Division Directors and Hazard Mitigation Assistance Branch Chiefs, 2013¹).

With that benefit–cost decision rule, a property owner who is paying pre-FIRM subsidized premiums and making large and frequent claims can receive mitigation assistance without regard to their ability to pay for his or her own mitigation. Once the provisions of BW 2012 and HFIAA 2014 have been fully implemented (the premise of this discussion), premiums will be NFIP risk-based. As a result, the difference between future claims and premium revenues (the benefit) would shrink for all properties. As the benefits of mitigation as currently calculated approach zero, the benefit–cost test would no longer be useful for establishing mitigation funding priorities. The benefit–cost criterion might be replaced with a means tested basis for prioritizing mitigation grant spending.

Second, an administratively simple assistance program would begin with eligibility criteria chosen by FEMA and Congress that can be used to identify a group of households that have pre-FIRM subsidized premiums and would be allowed to retain those premiums (or have premiums frozen at a level consistent with the household's ability to pay).² These same households then would be given priority for receiving mitigation grant funding as such funding becomes available. In this way, mitigation funds

¹http://www.fema.gov/media-library-data/1382557637411-c1e5842153d2c957aabc0a09f008564c/PrecalcBenClarific_memo_508withsig.pdf.

²As long as this group of households pays less than NFIP risk-based rates, NFIP revenues for the group could fall below expected claims. Congress could consider continuing the HFIAA 2014 surcharge on all policies to cover this revenue shortfall, or could agree to pay claims made by households in this group from general revenues.

are targeted to those for whom the NFIP risk-based premium creates an affordability challenge. Once mitigation funding is received, a property owner would, consistent with BW 2012, pay NFIP risk-based premiums thereafter, although the owner may still qualify for premium assistance (see discussion of vouchers).

Third, the post flood Hazard Mitigation Grant Program (HMGP) and the Community Development Block Grant Disaster Recovery (CDBG-DR program; see Box 7-1) could be used for elevating homes or instituting community measures that may alter the FIRM or increase standing in the Community Rating System (CRS; see Chapter 3 and discussion below). Because use of funds for those types of projects is at state and local government applicants' discretion, these applicants could design programs to direct mitigation assistance to low-income households that face the prospect of paying NFIP risk-based insurance premiums. In fact, a portion of the CDBG funds is directed to benefit primarily low-income or moderate-income households.³ One challenge posed by relying on post flood mitigation grant programs is the delays experienced by state and community officials, as well as households, between submission of a grant application and the awarding of funds. That time delay can be substantial (for example, 18 months or longer), and additional time then is required for state and local government to provide funds to approved homeowners. If homeowners are trying to use funding for a mitigation action that will lower their insurance burden, the NFIP could offer the lower premium as soon as the mitigation project is approved for funding (even if the mitigation has not been implemented).

Mitigation Loans

Mitigation measures can have significant initial costs, but any reductions in annual NFIP premiums will occur later. Ideally, a household may consider a mitigation measure to be cost-effective if the reduction in annual premiums exceeds the initial cost of the mitigation measure. Even if the mitigation is deemed cost effective, mitigation grant funds may not be available and the household may have little access to funds for making the investment. For example,⁴ suppose that a household faces a \$4,000 NFIP

³The Department of Housing and Urban Development notes that this requirement can be met through uses of the funds in which the majority of beneficiaries have low or moderate income or through activities that benefit an area in which over half of the population is of low or moderate income. See <https://www.hudexchange.info/cdbg-dr/cdbg-dr-eligibility-requirements>.

⁴These suggested calculations suggest deliberative thinking on the part of the household, but (and as pointed out in Chapter 4) homeowners may focus primarily on benefits from investments in the short term, and thus place lower priority on future returns from their mitigation investment.

risk-based premium and could implement low-cost mitigation at a cost of \$25,000 and that as a result the annual premium falls from \$4,000 to \$500 (an annual saving of \$3,500). The \$25,000 initial cost of mitigation, however, may be prohibitively expensive. Indeed, low-income households are unlikely to have the cash needed to make the investment and may not have access to a mitigation grant. If the household received a 20-year \$20,000 loan at an annual interest rate of 3%, the annual loan payments would be \$1,680. The NFIP premium would fall to \$500 and the total annual cost for managing the household's flood risk would fall from \$4,000 for the NFIP premium to \$2,180—\$500 for the NFIP premium plus \$1,680 for the mitigation loan.⁵ The household may be able to afford the \$2,180 annual payment but not the \$4,000 annual premium.⁶

Although a loan might appear to make financial sense, a low-income household may not have access to a private commercial loan. Funds might therefore be allocated to a federally backed loan program that is targeted to households that have little access to commercial credit. Also, the attractiveness of a loan depends on the interest rate. Interest rates currently are low and a loan program could offer low rates. If interest rates increase, the program might offer a below-market rate. Interest rate discounts and the need for federal loan guarantees given the possibility of high default rates make this a subsidy program that might be available only to homeowners who meet eligibility and assistance criteria on the basis of the considerations discussed in Chapter 6.⁷

Vouchers

This committee's task statement, as derived from BW 2012, identifies "means tested vouchers" for the NFIP as a specific means for providing assistance when NFIP risk-based premiums create a household affordability problem. Generally, a voucher is a certificate issued to an individual to

⁵The results shown in this illustrative example are specific to the estimates of dollar costs used for making this calculation. Therefore, no general conclusions about the benefits of a loan should be based on this single illustration.

⁶The loan can make the household financially better off each year that it resides in their home. However, the household may not intend to live in the home for the 20 years assumed in the example above. The loan, however, would be a lien on the property and the mitigation would be expected to increase the home's market value. If the property were sold, the outstanding balance of the loan would be paid off at closing.

⁷For example, the Small Business Administration has a low-interest disaster loan program for households that need funds to repair and rebuild, and it might be authorized to issue such loans. If any new federally backed loan program is to be implemented, it may need to be authorized by Congress and be designed according to tightly specified rules. Guidelines for setting up federally backed loan programs can be found at http://www.whitehouse.gov/sites/default/files/omb/assets/a129/rev_2013/pdf/a-129.pdf.

pay for all or part of a specific good or service. The funds to support a voucher program may come from general revenues. As an alternative, the NFIP may be permitted to impose a surcharge on all policies and use the revenues to provide vouchers to those eligible. Such a surcharge would need to be evaluated against the actuarial principle of minimizing cross subsidies (Chapter 3). In this application, the voucher would be provided to qualifying persons each year when the NFIP premium is due so that the allocated funds could be used to pay a portion of the cost of the premium. Each year, the household would be informed of the cost of the insurance and would apply for a voucher. Funds for offering the voucher would be made available on an annual basis with the amount based on the criteria discussed in Chapter 6.⁸

Ease of administration suggests offering the voucher through existing programs. One approach would allocate funds for the voucher to the Department of Housing and Urban Development through its existing means-tested housing assistance programs. Another possibility is that the NFIP might administer the program by offering a premium discount to those eligible and then transferring an amount equal to the difference between the NFIP risk-based premium and the discount to the NFIP reserve.

Annually issued vouchers could also be used to offset payments for mitigation loans. More specifically, if the property owner were offered a multi-year loan to invest in mitigation, the voucher could cover not only a portion of the resulting risk-based insurance premium, but the loan cost to make the package affordable. A 2014 study proposed using vouchers to cover both mitigation and insurance costs. It was concluded that such a program would probably be financially more attractive to both the property owner and the federal government than a voucher program that covered only the insurance cost, because the mitigation measures would lead to permanent reductions in expected NFIP payouts and hence lower insurance premiums (Kousky and Kunreuther, 2014).

Federal Tax Deductions and Credits

Other ways to lower household costs of flood insurance premiums or mitigation investments that lowers premiums are through tax deductions and tax credits. A tax deduction reduces how much taxable income an individual must claim on his or her return. An example is the mortgage interest deduction, which allows property owners to deduct annual interest on their home loans from their income. In fact, tax deductions are used to help disaster victims. For example, for presidentially declared disasters, filers can

⁸Vouchers also could be extended at the discretion of Congress to those who voluntarily buy a policy and the costs borne by the federal government.

deduct some losses not covered by insurance or disaster aid. Eligibility for the deduction is means tested: filers must first subtract \$100 and then 10% of their adjusted gross income from their losses (IRS, 2014a).

A tax credit, in contrast, directly reduces the amount of taxes owed. The benefit of a deduction is determined by the filer’s marginal tax rate and by any constraints on the amount that is allowed to be deducted. The reduction in taxable income is also limited to taxpayers who itemize their deductions rather than taking the standard deduction. In 2011, just under 32% of taxpayers itemized their deductions (IRS, 2014b). A credit is independent of the tax bracket but benefits only those who owe taxes unless it is in the form of refundable tax credits, whereby a refund is given if the filer owes less tax than the credit. Two examples are the Earned Income Tax Credit and the First Time Homebuyer Credit. Credits generally provide greater financial assistance in that they lower the actual amount of taxes paid.

Table 7-1 shows deductions or credits that could be given to policyholders on the basis of the amount of premium paid and any other eligibility criteria for determining assistance to address affordability (discussed in Chapter 6).

Some arguments have been raised in favor of and against using the tax code for social policy. On the one hand, the tax code has been criticized for not being transparent, having uncertain effects on behavior, introducing economic distortions, and not appropriately targeting those in need of tax

TABLE 7-1 Effects of Tax Deductions and Credits on Affordability

	Premium	Mitigation
Credit	<ul style="list-style-type: none">* Reduces taxes owed by premium paid (or portion thereof)* Would benefit only those owing tax, unless it is a refundable credit	<ul style="list-style-type: none">* Reduces taxes owed by amount spent on qualifying mitigation activities (to address affordability would need to be activities that reduced premiums)* Would benefit only those owing tax unless it is a refundable credit
Deduction	<ul style="list-style-type: none">* Reduces taxable income by premium paid (or portion thereof)* Would benefit only those paying income tax* Constitutes a higher benefit to persons having higher income	<ul style="list-style-type: none">* Reduces taxable income by amount spent on qualifying mitigation activities* Would benefit only those paying income tax* Constitutes a higher benefit to persons having higher income

relief. Some also have contended that it is inappropriate to use the federal tax code to guide social policy. Those favoring use of the tax code maintain the IRS is in a good position to administer income-based policies and that some tax incentives produce better results and are more permanent than outlays (Stead, 2006).

In 2013, a bill entitled the Flood Mitigation Expense Relief Act was introduced. It offered a \$5,000 tax credit to taxpayers (individuals or small businesses that had 50 or fewer employees) that undertook qualifying flood mitigation expenses, held an NFIP policy, owned property that faced premium increases, and had an elevation lower than base flood elevation (BFE), or was in a newly mapped high-risk area. Prior to passage of HFIAA 2014, the Flood Mitigation Expense Relief Act of 2013 was introduced. It included a tax credit of up to \$7,500 for qualifying flood mitigation expenses for individuals or small businesses that held an NFIP policy (the credit would terminate in 2022). This bill delegated to FEMA the task of defining what flood mitigation expenses would qualify for the credit. To date, neither of these bills has been passed.⁹

Disaster Savings Accounts

Another disaster assistance option is a tax deductible disaster savings account. Pre-tax funds placed in such an account could be used to cover disaster damages, hazard mitigation investments and/or flood insurance premiums. In fact, the Disaster Savings Accounts (DSA) Act of 2014 would allow homeowners to contribute up to \$5,000 annually to cover uninsured disaster damages that exceeded \$3,000 for a state or federally declared disaster. Funds could also be used to cover investment in a list of mitigation measures specified in their bill. Funds could be contributed pre-tax, and amounts withdrawn for the designated uses would not be taxed.

The manner in which such accounts are most likely to contribute to NFIP affordability, however, may be to use them for covering homeowner expenses below the insurance policy deductible (Lehrer, 2007); this would encourage homeowners to purchase much less expensive coverage with higher deductibles. If a household could save \$5,000 or \$10,000 over time, it could purchase an NFIP policy that covers only damage above that threshold. As discussed in the section on higher deductibles (below), this would lower the cost of the NFIP premium.

⁹At the state level, South Carolina adopted a law in 2007 that provided an annual tax credit of up to \$1,250 for property owners that pay more than 5% of their income toward flood insurance on the filers' legal residences. It is not refundable, so it benefits only those that owe taxes. A similar design could be used for a federal program of providing assistance through the tax code for those who are cost burdened by premium payments.

The financial benefit to a household would depend on its marginal tax rate: higher income households would obtain a larger absolute benefit than lower income ones. It also would not help those whose disposable income is insufficient to place funds into such an account. The costs to the federal government would be the foregone tax revenue; these costs could be calculated in a manner similar to that of other tax-preferred accounts, such as those for health care or retirement.

ADDITIONAL NFIP REFORMS

This section discusses actions that have been suggested in legislation or by stakeholders as a means of lowering premiums for all policyholders.¹⁰ They include expanding the variety of mitigation measures, higher deductibles, designating the US Treasury as a reinsurer during catastrophic-loss years, enhancing the write your own (WYO) agent advisory role, reducing loadings for administrative costs, and eliminating mandatory purchase.

Expanding the Variety of Individual Mitigation Measures That Reduce Premiums

If mitigation actions¹¹ lead to lower damages and lower expected claims, they could make NFIP policies less expensive for households that implement them.¹² However, at the household level, there are only a few mitigation actions that might result in lower NFIP premiums. They include elevating a building above BFE, building a replacement structure above BFE on the same footprint, modifying the ground floor with wet floodproofing measures and moving all improvements and habitable areas up to the second floor, and, for nonresidential structures, dry floodproofing.¹³

As discussed in Chapter 3, NFIP premiums are based on the relation of

¹⁰BW 2012 Section 100232 asks FEMA to report on opportunities for private insurers to participate in the provision of flood insurance, either as primary insurers or as reinsurers. FEMA may include assessments of whether privatization might result in lower rates and premiums.

¹¹The focus in this section is on ways to implement mitigation measures in single-family homes. Implementing these measures for multi-family units may be expensive and so may require community-wide action.

¹²Mitigation also may help reduce future uncompensated flood damages, and increase resilience of both the household and the community.

¹³Dry floodproofing—prohibiting water from entering a structure—below BFE is not allowed for residential buildings, except in communities that have been given an exception from FEMA for basements. It is not allowed in V zones. Wet floodproofing—using water resistant materials—may be allowed for small enclosed areas or if specified requirements are met and a variance is issued. For more details on floodproofing and the requirements under the NFIP, see <https://www.fema.gov/national-flood-insurance-program-2/floodproofing>.

the first floor to the BFE, so elevating the home can always result in lower premiums. Elevating a structure can be expensive, however, particularly for large slab structures. In fact, HFIAA 2014 requires the NFIP to consider mitigation measures other than elevating homes for reducing property insurance premiums.¹⁴ One possible approach for single family households that may be more affordable than elevating a structure is low-cost retrofitting of structures that experience shallow water flooding. Studies of that topic date back to the 1960s (Sheaffer, 1960; Sheaffer et al., 1967; Laska, 1986; Laska and Wetmore, 1990, 2000; FEMA, 1999). FEMA has developed several handbooks for identifying mitigation measures and describing their implementation (see FEMA, 2007, 2012b, 2013c). The US Army Corps of Engineers has provided guidance on the topic (USACE, 2005), and FEMA recently refined its publication on low-cost retrofitting (FEMA, 2014c). Homes may realize substantial reductions in damages if shallow water flooding is reduced, which in turn could lead to reduced claims. One challenge for FEMA and the NFIP will be to determine whether shallow water flooding is the reason for the modest claims and, if so, to reflect low-cost retrofitting approaches in the rating tables for homes where shallow water flooding is likely.

For a broader set of mitigation measures, including shallow water flooding, to be considered in setting premiums, FEMA would need to develop data and analyses that would link the measures' expected reduction in losses to insurance premiums. A particular concern about the effectiveness of any such measures is how to ensure needed maintenance once they are implemented and the reliability of human actions to activate them during floods. Implementation rules and requirements would have to be promulgated for eligible flooding conditions, eligible structures, eligible mitigation measures, requirements for implementation, and the actuarial calculation of the reduction in flood insurance premiums that results from different retrofit measures.

Approximately \$150 million was provided by Congress in 2014 for pre-disaster mitigation (see Box 7-1), but that funding allows for only 2,500 structures to be elevated if a \$75,000/house cost estimate is used.¹⁵ As one option for FEMA to consider, a portion of the grant funds could

¹⁴See Sections 14 and 26 of the act. Section 14 directs FEMA to carry out studies to estimate risk premium rates "based on consideration in part of the flood mitigation activities undertaken on a property, including differences in the risk due to land use measures, floodproofing, flood forecasting, and similar measures." Section 26 directs FEMA to issue guidelines for alternatives to elevation, to take them into account when calculating rates, and to inform homeowners about how they will affect their rates.

¹⁵The \$75,000 figure admittedly may be low. The median building elevation costs of elevations through the FEMA mitigation program (2008–2013) was \$166,000 (Ryan Janda, FEMA, personal communication, 2014).

be set aside for lower-cost alternative mitigation, and this would still leave FEMA pre-disaster and post-disaster mitigation funds to pay for elevating homes for which lower-cost alternatives may not be effective. That would allow a predictable source of funds for lower-cost mitigation.

Encouraging Selection of Higher Insurance Deductibles

As a general matter insurance premiums can be lowered if the purchaser chooses a higher deductible. In the case of flood insurance, the NFIP offered deductibles to homeowners that prior to BW 2012 ranged from \$500 to \$5,000. A 2010 study found that of the more than 1 million flood insurance policies in force in Florida in 2005, almost 80% of policyholders chose the lowest possible building deductible, \$500, and around 18% chose the second-lowest deductible available, \$1,000 (Kunreuther and Michel-Kerjan, 2009; Michel-Kerjan and Kousky, 2010). BW 2012 increased the minimum deductible and it is now \$1,000.¹⁶ Recent data show that 88% of the homeowners who have NFIP risk-based policies maintained the standard \$1,000 (that is, the lowest) deductible. Of the pre-FIRM subsidized homeowners, 37% choose a \$2,000 deductible, and 42% choose \$1,000. Although those data show that people prefer lower deductibles, they also suggest that offering a higher deductible as a default may lead a sizable number to choose to keep that option—a finding consistent with a large number of empirical studies that show that people disproportionately prefer the default option (see Johnson et al., 2012).

In the case of flood insurance, if the standard deductible chosen was \$5,000 instead of \$1,000, the NFIP risk-based insurance premium for any residential structure in the SFHA would be reduced by 25% (FEMA, 2014b). For example, a household that was paying \$4,000 for flood insurance with a \$1,000 deductible would pay \$3,000 if it took a \$5,000 deductible. If a low-income household suffered a loss of \$5,000 or less, however, it may have financial difficulty in covering the repair cost if it took the higher deductible. FEMA's Individual Assistance (IA) program does provide funds for losses incurred but are not covered because of the deductible. Although such households could potentially be assisted, receiving IA funding is not a certainty and in any case would not be received as quickly as payment for an insurance claim.

The choice of the amount of a deductible depends on a calculation that considers the future value of lower premiums against the possibility of bearing the cost of less damaging (and perhaps more frequent) flood events. Even with such a calculation, other considerations might go into that choice. In fact, the literature on this topic suggests that, for whatever

¹⁶Current deductibles are \$1,000, \$1,250, \$1,500, \$2,000, \$3,000, \$4,000, and \$5,000.

reasons, insurance purchasers tend to choose lower deductibles (Cutler and Zeckhauser, 2004; Doherty and Schlesinger, 1983; Kunreuther, Pauly, and McMorro, 2013; Sydnor, 2010).

For example, a 1983 study found that consumers choose the lowest deductible to be as fully protected as possible if they suffer a large loss (Doherty and Schlesinger, 1983). A “disappearing” deductible provides a rationale for a homeowner to take a larger deductible with a reduction in premium, knowing that the deductible will disappear if the loss is high enough. For illustration, if the flood damage exceeds \$50,000 then the deductible disappears. The NFIP might offer a disappearing deductible, and, given that the NFIP claims data show relatively few large losses from floods, the increase in premium caused by offering such a policy would be small relative to the premium for a policy that has a low deductible. Whatever deductible amounts are offered by the NFIP, encouraging the consideration, if not the choice, of higher deductibles is a possible role for the WYO agent (the WYO agents’ role in assisting homeowners is discussed in greater detail later in this chapter).

Rely on the US Treasury to Help Paying Claims in Catastrophic-Loss Years

Whether the NFIP can raise revenue to pay back the debt, build a reserve that can cover catastrophically high-loss years, and simultaneously promote takeup and keeping premiums at levels that would not require a substantial program of policyholder assistance remains an open question. Revisiting the original 1968 legislation (Chapter 2) that created the NFIP suggests one possible way to reconcile conflicting goals. The 1968 legislation established the US Treasury as a reinsurer for catastrophic-loss years: when total losses in any year exceeded a threshold level, the Treasury would provide the funds needed to honor claims that exceeded the threshold.

The logic at that time was that if the Treasury acted as reinsurer, NFIP risk-based premiums would be kept at reasonable levels to encourage purchase. In the contemporary context, proposing a similar role for the Treasury could be one option within a larger affordability context. It might work as follows. First, Congress could forgive all or a share of the current NFIP debt. Second, Congress could designate the US Treasury as reinsurer for the NFIP, as was the case in the original legislation. Specifically, Congress could explicitly state that when total annual losses in the program exceed some designated threshold (as an illustration, \$2 to \$6 billion, perhaps on the basis of the average of noncatastrophic historical claims years), the Treasury will provide funds to allow the NFIP to honor all the claims. The funds may be provided through the Disaster Relief Fund, and, if needed, by an emergency supplemental budget. Taken together, those

two actions could result in lower NFIP risk-based premiums, enhance affordability, and in turn lead to less spending for assistance. Congress would incur occasional costs by designating the US Treasury as the source of funds for payment of claims above the defined threshold in high-loss years but would not need to draw on the Treasury each year to provide assistance payments to policyholders who face unaffordable premiums.

Enhance the Write Your Own Agent Advisory Role

The WYO agent has the most direct and most frequent contact with property owners as the owner considers an NFIP purchase decision. There may be opportunities for the agent to play a new and creative role in providing residents in flood-prone areas with information on the risks they face and actions they can take to reduce future losses and make their premiums more affordable. More specifically, agents could provide data on the premium savings associated with investing in specific loss reduction measures (especially as new measures are considered in rating a property's risk), inform homeowners of mitigation programs, assist in obtaining mitigation loans and choosing the deductible, and so on.

For a WYO agent, providing those services would require additional work, new training, and new technology. FEMA could provide the necessary new training and technologic support. For example, Web-based and automated rating tables might allow a WYO agent to evaluate the effect of a mitigation action on premiums quickly, especially if the number of mitigation actions that affect premiums is increased. The cost of increased time to learn and then consult with clients may have to be compensated. The costs may increase WYO administrative charges, but FEMA may deem such additional costs to be justified. Whether the costs would be recovered through higher premiums is a matter to be determined.

In addition, because WYO agents and their companies are compensated as a percentage of the premium charged (for example, 15% of the premium to the agent), a different compensation structure that is not based on a percentage of the premium may be required.

Reducing National Flood Insurance Premium Administrative Cost Loadings in Premiums

The NFIP pays a portion of premium revenue to the WYO insurance companies to compensate them for writing policies, collecting premiums, and settling, paying, and defending claims. Reducing administrative costs could help lower premiums across the board but determining the effects of this option requires an understanding of the fees paid to WYO companies.

When those are examined, substantial reductions in premiums through lower WYO payments appear unlikely.

WYO companies receive an allowance that is composed of three categories: 15% of written NFIP premiums covers agent commissions; 2.3% of written NFIP premiums goes to voluntary-payment state premium taxes on WYO policies; and 12.5-13.5% of written premiums compensates insurance companies for their expenses. In addition, if WYO companies meet targets to increase the number of policies written, they can receive up to a 2% bonus.

There is little room to adjust commissions. The NFIP has entered into an agreement to pay state premium tax taxes (state insurance departments oversee the WYO companies). Those costs thus seem difficult to reduce. To determine how much insurers receive for expenses, the NFIP calculates a 5-year industry average of multiple property insurance lines and then adds an extra 1% to cover additional expenses for participating in a federal program.

Although the NFIP could potentially collect actual expense data from the approximately 85 WYO companies, the administrative cost of such data collection is nontrivial, and it is unclear how large the savings would be. A 2010 GAO report noted that a survey of six WYO companies found that payments from FEMA were 16.5% higher than actual expenses (GAO, 2010). That would be a reduction in administrative costs but not a very large one, so it is unlikely to address premium affordability issues substantially and, like some other measures discussed herein, would not be targeted specifically at cost-burdened households.

In exchange for processing claims, WYO companies receive reimbursement according to established formulas and additional reimbursement for any special handling expenses, such as litigation costs or engineering studies. Paying WYO companies according to the size of claims led to extraordinary payments to WYO companies in 2004 and 2005. In response, in 2008, FEMA used actual expense data to modify how it handles payments, considering actual costs incurred by the companies (GAO, 2009). Questions of administrative costs of the NFIP are still under review, but the costs to pay WYO companies may be modest in light of the time and cost involved.

Eliminating the Mandatory Purchase Requirement

Households that have mortgages from federally backed or regulated lenders and that are in a mapped SFHA are required to purchase flood insurance policies. Households that have received disaster assistance also

may be required to have flood insurance policies.¹⁷ One way to eliminate the financial burden of NFIP premiums is to eliminate this requirement. If purchase were voluntary, those who could not afford the NFIP risk-based premiums would not have to incur the expense.

If the past is a guide, it is likely that takeup rates for policies could drop substantially if homeowners were not required to purchase them. The NFIP adopted the mandatory purchase in 1972 because 4 years after the NFIP was established in 1968, fewer than 200,000 flood insurance policies were in force nationwide (Pasterick, 1998). In addition, findings in the present report's Chapter 4 suggest that many households may not voluntarily purchase disaster insurance, even if they would not be cost burdened by it.

As a result, households would need to rely more upon their own resources for post-flood recovery. Households could potentially receive federal aid, although such aid is usually modest, uncertain, and delayed (see Kousky and Shabman, 2012). In addition, the presence of uninsured properties may reduce the resilience of a community in event of a flood disaster. For all these reasons (as noted in Chapter 2), increased takeup rates always have been a goal of Congress for the NFIP. As long as high takeup rates remain a program objective, the additional objective of making premiums affordable, even if there is a subsidy to some, is likely to be a more successful option than making all purchases voluntary.

COMMUNITY-BASED PROGRAMS

This section discusses an affordability strategy that depends on community-based measures of flood risk reduction. Flood hazards and flood insurance premiums can be reduced by a variety of measures, including the limiting of development in floodways, development of stormwater retention practices, construction of wetlands and other green infrastructure for water retention and enhanced drainage, and construction of levees, floodwalls, or dunes to control flood hazards (FEMA, 2013d). Flood risk management projects have been instituted across the nation in partnership with the US Army Corps of Engineers, but state and local funding alone can be used for such projects. Some community-level mitigation measures can lead to lower NFIP premiums through modifications to FIRMs or through the Community Rating System (CRS), discussed below.

¹⁷At times, federal disaster assistance may help victims with these costs. For example, many recipients of HUD assistance have low incomes and HUD grant funds can sometimes help to maintain flood insurance for these individuals (Tobin and Calfee, 2005). Similarly, state and local governments have at times used federal disaster aid dollars, such as FEMA Other Needs Assistance, to help cover the costs of flood insurance policies for recipients of the aid.

Community Mitigation Programs

HFIAA 2014 requires FEMA to recognize the effectiveness of communitywide and area-wide mitigation activities when setting insurance premium rates (Section 14) and to maintain updated maps for the communities that reflect mitigation actions (Section 27). Community-based efforts aim to direct resources to measures that may benefit clusters of structures, even multiple neighborhoods, while dispersing mitigation knowledge more broadly among community officials and residents.¹⁸ A recent pilot project funded by FEMA and implemented by the Natural Hazard Mitigation Association engaged 10 communities that were actively involved in mitigation. The project, the Resilient Neighbors Network, emphasizes partnerships and recognition and rewards to motivate communities and regulatory and economic alignment (see Hayes, 2012). Many communities are working with FEMA to learn the best ways to promote and incentivize local risk reduction efforts and collaboration among communities. This effort demonstrates a commitment by FEMA to encourage self-initiated efforts in conjunction with their more prescribed CRS approach.

The Community Rating System

The CRS offers premium reductions for “community floodplain management activities that exceed the minimum NFIP requirements” to “reduce flood damage to insurable property, strengthen and support the insurance aspects of the NFIP and encourage a comprehensive approach to floodplain management” (FEMA, 2015). A community that has cost burdened households may take actions to increase flood hazard preparedness, which may result in reduced premiums, by participating in the CRS. For example, representatives of CRS communities in Louisiana have increased their CRS engagement since passage of BW 2012 by forming regional collaborative groups that meet regularly to share best practices for undertaking specified measures, especially ways to improve risk communication (personal communication, Monica Ferris, University of New Orleans, 2014). The regional groups have also transformed their CRS involvement into a community engagement approach. If this multi-community collaboration results in actions that earn additional points in the CRS program, more households may benefit from lower premiums. Some studies have found that CRS participation in various measures—such as open space protection, high elevation

¹⁸Community-based efforts also may help prepare for flood-related losses that are due to climate change impacts such as sea level rise and increased precipitation and increased severity of tropical storms. These challenges can be brought to the attention of communities through such community-based efforts as those described in this section, especially given the role of communities in land use regulations for floodplains and building codes.

requirements, and small flood control projects—has reduced flood claims and property damage (Brody et al., 2007; Michel-Kerjan and Kousky, 2010; Brody and Highfield, 2013).

Joining the CRS requires a community application. Requirements were modified in 2013, and some of these modifications of which were considered by some communities to be burdensome. For example, smaller communities with little GIS technical capability have difficulty in producing the detailed maps that FEMA requires to earn points for some activities (for example, improving a community's drainage capacity). The modest premium reduction achieved for the prescribed CRS actions and the small number of communities that have attained substantial rate improvements do not suggest that this program, given the costs of application, will contribute greatly to the affordability of flood insurance. A recent increase in interest in the CRS by many communities, however, suggests that they believe that the CRS will help to lower premiums, and that they may be willing to incur the CRS application costs.

Community Insurance Policies

Various reforms to the NFIP have been considered over the years. One is community-level insurance policies. A community insurance option would enable communities to purchase a group flood insurance policy on behalf of all properties that are at risk of flooding. The community would pay a single premium for the group policy and then recover the costs of the policy through special assessments levied on covered properties, most likely as an adjunct to the property tax. A FEMA report that evaluated NFIP reform options that were based on assessments by expert panels concluded that a community insurance option would substantially reduce exposure to flood hazards but that administrative challenges and political feasibility would need to be addressed (FEMA, 2011). Under HFIAA 2014, FEMA has been directed by Congress to examine and report on a community insurance option.

Community insurance would increase takeup rates by automatically insuring all members of a participating community. That could exacerbate, instead of lessen, affordability problems by forcing all members of a community to pay flood insurance premiums. That said, risk-based premiums could be coupled to premium reductions when communities or individuals engage in flood risk management activities that lead to higher adoption of flood mitigation measures. If the reduction in premiums incentivized greater adoption of hazard mitigation at a community level, such as encouraging communities to move up through the CRS program discussed in the previous section, it would translate into lower insurance costs for all residents—but again the reduction in premiums may not be sufficient

to address affordability issues. Community insurance could shift the issue of affordability to the local level and let each community address it in the way that it sees fit; this could be achieved through cross-subsidizations in the assessments of premiums or by using other community funds to offset high premiums for low-income and moderate-income households. And, of course, community insurance could be combined with other programs discussed in this section.

SUMMARY

BW 2012, Section 100236, as well as HFIAA 2014, focus on affordability of insurance rates motivate the development of affordability policy options. Chapter 6 discussed the array of decisions that must be made by policymakers, and this chapter has focused on options for assisting individual policyholders or entire communities. Although the options are discussed separately, a subset of them could be implemented simultaneously. The options can be combined in different ways; for example, mitigation loans may be reserved for low-cost mitigation actions. Options may have conditions attached to them; for example, eligibility for a voucher for assistance in paying a premium may include a requirement to implement mitigation actions.

- The NFIP can strive for risk-based premiums while addressing affordability by implementing a combination of policy measures, including means tested mitigation grants, mitigation loans, vouchers, and encouragement of higher premium deductibles.
- Reforms to mitigation grant programs can be implemented so that means testing, as a replacement for the current benefit-cost test, is the basis for setting priorities for mitigation grant spending.
- A mitigation loan can make it financially attractive and feasible for low-income residents to invest in mitigation measures without having to rely on mitigation grants.
- Vouchers are an administratively simple way to direct payments to cost burdened policyholders for use in paying premiums or for offsetting mitigation costs.
- The few mitigation measures that result in lower NFIP premiums tend to be expensive, such as elevating homes. As a result of BW 2012, FEMA will consider whether lower-cost mitigation of structures will result in lower premiums. Determining the effect of lower-cost mitigation on NFIP risk-based rates will require additional analyses.
- If Congress authorized supplements from the Treasury to be used for making NFIP claim payments in catastrophic-loss years, this could

allow lower NFIP risk-based premiums and, in turn, less spending for assistance.

- Some policies that have been advanced to lower NFIP risk-based premiums for cost burdened households either will not have that effect, or may not be easily accessed by cost burdened policyholders. These include reducing administrative fees, disaster savings accounts, and income tax credits and deductions.
- Community measures can lower insurance premiums through mitigation actions that benefit clusters of structures and through the CRS. These might be particularly important in mitigation related to multi-family properties.

Future Work

In Section 100236 of the Biggert-Waters Flood Insurance Reform Act of 2012, Congress directed FEMA to cooperate with the National Academy of Sciences on an affordability study. Section 100236 referred to another section of BW 2012, which called on FEMA to develop an “affordability policy framework” and affordability policy options to mitigate adverse effects of premium increases. These affordability policy options were to be evaluated as part of the Section 100236 study. Section 9 of the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014) further emphasized the interest of Congress in having FEMA submit concepts for an affordability framework, and added time and resources to support the national affordability study called for in Section 100236 of BW 2012.

This is the first of two reports from the National Research Council Committee on the Affordability of National Flood Insurance Program Premiums. It describes policy options that might be part of an affordability strategy. The second report will propose analytical procedures with which FEMA might conduct an analysis of those options. This concluding chapter summarizes briefly this report’s key findings in light of objectives for Report 2.

The objective of BW 2012 was to yield NFIP risk-based premiums for all policies and an NFIP financial structure that would avoid large future

debt.¹ Provisions of BW 2012 that were expected to achieve those results, and the history of those efforts, were discussed in Chapters 2 and 3. The elements of the affordability framework mentioned in BW 2012 and stressed in Section 9 of HFIAA 2014, called for actions that could provide assistance to households for which NFIP risk-based premiums would be unaffordable. The concern for affordability was motivated by two situations that were expressed in testimony and constituent letters after BW 2012 began to be implemented. The first cause for concern was that NFIP risk-based premiums might impose unaffordable costs on some property owners (and renters) that were mandated to purchase flood insurance and that where there were concentrations of such properties (Chapter 5), financial stresses on individual households may have effects on the economy of a neighborhood or community. A second cause for concern was that higher premiums might result in greater noncompliance with the mandatory purchase requirement and discourage voluntary purchase (Chapter 4).

This committee's second report will describe an analytic protocol(s) that FEMA could employ to simulate effects of different affordability policies on NFIP and on policyholders. The policy alternatives that FEMA might evaluate can be developed by applying the framework for organizing the decisions that must be made in designing an assistance program (Chapter 6) and policy alternatives (Chapter 7). Chapter 7 presented policy alternatives that have been suggested by others or that the committee has developed that could enhance affordability of flood insurance. Some of the options are mitigation actions that would lower risk and thus lower premiums. Other options directly reduce amounts paid for insurance premiums.

The committee's Report 2 will propose a procedure(s) for FEMA to use in conducting a national analysis of affordability policy options. A premise of Report 2 will be that NFIP risk-based premiums will be paid by all policyholders. Therefore, assistance policy options will be formulated for illustration as necessary to describe the computational and data needs for assessing the full array of policy options that FEMA may consider. One example of an affordability policy option is the combination of NFIP risk-based premiums for all, with means-tested vouchers for premium assistance funded by surcharges on all policies. Another example is the combination of NFIP risk-based premiums for all, with means-tested mitigation grants funded by general federal revenues for the most cost-effective (premium reducing) mitigation actions.

For any policy option, analytical procedures must be capable of esti-

¹HFIAA 2014 reinstated grandfathering and changed when some households that were paying pre-FIRM subsidized premiums would pay NFIP risk-based premiums. HFIAA 2014 made no other changes to sections of BW 2012 that affected premiums. The present report presumed full implementation of BW 2012 as envisioned originally.

mating effects on different objectives. The set of objectives will be derived from the specific language of BW 2012 and HFIAA 2014 and from the present report. Evaluation objectives will include the following:

- The number of households subject to mandatory insurance purchase and are cost burdened by paying NFIP risk-based premiums
- The total of NFIP premiums and surcharges less claims paid and administration costs for a specified period (net program revenue)
- Total federal outlays for payments to cover NFIP net revenue “short-fall,” for premium assistance, for federal share of mitigation cost, and for post-flood aid for a specified period
- Number of policies in force (takeup rate)

In its second report, which will be issued later in 2015, the committee will report on the costs for FEMA to implement the protocol(s), in consideration of computational needs, access to available data, and a sampling strategy for collecting data that is not now available. To refine the descriptions of data needs and costs, the analytic protocol(s) will be tested as a proof-of-concept by using data and readily available analytic platforms that are available from the North Carolina Department of Public Safety.

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List of Terms*

*Indicates that a definition is taken, with minor editing, from the Federal Emergency Management Agency Website.¹

The terms are ordered so that each definition(s) builds on a previous definition(s) and thus are not listed alphabetically as in a glossary.

Flood*: A general and temporary condition of partial or complete inundation of normally dry land area.

Floodplain*: Any land area susceptible to being inundated by water from any source.

Flood frequency: Probability, expressed as a percentage, that a given flood stage elevation will be equaled or exceeded in any given year.

Direct physical loss by or from flood*: Loss of or damage to insured property caused directly by a flood.

Flood risk: The expected direct physical loss (flood damage) in any year from a range of floods with a specified frequency.

1% annual chance flood*: A flood stage elevation that has a 1% chance of being equaled or exceeded in any given year; also known as a 100-year flood or base flood.

¹<https://www.fema.gov/national-flood-insurance-program/definitions#P>.

Mitigation*: Action to reduce or prevent future damage, preferably before a disaster strikes (see Floodplain management).

Floodplain management*: The operation of an overall program of corrective and preventive measures for reducing flood damage, including an emergency preparedness plan, flood-control works, and floodplain management ordinances (see Mitigation).

Community*: A political entity that has the authority to adopt and enforce floodplain ordinances (engage in mitigation) for the area under its jurisdiction as a requirement of the National Flood Insurance Program. In most cases, a community is an incorporated city, town, township, borough, or village or an unincorporated area of a county or parish.

Flood hazard boundary map*: Official map of a community issued by FEMA on which the boundaries of the flood, mudflow, and related erosion areas of varying flood risk have been designated.

Special flood hazard area*: The land in the floodplain within a community that is subject to a 1% or greater chance of flooding in any given year. Also called the regulatory floodplain.

Base flood elevation*: The elevation of surface water resulting from a flood that has a 1% chance of occurrence in any given year.

Negatively elevated structure*: A structure in the Special Flood Hazard Area with a ground floor elevation below the BFE.

National Flood Insurance Program flood zone*: A geographical area shown on a Flood Hazard Boundary Map or a Flood Insurance Rate Map that reflects the severity or type of flooding in a Special Flood Hazard Area. Zones associated with the letter A refer to flood elevations associated with the 1% annual chance flood. Zones associated with the letter X have a lower flood risk than those associated with the A zone. V zones are areas where the Base Flood Elevation also includes storm surge and wave effects.

Flood insurance rate map*: Official map of a community on which FEMA has delineated Special Flood Hazard Areas, Base Flood Elevations, and risk premium zones applicable to the community.

Map Revision*: A change in the Flood Hazard Boundary Map or Flood Insurance Rate Map for a community that reflects revised zone, base flood, or other relevant information.

Pre-FIRM building*: A building constructed or substantially improved on or before December 31, 1974, or before the effective date of the initial Flood Insurance Rate Map of the community, whichever is later.

Subsidy: Direct financial assistance intentionally given to a business or individual and paid from general government revenues.

Cross-subsidy: Direct financial assistance intentionally given to a business or individual by using a good or service paid for by charging higher prices to other users of the good or service.

Actuarial pricing principles: A set of guidelines recognized by professional actuaries as guides for setting premiums. A rate should reflect the expected value of future claims, provide for all the costs of risk transfer (insurance program administration), and provide for all costs associated with individual risk transfer by trying to avoid cross-subsidization among policyholders. If those three principles are met, premiums should not be excessive, inadequate, or unfairly discriminatory (American Academy of Actuaries, 2012).

National Flood Insurance Program servicing agent*: A corporation, partnership, association or any other organized entity that contracts with FEMA to service insurance policies as direct business.

Write-Your-Own program*: A cooperative undertaking of the insurance industry and FEMA that began in October 1983. It operates within the context of the NFIP and involves private insurance carriers that issue and service NFIP policies.

Rating: The guidance used by an NFIP servicing agent to calculate the premium for a specific property. The guidelines are in NFIP rating tables and are used to estimate premiums on the basis of various characteristics, NFIP flood zone locations, elevations, and coverage levels.

Elevation certificate*: A certificate that verifies the elevation data on a structure on a given property relative to the ground level. It is used by local communities and builders to ensure compliance with local floodplain management ordinances and is also used by insurance agents and companies in setting premiums for flood insurance policies.

NFIP risk-based premium: The premium for a group of policies that, as legislative and administrative constraints allow, will meet actuarial pricing guidelines.

Pre-FIRM subsidized premium: A premium made available to owners of properties that were located in a Special Flood Hazard Area before the first Flood Insurance Rate Map for the community was issued. The rate per \$1,000 of coverage for the first \$60,000 of coverage is less than the NFIP full-risk rate. There is no cross-subsidization in the NFIP full-risk rating table to offset the loss of premiums revenues due to the lower than NFIP full-risk premiums.

Grandfathered premium*: A premium for a post-FIRM building that was constructed in compliance with the floodplain management regulations in effect at the start of construction. Such a premium will continue even if a FIRM revision results in a higher Base Flood Elevation. There is a cross-subsidization in the NFIP full-risk rating table to offset the loss of premium revenues due to the lower than NFIP full-risk premiums.

Community Rating System (CRS)*: A program developed by FEMA to provide incentives for communities that have gone beyond the minimum NFIP floodplain management requirements and developed extra measures to provide protection from flooding.

Community Rating System discounted premiums: Discounted premiums reduced from NFIP full-risk premiums that are available for some properties in a community if the community adopts one or more NFIP flood risk management actions. The discount varies with the community actions and is available to properties that would be paying NFIP full-risk premiums and are in a Special Flood Hazard Area. There is cross-subsidization in the NFIP full-risk rating table to offset the loss of premium revenues due to the lower than NFIP full-risk premiums.

Mandatory purchase*: The requirement, under the provisions of the Flood Disaster Protection Act of 1973, that individuals, businesses, and others buying, building, or improving property that is located in identified Special Flood Hazard Areas in participating communities to purchase flood insurance as a prerequisite for receiving any type of direct or indirect federal financial assistance (for example, any loan, grant, guaranty, insurance, payment, subsidy, or disaster assistance), if the building or property is the subject of or security for such assistance.

Takeup rate: Ratio of the number of properties that have NFIP flood insurance policies to the number of eligible properties. Takeup rate can be affected by the mandatory purchase requirement and by voluntary purchase decisions of property owners and renters.

Appendix A

Section 100236 – Biggert-Waters Flood Insurance Reform Act of 2012

SEC. 100236. STUDY OF PARTICIPATION AND AFFORDABILITY FOR CERTAIN POLICYHOLDERS

(a) FEMA STUDY.—The Administrator shall conduct a study of—

(1) methods to encourage and maintain participation in the National Flood Insurance Program;

(2) methods to educate consumers about the National Flood Insurance Program and the flood risk associated with their property;

(3) methods for establishing an affordability framework for the National Flood Insurance Program, including methods to aid individuals to afford risk-based premiums under the National Flood Insurance Program through targeted assistance rather than generally subsidized rates, including means-tested vouchers; and

(4) the implications for the National Flood Insurance Program and the Federal budget of using each such method.

(b) NATIONAL ACADEMY OF SCIENCES ECONOMIC ANALYSIS.—

To inform the Administrator in the conduct of the study under subsection (a), the Administrator shall enter into a contract under which the National Academy of Sciences, in consultation with the Comptroller General of the United States, shall conduct and submit to the Administrator an economic analysis of the costs and benefits to the Federal Government of a flood insurance program with full risk-based premiums, combined with means-tested Federal assistance to aid individuals who cannot afford coverage, through an insurance voucher program. The analysis shall compare the costs of a program of risk-based rates and means-tested assistance to the

current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage.

(c) **REPORT.**—Not later than 270 days after the date of enactment of this Act, the Administrator shall submit to the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Financial Services of the House of Representatives a report that contains the results of the study and analysis under this section.

(d) **FUNDING.**—Notwithstanding section 1310 of the National Flood Insurance Act of 1968 (42 U.S.C. 4017), there shall be available to the Administrator from the National Flood Insurance Fund of amounts not otherwise obligated, not more than \$750,000 to carry out this section.

Appendix B

Homeowner Flood Insurance Affordability Act of 2014 – Section 16

SEC. 16. AFFORDABILITY STUDY AND REPORT

(a) STUDY ISSUES.—Subsection (a) of section 100236 of the Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957) is amended—

(1) in paragraph (3), by striking “and” at the end;

(2) in paragraph (4), by striking the period at the end and inserting a semicolon; and

(3) by adding at the end the following new paragraphs:

“(5) options for maintaining affordability if annual premiums for flood insurance coverage were to increase to an amount greater than 2 percent of the liability coverage amount under the policy, including options for enhanced mitigation assistance and means-tested assistance; “(6) the effects that the establishment of catastrophe savings accounts would have regarding long-term affordability of flood insurance coverage; and “(7) options for modifying the surcharge under 1308A, including based on homeowner income, property value or risk of loss.”

(b) TIMING OF SUBMISSION.—Notwithstanding the deadline under section 100236(c) of the Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957), not later than 18 months after the date of enactment of this Act, the Administrator shall submit to the full Committee on Banking, Housing, and Urban Affairs and the full Committee on Appropriations of the Senate and the full Committee on Financial Services and the full Committee on Appropriations of the House of Rep-

representatives the affordability study and report required under such section 100236.

(c) AFFORDABILITY STUDY FUNDING.—Section 100236(d) of the Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957) is amended by striking “\$750,000” and inserting “\$2,500,000.”

Appendix C

Section 100236 – Biggert-Waters Flood Insurance Reform Act of 2012 as Modified by HFIAA 2014, Section 16

SEC. 100236. STUDY OF PARTICIPATION AND AFFORDABILITY FOR CERTAIN POLICYHOLDERS

(a) FEMA STUDY

The Administrator shall conduct a study of — (1) methods to encourage and maintain participation in the National Flood Insurance Program; (2) methods to educate consumers about the National Flood Insurance Program and the flood risk associated with their property; (3) methods for establishing an affordability framework for the National Flood Insurance Program, including methods to aid individuals to afford risk-based premiums under the National Flood Insurance Program through targeted assistance rather than generally subsidized rates, including means-tested vouchers; (4) the implications for the National Flood Insurance Program and the Federal budget of using each such method; (5) options for maintaining affordability if annual premiums for flood insurance coverage were to increase to an amount greater than 2 percent of the liability coverage amount under the policy, including options for enhanced mitigation assistance and means-tested assistance; (6) the effects that the establishment of catastrophe savings accounts would have regarding long-term affordability of flood insurance coverage; and (7) options for modifying the surcharge under 1308A, including based on homeowner income, property value or risk of loss.

(b) NATIONAL ACADEMY OF SCIENCES ECONOMIC ANALYSIS

To inform the Administrator in the conduct of the study under subsection (a), the Administrator shall enter into a contract under which the National

Academy of Sciences, in consultation with the Comptroller General of the United States, shall conduct and submit to the Administrator an economic analysis of the costs and benefits to the Federal Government of a flood insurance program with full risk-based premiums, combined with means-tested Federal assistance to aid individuals who cannot afford coverage, through an insurance voucher program. The analysis shall compare the costs of a program of risk-based rates and means-tested assistance to the current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage.

(c) REPORT

Not later than 270 days after the date of enactment of this Act, the Administrator shall submit to the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Financial Services of the House of Representatives a report that contains the results of the study and analysis under this section.

(d) FUNDING

Notwithstanding section 1310 of the National Flood Insurance Act of 1968 (42 U.S.C. 4017), there shall be available to the Administrator from the National Flood Insurance Fund, of amounts not otherwise obligated, not more than \$2,500,000 to carry out this section.

Appendix D

Invited Guest Speakers at Committee Meetings

Federal Agencies

Thomas Hayes, Federal Emergency Management Agency, Washington, DC
Ryan Janda, Federal Emergency Management Agency, Washington, DC
David Miller, Federal Emergency Management Agency, Washington, DC
Andy Neal, Federal Emergency Management Agency, Washington, DC

Alicia Cackley, Government Accountability Office, Washington, DC
Pat Ward, Government Accountability Office, Washington, DC

Dan Hoople, Congressional Budget Office, Washington, DC

Todd Richardson, Department of Housing and Urban Development,
Washington, DC
Josh Sawislak, Department of Housing and Urban Development,
Washington, DC

Other Government Agencies

John Dorman, North Carolina Department of Public Safety, Raleigh
Katherine Grieg, New York City Mayor's Office, New York
Tim Trautman, Charlotte-Mecklenberg County, Charlotte, NC

Nonprofit and Trade Organizations

Chad Berginnis, Association of State Floodplain Managers, Madison, WI

Birny Birnbaum, Center for Economic Justice, Austin, TX

Steve Brown, National Association of Realtors, Washington, DC

Susan Gilson, National Association of Flood and Stormwater

Management Agencies, Washington, DC

James Lynch, Insurance Information Institute, New York, NY

Frank Nutter, Reinsurance Association of America, Washington, DC

Tabby Waqar, National Association of Home Builders, Washington, DC

Research Organizations

Craig Colten, The Water Institute of the Gulf, Baton Rouge, LA

Appendix E

NFIP Flood Designations

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.

continued

AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed hydraulic analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

High Risk - Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1 - 30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

SOURCE: FEMA's Map Service Center, available online at <https://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogI=10001&Id=-1&content=floodZones&title=FEMA%2520Flood%2520Zone%2520Designations> [accessed March 2015].

Appendix F

Biographical Sketches of Committee Members

LEONARD A. SHABMAN, *Chair*, joined Resources for the Future in 2002 as a resident scholar after 3 decades on the faculty of Virginia Polytechnic Institute and State University. His research and communications efforts focus on programs and responsibilities for flood and coastal storm risk management, design of payment for ecosystem services programs, and development of evaluation protocols for ecosystem restoration and management projects, especially in the Everglades, coastal Louisiana and Chesapeake Bay. Among the specific topics related to those themes are applied research on permitting under Section 404 of the Clean Water Act, creating market-based incentives for water quality management and provision of ecosystem services, and design of collaborative water management institutions. He served for 8 years on the National Research Council Water Science and Technology Board, has chaired or been a member of several NRC committees, and has been recognized as an Associate of the National Academy of Sciences. Dr. Shabman holds a Ph.D. degree in agricultural economics from Cornell University.

SUDIPTO BANERJEE is professor and chair of Biostatistics at the University of California, Los Angeles. His research, dissertation advising and mentoring activities focus on statistical modeling and analysis of geographically referenced datasets, Bayesian statistics, the interface between statistics and geographical information systems, and statistical computing. He received a National Institutes of Health challenge grant in 2009. In the same year he was honored with the Abdel El Sharaawi Award of the International Environmetrics Society, and in 2011 received the Mortimer Spiegelman

Award of the American Association of Public Health. He is an elected fellow of the American Statistical Association and an elected member of the International Statistical Institute. Dr. Banerjee received his B.S. degree from Presidency College, an M.S. degree in statistics from the Indian Statistical Institute (both in Calcutta), and M.S. and Ph.D. degrees in statistics from the University of Connecticut.

JOHN J. BOLAND is an engineer and economist and is professor emeritus in the Department of Geography and Environmental Engineering of Johns Hopkins University. His fields of research include water and energy resources, environmental economics, benefit-cost analysis, and public utility management. Dr. Boland has studied resource problems in more than 20 countries, has published more than 200 papers and reports, and is a coauthor of two books on water demand management and three more on environmental management. He has served on several NRC committees and is a founding member and past chair of the Water Science and Technology Board. Dr. Boland received his Ph.D. degree in environmental economics from Johns Hopkins University.

PATRICK L. BROCKETT is the Director of the Risk Management and Insurance Program and the Gus S. Wortham Memorial Chair in Risk Management and Insurance of the University of Texas at Austin. He conducts research in risk management and insurance, financial risk, actuarial science, decision analysis, management science and operations management and research, statistical analysis, and business applications. Dr. Brockett is an elected member of the International Statistical Institute and a fellow of the Institute for Risk Management, the American Statistical Association, the Institute of Mathematical Statistics, and the American Association for the Advancement of Science. In 2006, he received the American Risk and Insurance Association Outstanding Achievement Award for furthering the science of risk management through promotion of education, research, and communication during his tenure as editor of the *Journal of Risk and Insurance*. He is the editor of the *North American Actuarial Journal*. Dr. Brockett received his B.S. degree in mathematics from California State University-Long Beach, and his M.S. and Ph.D. degrees in mathematics from the University of California, Irvine.

RAYMOND J. BURBY is professor emeritus of city and regional planning at the University of North Carolina at Chapel Hill. He is a fellow of the American Institute of Certified Planners and has received the biannual Distinguished Educator Award of the Association of Collegiate Schools of Planning. He is the author, coauthor, and editor of 14 books and more than 150 publications on hazard mitigation, environmental management,

and land use planning and management. Dr. Burby served as coeditor of the *Journal of the American Planning Association* from 1983–1988 and was an associate editor of the *Natural Hazards Review*. He has served on NRC committees on pipeline safety, dam and levee safety, and lessons from Hurricane Katrina. His research interests include federal and state hazard mitigation planning mandates, integration of hazard mitigation plans with local comprehensive plans, and improvements in code enforcement to create disaster resilient communities. Dr. Burby holds an A.B. degree in government from George Washington University and M.R.P. and Ph.D. degrees in city and regional planning from the University of North Carolina at Chapel Hill.

SCOTT A. EDELMAN is the director of the AECOM Water Resources team for North America. He has 32 years of experience devoted to flood insurance studies and floodplain mapping. Mr. Edelman has overseen AECOM's floodplain mapping and mitigation work for the Federal Emergency Management Agency and many state and local partners, including Georgia, Alabama, North Carolina, South Carolina, Mississippi, Maryland, and California. He was a contributor to such FEMA projects as the initial Multi-Year Flood Hazard Identification Plan, developing initial concepts for the Mapping Information Platform, and contributing to Guidelines and Specifications. He has managed riverine and coastal flood insurance studies for the last 23 years, including more than 15,000 digital Flood Insurance Rate Map panels, which represents approximately 10-15% of the floodplain maps in the nation. Mr. Edelman is a licensed professional engineer in five states. He served on the NRC Committee on Floodplain Mapping Technologies. He received his B.S. degree in civil engineering from Pennsylvania State University.

W. MICHAEL HANEMANN, NAS, is a professor of economics and holds the Wrigley Chair in Sustainability at the School of Sustainability of Arizona State University. He is also a professor in the graduate school and Chancellor's Professor Emeritus in the Department of Agricultural and Resource Economics of the University of California, Berkeley. Elected to the National Academy of Sciences in 2011, Dr. Hanemann is an environmental economist who works in nonmarket valuation, water economics and policy, and climate change. A focus of his current research on water is the distinctive physical and institutional features of water, the evolution of water rights and institutions in the American West, legacy effects with respect to obstacles to promoting better uses of water, balancing extractive vs in-stream uses of water, and adapting water rights to face the challenges of climate change. He is a lead author and coordinating lead author in Working Group III of the Intergovernmental Panel on Climate Change

Fifth Assessment Report. He received his Ph.D. degree in economics from Harvard University.

CAROLYN KOUSKY is a fellow at Resources for the Future in Washington, DC. She has published numerous articles, reports, and book chapters on the economics and policy of natural disasters and disaster insurance markets. Her research focuses on decision-making under uncertainty, natural resource management, and individual and societal responses to natural disaster risk. She has evaluated the demand for natural disaster insurance, the functioning of the National Flood Insurance Program, policy responses to potential changes in extreme events with climate change, and how individuals learn about risk. She is the recipient of the 2013 Tartufari International Prize of the Accademia Nazionale dei Lincei. She holds a B.S. degree in Earth Systems from Stanford University and a Ph.D. degree in Public Policy from Harvard University.

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APPENDIX H.AFFORADABILITY OF NATIONAL FLOOD INSURANCE PROGRAM PREMIUMS: REPORT 2

AFFORDABILITY OF NATIONAL FLOOD INSURANCE PROGRAM PREMIUMS

R E P O R T 2

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by Michael Goodchild, University of California, Santa Barbara, and David Moreau, University of North Carolina, Chapel Hill. Appointed by the National Research Council (NRC), they were responsible for making certain that an independent

examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the NRC.

Preface

The National Flood Insurance Program (NFIP) was created by Congress in 1968 and over the years an uncounted number of studies and reports have reviewed the program's structure and operations, often making recommendations for reform. Many, but not all, of these reports were made at the request of Congress. The reports of this committee were prepared in response to a congressional request in the Biggert-Waters Flood Insurance Reform Act of 2012 (BW 2012).

BW 2012, Section 100236, mandated that the Federal Emergency Management Agency (FEMA) conduct a study in cooperation with the National Academy of Sciences (NAS) that would “compare the costs of a program of risk-based rates and means-tested assistance to the current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage.” This came to be known as the “affordability study” as a shorthand reference.

In response, the Water Science and Technology Board in the Division on Earth and Life Studies at NAS, in collaboration with the Board on Mathematical Sciences and their Applications, and the Committee on National Statistics, convened the committee on *Affordability of National Flood Insurance Program Premiums*. The committee members for both reports included persons who collectively brought expertise in insurance, economics, floodplain management, national flood and disaster science and policy, mapping and spatial statistics, and risk perception and communication to the work of the committee.

To fulfill the mandate of BW 2012, FEMA and NAS agreed to a plan of work to produce two reports. The first report, titled “Affordability of

National Flood Insurance Program Premiums—Report 1,” described policy options and decisions to be made for FEMA’s consideration as it formulates affordability policy alternatives for consideration by Congress. The first report was publicly released for prepublication on March 26, 2015. A second report focused on how FEMA might develop analytical capacity and databases needed to evaluate affordability policy alternatives. The committee was not tasked to complete such a study.

The committee process for preparing the two reports began in late 2013. The committee met five times during 2014 and 2015—January 2014, March 2014, July 2014, November 2014, and May 2015. The first four meetings were held in Washington, D.C., and the last meeting was held in Irvine, California. The first three meetings included guest presentations and we thank the many individuals who presented to the committee and provided reference materials. We list these in Appendix D of Report 1; the latter two meetings were mostly closed committee meetings.

In addition to those who presented, the committee recognizes three specific contributions. We thank Susan Phelps, as well as her employer AECOM, for her helpful contributions in working with the NFIP policy database and in preparing numerous maps and tables for consideration by the committee, many of which were not included in this final report.

The content of the second report drew heavily from the results of the proof-of-concept report that will be published as the North Carolina Floodplain Mapping Program. John Dorman, Program Director, and his staff provided a draft of the report to the committee and were responsive to requests for further explanations and clarifications of the report content.

We especially thank Andy Neal from FEMA for helping the committee understand the details of the NFIP program and for his timely, comprehensive, and enlightening replies to questions from the committee.

Through meetings, phone calls, and email exchanges each committee member has enthusiastically shared their expertise and knowledge and as a result has made valuable contributions to the report. I owe them all my gratitude. I would especially like to thank Dr. Allen Schirm from Mathematica Policy Research. Allen is an expert in assistance program design and microsimulation analysis. These topics became central to our committee’s work and we relied upon Allen’s advice and knowledge to a much greater extent than we, and maybe he, had expected. Allen’s commitment to the project and spirit of collegiality were crucial to the successful completion of our reports.

Finally, I want to thank particular NAS staff. Dr. Connie Citro prepared essential text that appears in the second report. Dr. Jeffrey Jacobs served as study director for the first report and Dr. Ed Dunne served as study director

for the second. Their attention to keeping the committee focused on its task and moving our reports to completion is truly appreciated.

Leonard Shabman, *Chair*
Committee on the Affordability of National
Flood Insurance Program Premiums

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Summary

When Congress authorized the National Flood Insurance Program (NFIP) in 1968, it intended for the program to encourage community initiatives in flood risk management, charge insurance premiums for new construction that was based on the flood risk at the property, and encourage the purchase of flood insurance by owners of flood-prone properties (that is, seek a high takeup rate), in part by offering affordable premiums. The NFIP has been reauthorized many times since 1968, most recently with the Biggert-Waters Flood Insurance Reform Act of 2012 (BW 2012). In this most recent reauthorization, Congress placed a particular emphasis on setting flood insurance premiums following actuarial pricing principles, which was motivated by a desire to ensure that future revenues were adequate to pay claims and administrative expenses (NRC, 2015a).

BW 2012 would have increased premiums for policyholders who had previously been paying less than NFIP risk-based premiums and possibly would increase premiums for all policyholders. Subsequently, congressional concern for the effect of that legislation on the affordability of flood insurance led to the Homeowner Flood Insurance Affordability Act (HFIAA 2014), modifying some provisions of BW 2012. HFIAA 2014 (Section 9) further emphasized that the Federal Emergency Management Agency (FEMA) report to Congress with a plan for an “affordability framework” following its submission of the affordability study that was originally required by Section 100236 of BW 2012.

The legislative language that called for an affordability study directed FEMA to seek advice from the National Academy of Sciences (NAS). In

response, NAS convened the Committee on the Affordability of National Flood Insurance Program Premiums that was directed by its task statement to prepare two reports. The first report (Report 1) was released in March 2015. It included chapters on the history of the NFIP pricing practices, the demand for flood insurance, considerations for design of an assistance program for persons who might be cost burdened by rising premiums, and policy options that could make premiums less expensive for all policyholders (NRC, 2015a). The summary of Report 1 is included as Appendix A.

This report (Report 2) proposes an analytical approach FEMA might use to evaluate affordability policy options such as those described in Report 1. In preparing Report 2, the committee's work was informed by lessons learned from a proof-of-concept pilot study completed in North Carolina specifically for this committee's work. The state of North Carolina has extensive data on floodplain properties and it has extensive experience in conducting analyses, using models, of flood risk management options. That proof-of-concept report¹ undertaken by the North Carolina Floodplain Mapping Program (NCFMP) is an independently written, companion document to the committee's report (see Box 1-1, Chapter 1, for the complete statement of task for Report 2).

Chapter 2 of this report describes model development for evaluating affordability policy options and their application to the NFIP. The analytical requirements to evaluate options led the committee to specifically consider microsimulation techniques to support a structured approach to assess NFIP policy options. How such analyses may be conducted is illustrated with examples of model output from the North Carolina proof-of-concept report. Chapter 3 discusses the data available to the NFIP and from other sources for conducting such analyses. Further, it describes ways to fill data gaps.

FEMA is directed to propose an affordability framework to Congress 18 months after completing the affordability study.² The affordability framework was to include actions that advanced the original goals for the NFIP, which were to ensure reasonable insurance premiums for all, base all premiums on risk, secure widespread participation, and earn premium and fee income that covers claims and expenses. Ideally, FEMA would formulate affordability policy alternatives for consideration, conduct an evaluation of the alternatives, and propose a preferred affordability strategy. Policy analysis capacity and necessary data, however, currently are not available to complete a comprehensive analysis of affordability policy options. None-

¹ The NCFMP (2015) report is publicly available at <http://dels.nas.edu/resources/static-assets/wstb/miscellaneous/wstb-cp.pdf>.

² Section 100236 of BW 2012 states "methods to aid individuals to afford risk-based premiums under the NFIP through targeted assistance rather than generally subsidized rates, including means-tested vouchers."

theless, FEMA can complete some limited analyses in the near term as the agency builds its analytical modeling capacity and database through time. Chapter 4 suggests such initial analyses.

In the process of preparing its second report, the committee had the opportunity to reflect on Report 1 findings and, as a result, develop additional findings for FEMA to consider as it prepares its affordability framework for Congress. Chapter 4 includes these additional findings. This report summary includes select findings from Chapters 2, 3, and 4. These are findings the committee believed were of the highest immediate priority. A complete list of all report findings are presented at the end of each chapter. All the committee findings are shown in bold text and reflect chapter number and sequence of findings in the respective chapter.

BUILDING MODELING CAPABILITY

A structured analytical process will provide answers to policy questions. For example, if BW 2012 reforms are in effect, will premiums exceed the ability of owners to pay for insurance for flood-prone properties? And what are the policy alternatives that can make premiums affordable for those who have limited ability to pay?

The need to answer such questions directs attention to development of models and data for estimating the effects of BW 2012 (the baseline condition) and then estimating how affordability policy options alter those effects of BW 2012. Microsimulation techniques often are well suited to making these estimates. Microsimulation models have two essential elements: (1) a microdatabase and (2) a computer program. To answer the policy questions implied in Section 100236 of BW 2012 the database would include information about each NFIP policyholder (or a sample of such policyholders), about their property characteristics, and about their policy. Ideally, the database also would include information about property owners and their properties located in flood-prone areas that do not purchase an NFIP policy, but might in the future. To estimate future flood damage to specific properties the database would require information that characterizes the likelihood of floods of different magnitudes and property-specific flood loss estimates based on the first-floor elevation. With these data available, the model's computer program would simulate NFIP premium-setting practices and estimate premiums paid under both the "baseline condition" policy of BW 2012 and for any alternative affordability policy options that reduce flood insurance premiums (Report 1, Chapter 7).

If there are options that provide financial assistance to property owners who would be unable to pay the premium (Report 1, Chapter 6) then the program would have to simulate the assistance program's rules that determine whether the property owner is eligible for assistance and estimate how

much assistance the property owner might receive. Other effects of interest might include, but would not be limited to, expected future insurance claims (especially if the assistance includes mitigation) and whether the policyholder would no longer purchase a policy at a higher premium (Report 1, Chapter 4). Making calculations for individual property owners and aggregating the results identifies effects on NFIP net revenues, on federal budget expenditures, and on the flood insurance takeup rate across all property owners and subgroups of interest (for example, low-income households).

Microsimulation is an attractive modeling approach because it focuses first on the individual policyholder and property owner. It can also aggregate results across policyholders to produce national estimates and estimates for categories of interest (i.e., income groups or geographic areas). This focus on the policyholder could address the concerns of those who will find premiums unaffordable, who might receive aid, and who might choose to purchase flood insurance. Microsimulation models, however, are necessarily complex to reflect the complexities of government programs and individual circumstances. As a result, their construction requires substantial time and resources. There are professionally recognized practices FEMA can rely upon if FEMA develops a microsimulation model. Among these accepted practices are building self-contained modules that can be readily added to or removed from a more comprehensive model. This in effect builds capacity incrementally as new and better data become available. The pace at which the modeling capacity grows will be determined by the resources available, access to appropriate expertise, and the support of agency leadership.

Finding 2.1: FEMA's capability to evaluate affordability policy options is very limited but can be substantially advanced by embracing a microsimulation modeling approach and building the model incrementally through time. This would begin with conceptual microsimulation model design and the writing of computational algorithms for the self-contained modules as necessary data are identified and data gaps filled.

INFORMATION FOR MICROSIMULATION MODEL IMPLEMENTATION

The microsimulation approach requires the construction of one or more microlevel databases. Data records for each property could include data on variables that characterize property features, socioeconomic characteristics of the property owner and occupant (if different from the owner), and the NFIP policy (if there is a policy in force on that property). The committee reviewed the policy data records in the October 2013 NFIP policy database. The database does include some of the necessary data, but there are incomplete records. A particularly important gap in the data

was the absence of structure first-floor elevation data that are necessary for estimating the damage to the structure from floods of different magnitudes. While some of those data are now being collected for properties inside the special flood hazard area (SFHA), such data are not available and are not being collected for properties outside the SFHA. Also, even if all of the data in the NFIP database were complete and accurate, the database cannot be used to simulate affordability assistance programs that are means tested because the database does not contain income, wealth, or housing cost data. Furthermore, the NFIP database does not contain information for nonpolicyholders located in flood-prone areas and cannot be used to analyze whether an alternative policy option that would reduce premiums or provide assistance might promote takeup among such households.

Some microsimulation model analyses will be for flood claims and perhaps needed to simulate the effects on premiums from new alternative policy options. Making these estimates will depend on information about the likelihood that different floods reach different stages in different areas of the floodplain and the claims resulting from these floods. Only some flood insurance rate maps (FIRMs) include such needed information. Other data sources might be used to replace or supplement the data provided through the FIRMs such as the risk and damage assessment computer software tools from the U.S. Army Corps of Engineers and the tools found in FEMAs Hazus model.

Finally, response functions that can be used to simulate the behavioral response of property owners to changes in policy will be needed to improve the accuracy of estimates. Two examples of response functions include how takeup rates will vary with premiums charged and how premium levels and offers of assistance might affect the demand for flood mitigation. The professional literature provides only a limited basis for developing such response functions. Sensitivity analyses could be used to assess the uncertainty in modeling behavioral responses.

The committee reviewed options for filling data gaps from existing sources for use in microsimulation modeling. These included securing data on socioeconomic characteristics of property owners from the decennial census of population and the continuing American Community Survey (ACS) or administrative records from the Internal Revenue Service (IRS) or the Social Security Administration (SSA). Decennial census and ACS data are of limited usefulness, and although administrative records from IRS or SSA could provide useful data, it might be difficult (due to time constraints) to obtain access to and begin using such data in the near term. Property characteristics might be obtained from commercial enterprises that now collect data at the individual property level and perform their own analyses of home prices from tax assessor records. Some of these sources hold promise for securing necessary data, but none offered readily accessible data.

Certain data gaps could also be filled with data from a new sample survey conducted on behalf of FEMA specifically for the NFIP. Depending on the interviewing mode (personal interviews could be desirable for a FEMA survey because of the ability to capture information by observation of the property) and the extent of follow-up needed to bring response rates up to acceptable levels, however, a survey could be very costly. The necessary number of completed survey cases will be a function of the extent of disaggregation of microsimulation model results that is desired (greater disaggregation requires a larger sample for precision) and the budget the agency can allocate. It is unlikely that new survey data could be obtained in the near term.

Finding 3.3. Information available from the NFIP policy database and from FIRMs are missing data critical to a comprehensive analysis of affordability policy options. Numerous other sources of information, including new survey data collection, could be used to conduct microsimulation policy option analyses. Although the data for a national affordability study initially will be limited, numerous opportunities for database improvement for answering NFIP policy questions can be secured as budget resources permit.

NEAR-TERM ANALYSIS

FEMA's current modeling capability and the data available cannot support building a microsimulation model for a comprehensive affordability analysis. Nonetheless, there are analyses FEMA can undertake in the near term. For example, some assistance program design questions require nonquantitative analysis. For example, who might administer an assistance program? Answers to such a question will affect the formulation of alternative policy options. Also, based on a conceptual-level argument and an understanding of each possible alternative, some might be initially removed from consideration (maybe to be reintroduced at a later date). For example, the discussion in Report 1 on disaster savings accounts, tax credits and deductions, and capping the NFIP responsibility to pay claims in high-loss years might be put aside if the alternative policy option is expected to have little applicability to low-income property owners.

After this kind of initial screening, some policy alternatives will remain candidates for inclusion in an affordability framework and could be subject to quantitative analysis. With this need in mind, FEMA could begin the conceptual development of modules that can answer some of the important policy questions. As one example, a question that can be answered now is how much premiums would increase if policyholders who were paying pre-FIRM subsidized (PFS) rates had to pay NFIP risk-based rates. This is the

baseline estimation needed to begin an analysis of affordability policy options. Answering this question requires a module to replicate the premium-setting practices of the NFIP to include rating tables, coverage selection, zone, and property characteristics including first-floor elevation. FEMA could use the data now being collected on first-floor elevations to impute first-floor elevations on PFS structures for which elevation data are not yet available. FEMA might be provided with the necessary resources and study schedule flexibility that will allow for a data development process to fill in critical, but missing, socioeconomic data on policyholders and property owners in specific geographic areas in North Carolina. This would allow FEMA to build on the proof-of-concept study to provide an evaluation of a number of affordability policy options, recognizing that the North Carolina results would be state specific.

Finding 4.1. Some decision-relevant analyses can be completed with currently available analytical tools and data, or with limited investments in methods and database development. In the process of doing such analyses, FEMA also will make progress toward building analytical capacity to conduct more comprehensive policy analyses in the future.

COMMITTEE REFLECTIONS AFTER REPORT 1

The committee was responsible for preparing two reports. The task for the first report was to describe concepts of affordability, assistance program design decisions, and policy options that may reduce the cost of premiums for those who were cost burdened by premium increases called for by BW 2012. To address its task, Report 1 was organized by chapters on pricing (Chapters 2 and 3), insurance demand (Chapter 4), location of affordability issues (Chapter 5), defining cost burden as ability to pay and assistance program design decisions (Chapter 6), and affordability policy options (Chapter 7). As a result of its work preparing Report 2, the committee developed additional findings regarding NFIP pricing after BW 2012, defining cost burden and ability to pay, and linking mitigation and premium assistance. In the process of preparing Report 2, the committee had the opportunity to reflect on its first report. The select new findings that the committee wishes to highlight are discussed below and other new findings can be found in Chapter 4.

NFIP PREMIUMS AFTER BW 2012 AND HFIAA 2014

Chapters 2 and 3 in Report 1 discussed NFIP rates and rate setting and the changes called for by BW 2012 and HFIAA 2014. With specific reference to rates and BW 2012, Congress instructed the NFIP to move toward

flood insurance premiums that better reflected the full risks of flooding at a given location, following actuarial pricing principles. In Report 2, the committee developed two additional findings regarding the effectiveness of BW 2012 in promoting actuarial-based pricing for the NFIP.

Grandfathered policies are allowed to maintain a lower flood insurance premium if a new FIRM moves the property into a higher flood-risk zone or identifies a new base flood elevation (BFE). BW 2012 eliminated grandfathering, but it was reinstated in HFIAA 2014. Report 1 found that the NFIP sought to compensate for the forgone revenues from grandfathering through a cross subsidy from other policyholders. This cross-subsidy violates the actuarial principle that each policyholder pays rates commensurate with its flood risk. Specifically, for policies that are grandfathered, premiums will be too low, and for those who pay the cross subsidy, premiums will be too high. In the future, and in the context of climate change, land development, and improved flood mapping, some properties will be mapped into SFHAs when they are not currently located or will have higher estimated BFEs. The owners of those properties will have the opportunity to pay grandfathered rates under HFIAA 2014, and the NFIP practice of increasing rates for all policyholders to account for revenue loss from grandfathering may continue.

Finding 4.2. HFIAA 2014's reinstatement of grandfathering, which will perpetuate cross-subsidies in the NFIP, will result in the program increasingly violating actuarial pricing principles if flood risks increase in the future.

The NFIP divides the floodplain into the SFHA and the area beyond the SFHA. Within the SFHA, PFS rates, even after HFIAA 2014, will be phased out and replaced with NFIP risk-based rates. This means that about 20 percent of all policyholders will pay a rate that is more compatible with actuarial pricing principles. As noted, grandfathering was to be eliminated, but HFIAA 2014 reinstated the practice with the result that rates for those properties will be NFIP risk based, but perhaps rated in the wrong flood zone. The number of grandfathered policies is not known. Also, policyholders who live in communities that take actions to reduce flood risk can earn points in the Community Rating System (CRS). Policyholders participating in the CRS receive discounts on the NFIP risk-based premium; some community actions that earn CRS points may reduce expected losses and warrant the premium reductions, but others may not. Outside the SFHA, the NFIP does not require an elevation certificate for properties and also offers preferred risk policies³ (PRPs) for properties that have a favorable loss

³ Preferred risk policies can provide flood insurance coverage for both buildings and contents that are located in moderate to low flood-risk areas.

history. Neither premium is set using a rating table that considers first-floor elevation in relation to a BFE and, as such, cannot be an NFIP risk-based premium rate. BW 2012 does not direct FEMA to review and modify PRP and X zones, which are zones of moderate to low risk of flooding rates to make them risk based.

Finding 4.3. Full implementation of BW 2012 will not result in NFIP risk-based rates for properties located outside the SFHA.

ABILITY TO PAY

BW 2012, Section 100236 states that FEMA

... shall enter into a contract under which the National Academy of Sciences, in consultation with the Comptroller General of the United States, shall conduct and submit to the Administrator an economic analysis of the costs and benefits to the Federal Government of a flood insurance program with full risk-based premiums, combined with means-tested Federal assistance to aid individuals who cannot afford coverage, through an insurance voucher program.

Even though the language in the committee's statement of task does not mirror the language in Section 100236, the committee did review Section 100236 to gain insights into the important questions being asked. For example, the phrase "cannot afford" can be understood as exceeding an individual's ability to pay an NFIP risk-based premium. This focus on ability to pay requires FEMA to define when such premiums impose a cost burden on an individual. Report 1 discussed three possible measures of cost burden, two of which were related to an individual's income. Specifically, Report 1 discussed an income approach and a housing cost as a percent-of-income approach to identify those who would be cost burdened by NFIP rate increases, as well as an approach suggested in HFIAA 2014 that identified premiums exceeding 1 percent of coverage as burdensome.

Cost Burden

During the preparation of Report 2 the committee continued to discuss different definitions of cost burden and ability to pay as it considered the data needed to build a microsimulation model module to estimate who would be eligible for assistance under various affordability policy options. In having that discussion, the committee developed new findings relevant to the topic, including the measure of cost burden suggested by HFIAA 2014—premium as a percentage of flood insurance coverage. The commit-

tee found that a property owner's income or wealth characteristics cannot be incorporated into the above-cited cost burden measure. For example, households with income of \$500,000 and \$50,000, but with the same coverage and premiums, would be considered equally cost burdened and, if a policy provided assistance to eliminate the entire cost burden, would receive similar amounts of assistance.

Finding 4.6. The use of premium as a percent of insurance coverage does not, by itself, satisfy the congressional directive to FEMA to consider providing “targeted assistance to flood insurance policyholders based on their financial ability.”⁴ Therefore, if ability to pay is the congressional concern, then FEMA will still need to develop a measure of cost burden based on policyholder income or wealth or both.

The committee's review of the capped premium approach to defining cost burden and its assessment of policy analysis data needs and gaps led the committee to consider the premium as a percentage of the assessed value of the insured property as an alternative measure of cost burden. Property value, which is a substantial component of total wealth for many households, is used as a proxy for wealth. Wealth, in turn, would be employed as a metric for defining ability to pay for flood insurance. Adding this cost burden measure means that the committee considered four different approaches for defining when NFIP premiums become unaffordable. Each of these approaches has both advantages and disadvantages.

Finding 4.7. For the purpose of implementing an assistance program, policy makers will need to decide whether they want to define cost burden with reference to income, housing costs in relation to income, premium paid in relation to property value, or some other measure. This decision can be informed by technical analysis of the alternatives, but the final selection is a policy judgment.

Loss of Property Value and Household Wealth

Some property owners prior to BW 2012 were eligible to pay PFS rates. Eliminating those rates will increase premiums and, in turn, lower property value. The committee was aware that reduction in property values was a frequently expressed concern of property owners and communities following passage of BW 2012. An argument made by some was that, in many cases, the property value was a substantial component of a policyholder's total wealth. Therefore, a premium increase that diminished property value

⁴ HFIAA, Sec. 9(b)(2).

would, in turn, have a negative impact on wealth. HFIAA 2014 was the congressional response to these and other expressed concerns, but it too will result in the eventual elimination of PFS rates and reduced property prices.

The committee considered the possibility of analytically identifying the effects on property values of losing PFS rates. However, isolating effects of premium increase from other determinants of market price will be difficult, even if the best data for making such a calculation were available. The committee also considered policy options to mitigate these effects if they could be identified. One option to mitigate these effects would be to cap rates at a level less than NFIP risk-based rates for all PFS rates and also allow that cap on the premium to transfer with the property to all future owners. This would be without regard to the future owners' ability to pay. This option would be contrary to the goals of BW 2012 to have property owners pay NFIP risk-based rates and would result in lost revenues to the NFIP, unless offsetting increases in revenues were provided by the federal treasury or by cross subsidy. Another option would be for FEMA to offer financial compensation for property value loss when homeowners sell their house.

Finding 4.8. The negative effect on property values from allowing PFS rates to rise to NFIP risk-based rates is a market-driven reality but would be analytically difficult to isolate from other determinants of property price. A policy decision to compensate for some amount of property value loss may require public expenditure.

LINKING MITIGATION WITH PREMIUM ASSISTANCE

Report 1 described how assistance might be offered for making flood insurance premium payments, for paying for some or all of mitigation that can lead to reduced premiums, or for a combination of both. One way to link flood insurance premium assistance with flood mitigation is through providing an annual assistance payment that the property owner could use to cover the premium and implement mitigation through a long-term loan. If the property owner is expected to decide how to use an assistance payment, then owners should be provided with information on mitigation measures and the contributions of adopting such measures to premium reductions. This type of information is not currently available to homeowners and would require a new outreach and communication effort, especially if the NFIP offers premium reductions for mitigation actions in addition to elevating one's home (Report 1, Chapter 7).

An alternative approach would be for the NFIP to make the calculation to determine the most cost-effective flood mitigation measure for the policyholder and, if assistance was offered, the NFIP would require that cost-effective mitigation be implemented. The argument for this mandatory

use of assistance is that people lack the information to make a financial assessment of the value of mitigation, so a calculation would be made on a policyholder's behalf.

Finding 4.10. Linking mitigation with premium assistance can lead to property owners having a cost-effective combination of mitigation and insurance coverage. Identifying that combination, however, requires complex calculations and the roles and responsibilities of FEMA in assisting with that calculation need to be assessed and, potentially, enhanced.

A FINAL REFLECTION

Floodplains and coastal areas across the United States will continue to be inhabited, especially in places where ready access to water is essential to the economic activities of people and their communities. These geographic areas will sustain occasional damages from future riverine floods and coastal storms. The costs of these losses will be borne in three possible ways, or in some combination. One is that individual NFIP policyholders will bear location cost in the form of insurance premiums paid and damages falling within policy deductible amounts. The second is that the federal taxpayer might bear floodplain location costs if the federal treasury develops a premium assistance program, makes up for NFIP premium revenue shortfalls, pays for pre-flood mitigation, or makes post-flood disaster assistance payments to individual households. Third, property owners and other floodplain or coastal zone inhabitants will bear costs for the losses that are uninsured or otherwise uncompensated.

An original intent of the NFIP was to replace disaster aid payment with flood insurance purchase to the maximum extent possible, shifting more of the cost of floodplain location onto those persons who occupy such places (Report 1, Chapter 2). If this goal is to be pursued, then requests for premium assistance or pre-flood mitigation grants and loans may increase due to future possible premium increases and from changes in flood risk, stemming from changes in climate and changes in watershed runoff due to development. As an NFIP affordability framework is developed, FEMA and Congress will confront the central question, "Who will bear the costs of floodplain occupancy in the future?" With specific reference to the goal of "affordable premiums," that question will be answered in recognition of the available governmental budget for premium or mitigation assistance and the adherence to the actuarial principle of minimizing cross-subsidies within the NFIP.

Introduction

The National Flood Insurance Program (NFIP) was created in 1968 legislation and today is administered by the Federal Emergency Management Agency (FEMA). When the NFIP was authorized, Congress intended for the program to encourage community initiatives in flood risk management, charge insurance premiums consistent with actuarial pricing principles, and also to make premiums affordable to encourage the purchase of flood insurance by owners of flood-prone properties instead of relying on post-disaster flood aid (NRC, 2015a).

Flood insurance can be purchased by individuals from private insurance agents once their community participates in the NFIP and, in so doing, adopts minimum floodplain management ordinances (NRC, 2015a). Flood insurance policies can be bought directly from the federal government through an NFIP Direct Servicing Agent or from a FEMA-identified Write-Your-Own agent.

NFIP risk-based premiums depend on expected future insurance claims; these claims will depend on coverage selected, property characteristics, and the location of the property. In addition, there are charges added to the premium to cover the costs of administering the program and maintaining a financial reserve to cover catastrophic-loss years. However, from its inception, the NFIP premium structure has deviated from strict adherence to actuarial principles to promote the multiple and sometimes conflicting goals of the original authorization (Hayes and Neal, 2011; NRC, 2015a).

The NFIP has been reauthorized many times since 1968, most recently with the Biggert-Waters Flood Insurance Reform Act of 2012 (BW 2012). In this most recent reauthorization, Congress placed a particular emphasis

on the goal of setting premiums following actuarial pricing principles, motivated by a desire to ensure that future revenues were adequate to pay future claims and administrative expenses (NRC, 2015a). BW 2012 was designed to move the NFIP toward risk-based premiums for all flood insurance policies. The result was to be increased premiums for some policyholders that had been paying less than NFIP risk-based premiums, and to possibly increase premiums for all policyholders (NRC, 2015a).

Recognition of the possibility of increased premiums for some policyholders and broader affordability concerns of flood insurance is reflected in Section 100236 of BW 2012 (Appendix C), and in Sections 9 and 16 of the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014) (Appendix D). These sections called on FEMA to propose a draft affordability framework for the NFIP after completing an analysis of possible options for offering “means-tested assistance” to policyholders for whom higher premium rates may not be affordable.

ORIGINS OF THIS REPORT

BW 2012 and HFIAA 2014 mandated FEMA to conduct a study. The legislation also called for FEMA to prepare a “draft affordability framework” as described in Section 9 of HFIAA. In developing the affordability framework, FEMA was to address several matters, only one of which is to propose an assistance program. The required content of the framework (paraphrasing the legislation) included

- a plan for offering targeted assistance for ensuring flood insurance affordability among low-income populations;
- programs to ensure communication of the flood risk to property owners and residents in floodplains;
- recognition of the effectiveness of a full range of individual and community actions to mitigate flood risk in NFIP rating tables;
- a report on the effect of increases in premiums on participation in NFIP; and
- a report on the consequences of map updates on affordability of flood insurance.

Section 100236 of BW 2012 also requested the National Academy of Sciences (NAS) to conduct a study that would “compare the costs of a program of risk-based rates and means-tested assistance to the current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage” (P.L. 112-141; 126 Stat. 957). The reference to programs of “risk-based rates” and “current system” refers to comparing the premiums that would have been in place as a result of BW 2012 with

those before BW 2012. The comparison called for in the congressional request was to be for a time when BW 2012 was in full effect. The 2012 legislative requirement for a NAS study was amended by HFIAA 2014, changing the schedule and providing additional resources for conducting the study (NRC, 2015a).

There are some differences between language in the legislation and the scope of work for this report, and Report 1. As noted in Report 1, “when reading this report, it is important to recognize that the language from Section 100236 of BW 2012 as amended in HFIAA 2014 differs from the language in the statement of task. The language in the statement of task was discussed and agreed on by FEMA and the NAS with consideration of the resources available to the NAS and the needs of FEMA” (see Appendix I for the task statement of both reports).

The first report, entitled “Affordability of National Flood Insurance Program Premiums—Report 1,” described policy options and decisions to be made as FEMA proposes an affordability framework. The summary of that report is included as Appendix A. Report 1 included chapters on the following:

- **Background and historical aspects of the NFIP.** Chapter 2 described the multiple goals for the NFIP, the initial responsibilities of the private sector, the legacy for current premium-setting practices, and the recent reform legislation.
- **Flood insurance pricing, policies, and premiums.** Chapter 3 reviewed NFIP premium-setting practices against actuarial pricing principles and explained the rationale for past deviations from those principles for the main types of NFIP policies (NFIP risk-based, pre-flood insurance rate map [FIRM] subsidized, grandfathered, Community Rating System discounted, and preferred risk). The text described how BW 2012 and HFIAA 2014 would affect future policy offerings and premium-setting practices.
- **The decision to purchase insurance.** Congress has long been interested in promoting the purchase of flood insurance and has continued (as evidenced in HFIAA 2014) to be concerned that higher premiums will discourage purchase. Chapter 4 reviewed the literature on the determinants of insurance purchase decisions and found that the effects of price on purchase was uncertain, but that premiums were one factor—however, not the only factor—affecting the decision to purchase flood insurance.
- **The spatial distribution of policy types and location of potential affordability challenges.** In Chapter 5, the limited policy data available were used to describe the number and distribution of NFIP policies of different types. Data limitations made it impossible to

determine how many policies were grandfathered, a matter of importance for affordability policy analysis.

- **Affordability concepts and a framework for assistance program design decisions.** Chapter 6 described three ways to measure when a premium might impose a cost burden on a policyholder and then described six design decision questions that policy makers must consider if they were creating an assistance program: who will receive assistance, what assistance will be provided, how will assistance be provided, how much assistance will be provided, who will pay for assistance, and how will assistance be administered? Technical analysis can provide valuable information, but the final answers to these questions require policy judgments.
- **Policy alternatives for an affordability strategy, including direct assistance options and actions that would reduce premiums for all policyholders.** Chapter 7 discussed specific ways to offer premium payment assistance and to offer premium-reducing mitigation assistance. For example, the chapter discussed changes to eligibility for mitigation grants. Another part of the chapter discussed alternatives to reduce premiums across the board. For example, the chapter discusses the opportunities and challenges of giving credit to mitigation actions other than elevation for reducing future claims and hence premiums.

This second report proposes an analytical platform and describes the data required for FEMA to use when evaluating the possible alternatives that might be included in an affordability framework. The committee's charge for this report—Report 2—is outlined in Box 1-1.

In developing the task statement, the NAS committee and FEMA were aware of substantial data gaps for the purposes of evaluating options for an affordability framework.

The committee's Report 1 concluded that the increase in premium costs to pre-FIRM properties from charging NFIP risk-based rates could only be estimated with additional data on structure elevations. There data are missing for pre-FIRM subsidized (PFS) policyholders, although FEMA is in the process of collecting it, and for policies located outside the special flood hazard area. The committee also found that there is a lack of data to identify whether a current policy is grandfathered. Other data gaps include floodplain property owners' household income, housing expenses (including mortgage obligations), and perhaps other characteristics for evaluating different means-tested assistance program designs (NRC, 2015a).

Lack of data for evaluating NFIP policy options has been recognized as a challenge in the past. In 1999, in response to the National Flood Insurance Reform Act of 1994, FEMA contracted with PricewaterhouseCoopers

BOX 1-1 **Statement of Task**

The Federal Insurance and Mitigation Administration is a component of the Department of Homeland Security, Federal Emergency Management Agency (FEMA), which operates the National Flood Insurance Program (NFIP). On March 21, 2014, President Obama signed the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 into law. This law repeals and modifies certain provisions of the 2012 Biggert-Waters Flood Insurance Reform Act and makes additional program changes to other aspects of the program not covered by that Act. One modification regards a study being conducted by the National Research Council (NRC) of the National Academy of Sciences. HFIAA requires the submission of the Affordability Study by the FEMA Administrator in 18 months from enactment of the Act.

The second report will propose alternative approaches for a national evaluation of affordability program policy options. The second report will include lessons for the design of a national study from a proof-of-concept pilot study. The second report shall discuss

- data issues such as needs, availability, quantity, and quality;
- appropriate analytical methods and related considerations, including models, computing software, and geographic areas to be analyzed;
- a proof-of-concept pilot analysis will be subcontracted as part of the study. This analysis will apply different methods for conducting a flood insurance affordability analysis for a state (North Carolina) in which data on elevations of structures and hydrologic flood hazards are readily available. This analysis will inform the committee's deliberations and findings regarding the possibilities for a national-level flood insurance affordability study, for which these data on elevations and flood hazards are less readily available; and
- national implications from the proof-of-concept pilot results including, but not limited to, possible impacts on participation rates (the analytical work for the proof-of-concept pilot may be carried out by the NRC directly or using subcontractors as necessary).

(PwC) for a study on the economic effects of charging actuarially based premium rates for pre-FIRM structures. The PwC report (PwC, 1999) tried to fill elevation data gaps by drawing a sample of pre-FIRM properties and then used sample results to impute missing values to the whole population of pre-FIRM properties including first-floor elevation. Because of study time and cost limitations, a sample of 50 communities that included pre-FIRM subsidized policies (a sample from 15,461 NFIP communities considered in the study) was selected. Elevation data were collected on structures in 23 of the 50 communities. It is not clear from the report the extent to which these

samples were representative of the entire population of NFIP communities. No new effort to secure elevation data was initiated and the 16-year-old results for the PwC report continue to be used to estimate the elevation of pre-FIRM properties in 2015.

More recently, the Government Accountability Office (GAO) and Congressional Research Service reported on various aspects of the NFIP. These included the challenges and financial status (King, 2012), improving the administration of the NFIP (GAO, 2011), subsidized properties (GAO, 2013), and strategies for improving the role of the private sector (GAO, 2014a) (see Appendix A for further description of the reports). In 2014, GAO also reported on forgone premiums—the difference between subsidized and full-risk premiums. As of the end of September 2013, there were more than 1.1 million subsidized policies (GAO, 2014b). GAO found that forgone premiums could not be measured, as there was a lack of property elevation data for PFS policyholders. Nonetheless, GAO did estimate how much forgone premiums might be and this ranged between \$16 and \$25 billion for the period 2002 to 2013 (GAO, 2014b). To do that, they relied upon estimates provided by FEMA (which in part are based on the elevation data reported in the 1999 PwC study).

The reality of limited data and little analytical capacity to quantitatively determine outcomes of different flood insurance affordability policy options is the context for this report. Importantly, the recognition that data gaps would not be easily filled directed the task statement for Report 2 toward a report on analytical process design, data gap identification, and approaches to filling data gaps.

REPORT 2 ORGANIZATION AND AUDIENCE

Responses to the questions implied by Congress in BW 2012 and HFIAA 2014 are being developed by FEMA in a context of no existing analytical platform and significant data gaps (see NRC, 2015a; GAO, 2013; and King, 2013). Chapter 2 of this report describes various models with a focus on a microsimulation approach to policy analysis for the NFIP that can be structured and scaled to the available time, cost, and data resources and then enhanced as more resources become available. This analytical approach, considered in the context of questions that need to be answered for an affordability framework, provides a basis for understanding data requirements. Chapter 3 then discusses the available data both in the NFIP policy database and from other sources both in and outside of FEMA. Presently, much of the data needed for simulation are not available; therefore, Chapter 3 also reports on ways to fill those data gaps. Within Chapters 2 and 3, the committee makes reference to a report prepared by the North Carolina Floodplain Mapping Program. This report used the analytical

method of microsimulation to evaluate affordability policy options and, in so doing, served as a proof-of-concept for that method and helped identify data needed to perform affordability policy analyses. Chapter 4 has two main sections. The first includes suggestions for near-term analysis that can be accomplished with existing or modestly expanded resources and data. In the process of preparing its second report, the committee had the opportunity to reflect on the findings of Report 1 and, as a result, developed additional findings (all findings are in boldface type and the numbering of findings reflects chapter number and sequence in the respective chapter) for consideration by FEMA as it prepares its affordability framework for Congress. Therefore, Chapter 4 includes additional findings for some of the topics covered in the different chapters of Report 1. Each chapter presents its findings in the body of the text or at the end of the chapter or both. The report summary includes select finds from Chapters 2, 3, and 4.

Appendix A is the Summary from Report 1. Appendix B is a table of past pertinent reports undertaken by the Government Accountability Office and the Congressional Research Service between 2011 and 2015. Appendix C is Section 100236 from the Biggert-Waters Flood Insurance Reform Act of 2012, and Appendix D is Section 16 of the Homeowner Flood Insurance Affordability Act of 2014. The committee biographical sketches are in Appendix E. Appendix F is a letter sent to the committee requesting evaluation of the specific cost burden measure suggested in HFIAA 2014. Appendix G is a table of data products from the American Community Survey, Appendix H includes tables of data fields found in the NFIP database, and Appendix I includes the task statements for Report 1 and Report 2.

The audience for this report includes FEMA; other relevant federal agencies, such as the U.S. Department of Housing and Urban Development (HUD); Congress and congressional staff; governors of states with flood-prone communities; mayors and citizens in flood-prone communities, especially NFIP policyholders; university faculty and other experts in the fields of natural hazards, flood insurance, and floodplain management; local and state officials with NFIP implementation responsibilities; and private-sector companies involved in flood insurance, flood mapping, and floodplain management.

An Approach to Policy Evaluation for the National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) was directed by Congress to conduct a study on how changes required by the Biggert-Waters Flood Insurance Reform and Modernization Act of 2012 (BW 2012) affect the affordability of flood insurance premiums. Such a study could support the design of a National Flood Insurance Program (NFIP) affordability framework that includes a financial assistance program, as specified by the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014), Section 9. The committee's first report (NRC, 2015a) described policy options that might be considered in proposing an affordability framework and also the design decisions that must be made by policy makers to develop an affordability assistance program. The various options can be combined in different ways to formulate a wide range of policy option alternatives. This chapter is organized in consideration of needing to choose among these policy option alternatives. It has three major sections: elements of a planning process; a discussion of policy modeling, including microsimulation; and an illustrative application of a planning process to evaluate affordability policy options.

ELEMENTS OF A PLANNING PROCESS TO EVALUATE AND COMPARE NFIP POLICY OPTIONS

A structured planning process for conducting the congressionally required affordability study can be organized around a suite of interrelated evaluation elements (Deason et al., 2010; Stokey and Zeckhauser, 1978). These elements are briefly described below and are generally executed in a

stepwise fashion, but the process can be iterative to provide opportunities for revisiting and refining steps to formulate a given alternative option.

1. Identify problems and opportunities. The evaluation process begins by identifying policy-relevant questions and outcomes. Most of the questions will be of the “what-if” nature, organized around a policy problem to be addressed by as yet unspecified policy options. For example, a what-if question would be the following: For how many policyholders would a particular assistance program eliminate the cost burden of NFIP risk-based premiums under full implementation of BW 2012? In the NFIP context, these could include the number and percent of policyholders who are cost burdened by their NFIP premiums using different measures of cost burden selected by policymakers for comparison.

2. Forecast future conditions. With the first element completed, a forecast of the future level of each metric without any policy interventions is prepared. In the context of BW 2012 Section 100236, this future condition would be BW 2012 fully implemented, without an associated affordability policy. This is the baseline for the analysis as discussed in this report.

3. Formulate policy options. The next step is formulation of alternative policy options that might affect metrics in the future. Report 1 (Chapters 4, 6, and 7) discussed actions to increase takeup rates and affordability policy designs that might reduce the cost burden of NFIP premiums.

4. Predict future conditions with an alternative policy option in place. The analytical and generally quantitative element then follows, wherein models and data are used to predict conditions under the baseline and with the policy options. For example, to assess the effect of a mitigation loan program, the number and percent of policyholders who would be cost burdened under the loan program could be estimated and compared to the number and percent values predicted under the BW 2012 baseline.

5 and 6. Evaluate and compare policy options. With all predictions made, the results are displayed in ways to allow decision makers to evaluate and compare options and, ultimately, choose a preferred policy option. Ideally, implementation of the chosen option is followed by monitoring of outcomes to ensure that policy-relevant concerns are being addressed; this will mean that important metrics (e.g., number and percent of policyholders who are cost burdened) are measured and tracked to assess the status of a given option.

MODEL DEVELOPMENT FOR EVALUATING AFFORDABILITY POLICY OPTIONS

Policy Modeling: What If?

A common charge to federal agencies from executive and legislative policy makers is to provide quantitative answers to questions about the likely future effects of one or more policy options in a “what-if” framework: If a policy changes in a specified way, what is an agency’s best estimate of not only the total costs to the government compared with current policy 1, 5, or 10 years out, but also who will benefit and who will lose from the change—which population groups, geographic areas, and organizational players? Any such analysis, no matter how simplistic, requires the development, implicitly or explicitly, of a model that makes assumptions and applies them to data to generate estimates.

One definition of a quantitative model is a “mathematical framework representing some aspects of reality at a sufficient level of detail to inform a clinical or policy decision” (Caro et al., 2012). More generally, a model is a communication tool that allows the complexity of a given system to be reduced to its component elements. Models range from simple to highly complex (Box 2-1). Models can be ad hoc—developed for one-time use, often “on the fly”—or they can be formal—developed for longer-term use for repeated evaluations of alternative policy options as they emerge in an area and, hence, requiring extensive documentation of assumptions, inputs, outputs, and modeling processes. Model outputs can range from aggregates for a few categorizations of the population of interest, to detailed disaggregation by areas or population subgroups. Model inputs can similarly pertain to a relatively small number of prespecified aggregations or to large numbers of individual observations that can be reaggregated in different ways. Model operations can be largely deterministic, or they can be probabilistic and include behavioral predictions based on empirical studies. Models can also accomplish future projections by “aging” the initial database and incorporate changes in key parameters due to external forces (e.g., sea-level rise due to climate change).

Prior to the advent of high-speed computers and extensive databases, modelling analysis was limited to simple, deterministic, highly aggregated, ad hoc models that could be computed on the “back of the envelope.” Beginning in the 1960s and 1970s, several types of formal computer modeling techniques and software were developed for longer-term use. Today, ad hoc models developed for specific applications often use software that utilizes tabular spreadsheets.¹ Tabular spreadsheets could be considered the

¹ Spreadsheets can also be used to develop some types of formal models.

BOX 2-1^a**Types of Policy Analysis Models and Their Applicability to the NFIP**

Time-Series Models—Models that range from simple extrapolation of a time series, such as participants in a program (e.g., the number of policyholders) or aggregate annual claims, to complex macroeconomic models that interrelate large numbers of time series with specified assumptions about, for example, the relationship of economic output to various inputs. With their focus on forecasting aggregate quantities based on historical data, simplistic time-series models are too limited for policy modeling of the NFIP, and complex macroeconomic models are not applicable.

Regression Models—Models that include parameter estimates of the relationships of input (right-side) variables to an output (left-side) variable from a regression performed on a database; for example, a regression model might be useful to relate the probability of participating in a flood mitigation program to characteristics of homeowners. Regression models are too limited for most policy modeling, including that required of the NFIP. One such limitation is the ecological fallacy—the logical error of making inferences about individuals (e.g., policyholders) from relationships estimated for groups (e.g., communities). Another limitation is the complexity of modeling many outcomes together. Nonetheless, appropriately specified and estimated regression models can often provide one source of input to another type of model (e.g., a microsimulation model).

Cell-Based Models—Spreadsheet models that perform computations on pre-specified “cells.” For example, NFIP policyholders might be classified by premium category prior to BW 2012 (e.g., NFIP full-risk, pre-flood insurance rate map [FIRM] subsidized, grandfathered), elevation, amount of coverage or property value, broad geographic area of property, and other characteristics. The cell-based

functional equivalent of yesterday’s “back of the envelope” calculations, although spreadsheets can also be used in more formal models. Among the available formal modeling techniques are time-series models, regression models, cell-based models, microsimulation models, and general equilibrium models (See Box 2-1). Numerous computing software packages have the capability of undertaking many of the modelling techniques listed below.

In considering modeling options, FEMA could view its congressional directive—that is to conduct a study on how BW 2012 would affect the affordability of flood insurance premiums—as limited to requiring the development of one or more ad hoc models for estimating costs and benefits of specific affordability policy options. However, if FEMA views its Congressional request in the context of a long history of requests for different kinds

approach could be useful for the NFIP—for example, assessing the effect of a very specifically targeted policy (e.g., providing affordability assistance based on a simple formula to policyholders that received pre-FIRM subsidies prior to BW 2012). However, a cell-based model would limit the detail of disaggregation of outputs that could be provided to policy makers and would likely require frequent respecification to add, delete, and modify cells as policy options (e.g., assistance targeting) and output needs changed.

Microsimulation Models—Models that operate on microlevel databases of individual records (e.g., policyholders), mimicking how current and alternative program provisions apply to the individual units described in those records. Such models permit detailed disaggregation of outputs to serve policy makers' diverse needs. Although microsimulation models are often complex (but typically less complex than macroeconomic models) and can be costly to build and maintain, such a model would be highly flexible and well suited, and relevant to the policy modeling needs of the NFIP.

Computable General Equilibrium Models—As their name implies, models that simulate entire economies, which are typically disaggregated into sectors, and are designed to estimate the general equilibrium effects—after several rounds—of major economic policy changes (e.g., changes in taxes). They are not applicable to the NFIP, which pertains to a tiny part of the U.S. economy. Similarly, integrated assessment models, which are used to model the interaction of environment factors, such as climate change, economic impacts, and large-scale policy responses (Nordhaus and Sztorc, 2013), are much too broad for use for the NFIP.

^a Although Report 2 focuses on the applicability of these techniques for policy modeling of the NFIP, more general discussions of these methods and their strengths and weaknesses for other applications can be found in NRC (1991, 1997) and OASPE (2012).

of analysis (See Appendix B) then it may choose to pursue the development, maintenance, documentation, and regular updating of a formal policy modeling tool that can be used repeatedly to analyze a variety of policy options and the effects of changing external conditions. The task for FEMA then becomes determining which formal modeling tool (or tools) to select for investment given the kinds of policy questions it is likely to be asked.

FEMA's modeling needs for NFIP premium affordability study require the ability to estimate yet-to-be developed policy options, singly and in combination, that could affect NFIP premium revenues and the affordability of premiums for current individual policyholders and groups of policyholders (defined, for example, by income or wealth, geographic area, and other characteristics) and potential policyholders. Congress and other

stakeholders may want answers to questions that have a specific focus, such as, What are the effects in a particular congressional district for various groups of property owners and where are the effects concentrated? As FEMA's modeling capacity is developed over time, the agency would be able to predict behavioral effects, such as the propensity for homeowners to newly purchase, increase, decrease, or entirely drop flood insurance coverage in response to changing premiums or assistance in paying premiums or undertaking mitigation. This combination of analytical requirements leads to consideration of microsimulation techniques for assessing NFIP policy options, including options for providing affordability assistance.

Regarding this choice, the committee began with the reality that the effects of BW 2012 (and other legislation and policies) are manifested first at the level of the individual policyholder/property owner. Therefore, the most appropriate and credible analytical approach has to begin at that level, and the only such approach for highly flexible, fine-grained, realistic analysis is microsimulation. In addition, microsimulation is the only approach that readily allows results to be presented for various levels of aggregation, as is typically required by policy makers. Of course, as the report notes, FEMA will need to consider its current directive from Congress and its mission and long-term objectives, as well as time, the availability of resources, and other factors in making a decision on modeling strategies. FEMA may determine that other modeling approaches (e.g., cell-based models) can be useful for some limited questions and purposes. But the committee does recommend microsimulation to FEMA on the assumption that FEMA will continue to be asked for detailed analysis of costs and benefits of various proposals for changes in the NFIP or other policies (e.g., disaster relief or mandatory purchase requirements), so that an investment in microsimulation is well worth it. Moreover, microsimulation analysis would likely be conducted on a sample of households and properties, and the size of the sample deemed adequate for answering the policy questions being raised will feature heavily in determining the cost and time for obtaining needed data completing cost-benefit analyses of various policy options.

A fully developed microsimulation model can be complex and can be costly to build and maintain. However, a complete microsimulation model does not need to be built before any analyses can be completed. Rather the construction of the model can begin immediately by building separate modules and as the available data permit can be used to answer some important but limited questions. Over time new modules can be built and linked together to create a more complete model that can be quickly deployed to answer future NFIP policy questions as they arise.

What Is Microsimulation?

The microsimulation modeling approach to produce estimates of the effects of proposed changes in government programs involves obtaining inputs from microlevel databases of individual records, mimicking how current and alternative program provisions apply to the individuals described in those records. For example, in simulating the effects of changes to the Supplemental Nutrition Assistance Program (formerly the Food Stamp Program), microsimulation models process records for families as if they were applying to the local welfare office for benefits, and in simulating the effects of tax law changes, microsimulation models process records for people as if they were filling out their 1040 tax forms.²

Microsimulation models have two essential elements: (1) a micro-database and (2) a computer program. The database is constructed from administrative or survey data with information on households in the population targeted by the government program. The model's computer program codes the rules of the government program under both the "baseline" policy, which is typically the current policy, and a "reform" policy, which is a proposed alternative. The computer program also simulates, in the case of a government assistance program, whether a household is eligible for the government program and the benefits for which the household would qualify. In addition, the computer program simulates a household's behavioral response, determining whether the household will participate in the program. Processing all the households in the database, the model counts participants to estimate the total participation in the program and adds up the assistance provided to estimate total program costs. By performing these operations under both baseline and reform policies and comparing the results, the model estimates the program cost and participation effects of the proposed reform policy option. The model can also estimate the distributional effects of the reform, identifying the population subgroups that gain and lose benefits (Schirm and Zaslavsky, 1997).

For the NFIP, a fully developed microsimulation model would likely have a database consisting of current NFIP policyholders and potential policyholders—in other words, both insured and uninsured properties—in areas of flood risk. For each property in the database, the computer simulation program would use location information, property characteristics, and preferred coverage to simulate premiums to be paid under a baseline and a proposed alternative policy option. Information on the assistance program design features, the property, and the property owner will allow the computer program to simulate whether the property owner is eligible for assistance (and the amount of assistance) in paying the premium or for

² Commercial tax preparation software is a form of microsimulation modeling.

undertaking mitigation. The program would also be able to aggregate the simulated results across properties in the database to estimate outcomes such as the insurance takeup rate, NFIP net revenues, and federal expenditures. Also, effects on subgroups defined by property or policyholder characteristics, including geographic area, premium category prior to BW 2012 (NFIP full-risk, pre-FIRM subsidized [PFS], grandfathered, and preferred risk policy) and household income or wealth could be estimated (see Box 2-2).³

Typically, microsimulation models are developed incrementally, with continuing improvements to both the database and computer simulation program over time. The simulation program is usually modularized, and the simulated results from some modules feed into other modules. Such modularization facilitates the refinement of old modules and the addition of new modules to enhance the model's simulation capabilities. In addition to simulation modules, the program will have basic tabulation routines that aggregate across individual observations in the database to produce estimated outcomes for the entire NFIP and important subgroups.

For the NFIP, an initial microsimulation database might include only current policyholders. Through time, properties that are not covered might be added to the database. Similarly, the first-generation model might not simulate behavioral responses, assuming, instead, that current policyholders maintain the same level of coverage as before even if the premium were to change substantially. Subsequently, a behavioral response module could be developed that simulates whether a current policyholder increases, decreases, or drops coverage and whether a potential policyholder takes up coverage on a previously uncovered property in response to a change in the premium, considering the current or potential policyholder's income and other characteristics.⁴

Although the first-generation NFIP microsimulation model might not simulate behavioral responses, it would certainly need a module that estimates a property's flood risk based on the property's characteristics, as well as a module that estimates the flood insurance premium based on the NFIP

³ Output from the microsimulation program could include, for example, premium revenues and the percentage of policyholders who are cost burdened by their NFIP premiums, for not only the entire NFIP, but also the subgroup of policyholders who lost pre-FIRM subsidies due to BW 2012. These outcomes would be estimated under both the baseline condition and the alternative policy option under consideration. The differences between the outcomes—such as the increase or decrease in the percentage of cost-burdened policyholders—show the effects of the alternative policy option.

⁴ Pending the development of such a behavioral response module, a microsimulation model could have the capability of conducting sensitivity analyses based on certain—probably fairly crude—assumptions, such as no response at all versus no response at all except for dropping coverage entirely if the premium increase exceeds some specified threshold.

BOX 2-2 **A Microsimulation Model of the NFIP**

A microsimulation model operates on a microlevel database of individual records (e.g., property owners in floodplains) and simulates how current program provisions and alternative policy options affect these individual records.

The essential elements in developing a microsimulation model of the NFIP include the following:

1. Construction of a microdatabase of properties, policies, and owners with all the relevant data elements, including hazard maps or other means to estimate flood losses and future claims should floods of different magnitudes occur and cause damage to properties.
2. Development of a computer program that can simulate a baseline policy (e.g., BW 2012 as fully implemented) and alternative policy reforms (e.g., an affordability assistance plan). The program would perform all of the necessary calculations to show “what happens” to a property owner or to other entities of interest (an entire community or other relevant subgroups) under the baseline and under alternative options. As it is developed, FEMA’s microsimulation model could incorporate projections of the baseline into the future based on changes in the population (e.g., aging and development) as well as changes in external conditions (e.g., sea-level rise due to climate change).

Microsimulation models are conceptually attractive because they begin at the appropriate decision level of the property and property owner and can account for the diverse circumstances and characteristics of the relevant population. In FEMA’s case, the relevant population may be current NFIP policyholders and potential policyholders in areas of flood risk.

rating tables (or the tables under an alternative plan), the chosen coverage and deductible, and the estimated risk from the risk module.⁵ Meanwhile, the microsimulation database would need to have all of the data elements required by these modules. These data needs and the gaps in existing data are discussed in detail in Chapter 3.

Of course, the reform options of most immediate interest to FEMA are affordability assistance programs, such as a program that provides premium assistance to policyholders who are cost burdened by NFIP risk-based premiums. If the assistance is paid from general federal revenues, the

⁵ The analysis called for by BW 2012 is pushing the NFIP rate-setting practice toward “full-risk” premiums on all insured properties. Therefore, the premium determination module must be able to mimic the process by which premiums are estimated.

BOX 2-3

Projection Capabilities in Microsimulation Models

Because federal, state, and other agencies are often asked to provide estimates of policy effects for future periods, any modeling tool requires a capability for projection of its input database. Projection capabilities in microsimulation models are achieved by two basic techniques: static aging and dynamic aging.

Static microsimulation models project a sample forward for short time periods by reweighting the records in the database (e.g., if new construction in an area is expected to increase at-risk properties by 10 percent over the next 5 years, then the properties in the database in that area are treated as if they each represented 1.1 properties).

Dynamic microsimulation models project a sample forward by dynamic aging (e.g., people aged 50 become 60 in year $t + 10$). FEMA may not need the added complexities of dynamic aging, because it is not concerned with following the trajectories of individual policyholders. Rather it is concerned with point-in-time estimates for specified periods (e.g., 5 or 10 years into the future). Such estimates can be accomplished by static reweighting techniques.

effect of the assistance program on NFIP premium revenues is limited to its effect on whether the premiums paid by those who receive assistance change their demand for insurance, a response that might not be simulated by a first-generation model. Yet, if the assistance program design caps premiums paid to the NFIP, revenues to the program would be reduced. In either case, one or more modules may be needed to determine which policyholders are eligible for assistance, the amount of assistance to be provided, and how the amount of assistance is paid (whether by reducing the premium or from an “outside” source). Additional modules or enhancements to other modules might be required if assistance programs providing mitigation assistance are to be simulated. For example, it could be necessary to simulate how a particular mitigation activity lowers flood risk and, thereby, the flood insurance premium (Box 2-3).

Moving Forward

FEMA will need to determine what it seeks to accomplish with any modeling it undertakes. At one extreme, it might see its needs met by a model with limited capabilities to answer immediate and specific questions about affordability policy options. For example, FEMA may choose to estimate only the effects of a policy that provides some or all previous recipients of PFS rates with assistance amounts equal to their pre-FIRM subsidies.

In contrast, FEMA might aspire to develop a microsimulation capability for providing rapid responses to a wide array of questions over time, including questions about program design that have not yet been asked (see Table 2-1 in section entitled “Identify Policy-Relevant Questions”).

Models based on microsimulation techniques are conceptually highly attractive because they operate at the appropriate decision level (e.g., household or individual) and take into account the diverse circumstances and characteristics of the relevant population, whether it be low-income families or taxpayers, or, in FEMA’s case, NFIP policyholders and potential policyholders in areas of flood risk. Such models are able to respond to important needs of the policy process for information about the effects of very fine-grained, as well as broader, policy changes, and the effects of policy changes on the NFIP as whole, as well as important population subgroups.

Building microsimulation models, however, which are necessarily complex to reflect the complexities of government programs and individual circumstances, requires substantial time and resources. There are recognized practices for an agency looking to develop a simulation model to address its needs for evaluating various policy options (NRC, 1991; OASPE, 2012, and the references on pp. 74-75 therein). These include

1. setting clear goals and priorities;
2. building capacity incrementally through time, especially as new and better data become available;
3. focusing on building self-contained modules that can be readily added to or removed from the model;
4. designing modules to facilitate documentation and validation and allow for enhancement over time;
5. being cognizant of the need to provide for entry and exit points in the model that facilitate linkages with other models, even if at some future date;
6. constructing prototypes and establishing milestones throughout the development process to help identify design flaws at an early stage;
7. enabling some analysis capabilities before the entire model is completed;
8. attaining model accessibility to allow for peer review and other users who are not experts;
9. preparing adequate documentation on a timely basis for the model and its components; and
10. conducting validation studies of the model and its components, including the assessment of uncertainty through the use of sensitivity analysis and the application of sample reuse techniques to measure variance.

Following these recognized practices will allow for the development of a well-documented and modularized microsimulation model. In adopting these practices, an agency is required to make clear the assumptions (tested and untested) in the model, the strengths and weaknesses of model components and the underlying data, and the relationships among model components. Such transparency helps develop a short-term and longer-term agenda for research and data acquisition to improve the model, which, in turn, improves the estimates of policy outcomes it provides.

MICROSIMULATION MODELING FOR THE NFIP

The purpose of this section is to illustrate how the evaluation elements might be implemented in a FEMA evaluation of affordability policy options. It is illustrative and not meant to be a recommendation for how

BOX 2-4

North Carolina Proof-of-Concept Pilot Analysis

The North Carolina Floodplain Mapping Program (NCFMP) prepared a report^a that served as a reference for the Committee on the Affordability of National Flood Insurance Premiums. NCFMP conducted analyses, as instructed by the committee, relevant to the committee's charge and the analyses were considered by the committee in writing Report 2.

The NCFMP work focused on the analytical challenges, data needs, and related data acquisition issues for conducting a national-level flood insurance affordability assessment. NCFMP was selected to work with the committee in this "proof-of-concept" pilot analysis because of the extensive and sophisticated databases and analytical models developed by the state to assess flood risk. By many measures, the NCFMP databases and related methods of analysis are the most advanced in the United States, although they still fall short in some respects of what might be needed eventually by FEMA.

The NCFMP's report demonstrated an analytical approach and identified data requirements for evaluating different NFIP policy scenarios, with specific attention to policies that would limit premium increases (premium assistance or mitigation grants) for some subset of policyholders. As a part of the study process, this committee provided the scope of work that resulted in the NCFMP report. The NCFMP report, however, is not a committee product, rather a report that the committee references throughout Report 2.

The main objectives of the pilot analyses were to

1. test the conceptual logic and computational methods for an affordability analysis and
2. identify data needs to perform similar analysis at a nationwide scale.

FEMA might conduct a particular analysis. In preparing these sections of the chapter, the committee provided specific illustrations for each of the six elements of the planning process that are pertinent to applying a micro-simulation approach to the NFIP. The particular illustrations used are based on the committee's experience in preparing both Report 1 and Report 2, along with insights gained from the North Carolina proof-of-concept pilot analysis (NCFMP, 2015; Box 2-4). As FEMA begins to implement its own analysis, it will have to define the relevant questions, outcomes and metrics to measure outcomes, and alternative policy options to evaluate.

Identify Policy-Relevant Questions

A common charge to federal agencies from executive and legislative policy makers is to provide quantitative answers to questions about likely

To accomplish objectives, NCFMP had three tasks:

1. Compile and integrate relevant data.
2. Establish a baseline flood insurance portfolio for North Carolina.
3. Evaluate alternative NFIP policy options and their impact on affordability.

NCFMP has acquired and developed advanced datasets and tools to support its ongoing and planned initiatives on floodplain mapping. Examples of specialized datasets include building footprints, which have detailed physical building and property information, floodplain mapping, and digital flood elevation data. Other examples include methods for calculating building-level flood damages, mitigation costs, and flood insurance premiums. NCFMP uses these advanced datasets and tools to support management of all regulatory and nonregulatory flood hazards and other risk management data in a database-derived, digital display environment.

These activities conducted by the NCFMP demonstrate that it is possible to acquire additional data for policyholders (beyond the data that FEMA has available) and data for properties that are not insured. The proof-of-concept pilot analysis further demonstrated that it is possible to use such data to simulate the replacement of pre-FIRM subsidized and grandfathered premiums by NFIP risk-based premiums and the targeting and costs of affordability assistance based on a very simple (but not recommended) measure of cost burden.

^a The NCFMP (2015) report is publicly available at <http://dels.nas.edu/resources/static-assets/wstb/miscellaneous/wstb-cp.pdf>.

future effects of one or more policy options in a “what-if” scenario. For example, if a policy changes, what is an agency’s best estimate of the effects compared with maintaining the current policy 1, 5, and 10 years into the future?⁶ To make such evaluations requires defining the objectives by which each option will be evaluated. This is an exercise that begins with the first element in the planning process—identifying problems and opportunities—but can be adjusted and clarified throughout the process. Any such quantitative analysis requires the analyst to understand the policy-relevant questions.

One approach is to identify evaluation objectives that are explicit or implicit in the questions being asked by decisionmakers. For the NFIP, this refers to the leading question posed by BW 2012 Section 100236, which is generally how to provide assistance (or make other reforms) that reduce the cost burden of an NFIP policy on owners of properties in flood-prone areas, as the legislation moves the NFIP toward risk-based pricing. This general concern can lead to a large number of more detailed questions as shown in Table 2-1. Table 2-1 includes illustrative examples of the questions posed during the course of the study by guest speakers, iterative discussions with FEMA, and other sources such as studies and reports from the Government Accountability Office (GAO) and the Congressional Research Service (see Appendix B). Questions can be either descriptive or of the “if-then” type. Such questions can give some guidance as to what kind of analyses might be needed to answer the questions being asked.

To conduct the required affordability analysis, FEMA will need to narrow down from the many possible descriptive and “if-then” questions into a more limited number of questions that can focus the analysis of alternative policy options and be used to define metrics for measuring the most critical program outcomes. These metrics will then serve as the basis for estimating the effects of each alternative option relative to the baseline and for comparing the alternatives against each other according to the policy objectives embodied in the metrics. Making reference to Table 2-1 and keeping the provisions of BW 2012 including Section 100236 in mind, one possible set of questions following from Report 1 might be the following:

- Does an assistance program reduce the number of policyholders who are cost burdened and the degree to which they are cost burdened (relative to BW 2012)? (Report 1, Chapter 6)
- Is an assistance program consistent with actuarial pricing principles, including NFIP revenues that cover claims and expenses through time, and does it provide transparency of grandfathering, discounts, and subsidies, and minimize cross subsidies? (Report 1, Chapters 2 and 3)

⁶ This also means that objectives, or at least the emphasis on particular objectives, may vary over time.

TABLE 2-1 Examples of Affordability Specific Questions

<p>Descriptive Questions</p> <p>Characteristics of the flood insurance program, as it existed before BW 2012, or as it is expected to exist after implementing BW 2012.</p>	<ul style="list-style-type: none">• How many existing policyholders paid pre-FIRM subsidized rates? Where are these policyholders located?• How much is the difference between pre-FIRM premiums and NFIP risk-based premiums for various subgroups of policyholders?• How many policies are grandfathered? Where are these policyholders located?• How much less are grandfathered premiums than NFIP risk-based premiums for various subgroups of policyholders?• What percent of buildings in the nation’s floodplain have an NFIP policy?• How many buildings that have a federally backed mortgage and are located in a special flood hazard area do not carry an NFIP (or equivalent) flood insurance policy?
<p>If-Then Questions</p> <p>The effects of an alternative policy option relative to the baseline of BW 2012. (These effects may or may not include behavioral responses, depending on the analytical capabilities of the microsimulation model.)</p>	<ul style="list-style-type: none">• If all policyholders who lost pre-FIRM subsidies received premium assistance under various assistance formulas, what would be the annual costs of such assistance?• If a subset of policyholders who lost pre-FIRM subsidies received premium assistance under various eligibility criteria what would be the annual costs of such assistance?• If mitigation assistance—loans or grants—was provided to all policyholders who lost pre-FIRM subsidies, what would be the annual costs of such assistance?• What changes would be expected in NFIP risk-based rates if FEMA added a loading for catastrophic loss coverage?• If grandfathering was continued into the future, in the face of increased flood risk in some watersheds (changes in watershed hydrology and hydraulics from climate change and land development), what are the consequences for adhering to actuarial pricing principles and for NFIP net revenues?• How would a particular premium assistance program affect takeup rates and, thus, compliance with mandatory purchase requirements among those who are required to purchase flood insurance?• How would a particular mitigation assistance program affect property values?

- What is the effect of an assistance program on takeup rates, including compliance with mandatory purchase and securing increased purchase by property owners who currently do not choose to purchase insurance? (Report 1, Chapters 2 and 4)
- What are the costs to the federal treasury of an assistance program? (Report 1, Chapter 6)⁷

For purposes of evaluating alternative policy options, questions such as these can be used to define metrics, so that the effect of a policy option (relative to the baseline) on each metric can be simulated. The metrics chosen will be logically connected to the policy questions and objectives and easily understood by decision makers and stakeholders. As an example of such an approach, NCFMP used the questions and associated metrics shown in Table 2-2 to structure and conduct the proof-of-concept pilot analysis.

This table is not an illustration of a complete ideal set of outcome metrics, but rather is only presented as an illustration from the proof-of-concept analysis. In fact, data gaps, which are discussed in detail in Chapter 3, may limit what outcomes can be predicted. For example, one of the long-standing concerns of Congress has been the takeup rate of flood insurance and how that takeup rate might be affected by higher premiums. No simulation to answer that question was done in the proof-of-concept analysis, because there was no behavioral response equation that could be used to predict the effect of higher premiums on takeup rate. Another challenge may be defining a measurable metric for a qualitative concern (see Box 2-5).

Specify Future Baseline Conditions

Analysis of flood insurance affordability policy options would define a baseline that can be used to evaluate the effect of alternative affordability policy options. The BW 2012, Section 100236, language suggests that the baseline is a situation where BW 2012 is in full effect. Adopting this baseline would require specification of what this means specifically in terms of rates for various classes of policyholders. This may not always be clear. For example, BW 2012 directs FEMA to evaluate the purchase of private reinsurance. The outcome of such an evaluation is not yet certain. As a result, one possible future condition is that there is a new load on all

⁷ These questions are related to—but do not replace—the six decision questions that policy makers must consider when designing affordability policy options (Report 1, Chapter 6). Potential answers to some of those six questions will undoubtedly be informed by descriptive and simulation analyses (showing, for example, the numbers and characteristics of policyholders who are cost burdened under BW 2012).

TABLE 2-2 Illustrative Evaluation Questions and Associated Metrics

Evaluation Question	Metric Description
How cost burdened are policyholders?	Number and percentage of all policyholders who will be cost burdened based on the definition chosen by policymakers. ^a Number and percentage of policyholders who previously paid pre-FIRM subsidized rates who will be cost burdened. Number and percentage of current policyholders who would lose grandfathered rates who will become cost burdened. Number of property owners in 500-year floodplains, who do not have a policy, and for whom purchase of an NFIP risk-based policy will create a cost burden.
Does NFIP pricing follow actuarial principles regarding net revenues and cross subsidies?	Expected NFIP premiums minus the sum of expected claims and expenses. Percent of all revenue from explicit across-the-board loadings to compensate for forgone revenue.
What is the effect on federal treasury spending?	Expenditures made for a premium assistance program. Expected spending for post-flood disaster aid.

^a In the North Carolina proof-of-concept analysis, cost burden was defined as when premiums exceeded 1 percent of flood insurance coverage. This measure was used because data to calculate this measure were readily available. This cost-burden measure was also discussed in Report 1 since the idea that premiums exceeding 2 percent of coverage are excessive was suggested in HFIAA 2014. The committee does not endorse this as a measure of cost burden. For further discussion, see Chapter 4 of this current report.

flood insurance premiums for reinsurance. Another is that the decision is for FEMA not to purchase reinsurance, but to continue to borrow from the federal treasury when necessary. This uncertainty by itself suggests that two different baselines are possible.

There are other future uncertainties independent of BW 2012 that can affect baseline conditions.⁸ For instance, the baseline takeup rate for flood insurance policies will be influenced by many factors. For instance, the amount of marketing of insurance policies by FEMA, general economic conditions, the occurrence of storms, and so forth can all impact takeup

⁸ The number of drivers of future conditions may be dictated by time horizon or nature of questions. To illustrate sea-level and climate change effects 30 years into the future is a different projection requirement than projecting private flood insurance policies in force in the next 5 years.

BOX 2-5
Illustrating the Challenge of Defining a
Metric: Community Resiliency

Resiliency has been defined as “the capacity of a system to absorb change and disturbances, and still retain its basic structure and function—its identity^a (Walker and Salt, 2006).

A resilient community is one which has the capacity to “absorb change and disturbances,” returning quickly to full function. One test of community resiliency is its ability to recover from a major flood. Another concern that may be expressed by policy makers is what impact BW 2012 would have on a community’s ability to recover from a flood.

The disruptions most relevant to NFIP flood insurance are direct damages to property and its contents. Following a flood, property owners bear the responsibility for repair or replacement of damaged buildings. Residential structures may be damaged or destroyed, relocating population and disrupting community cohesion. In some cases, property owners may have the financial resources—either available funds or borrowing capacity—to move quickly to restore properties to pre-flood conditions. However, many if not most property owners are not in a position to finance major, unanticipated repairs, let alone complete reconstruction.

The other means of dealing with flood damage are the following:

- Abandon the property, either in full or in part.
- Use post-flood disaster assistance (in the form of grants or low-interest loans) and other funds as needed to make needed repairs or replacements.
- In the case of properties covered by flood insurance, use insurance proceeds and other funds as needed to make needed repairs or replacements.

The first option is, of course, the antithesis of resiliency. If this is the result for some number of properties throughout a community, then the structure and the function of the community are lost or, at best, seriously damaged.

Although some states can provide a limited amount of post-flood assistance, the major programs of this kind are operated by the federal government—principally FEMA, the Department of Housing and Urban Development (such as the community development block grant [CDBG] program), and the Small Busi-

rates. Further, there is increasing interest in the private sector becoming more involved in underwriting flood insurance. New technologies and a better understanding of flood risks may have increased that interest (GAO, 2014a). Other examples of different baseline conditions include projections of changes in population density in flood-prone areas, price and extent of private-sector flood insurance offerings, and effects of changes in flood risk related to climate change.

ness Administration (SBA). A 2012 paper (Kousky and Shabman, 2012) analyzes the aid households can expect to receive from these programs and find that it is much less than many may anticipate. Federal assistance is only available in the case of a federal disaster declaration, which does not occur for all floods. FEMA grants to individuals through the Individual Assistance program are also only authorized in a subset of declarations; GAO (2012) found that, for declarations issued between 2004 and 2011, only 45 percent authorized Individual Assistance. Furthermore, the amount of this assistance is quite limited—capped at a bit more than \$30,000 per property (this number is indexed to inflation), and the average payout is only \$4,000 (McCarthy, 2010). Low-interest loans from the SBA may be available, but these must be repaid, although that can help provide liquidity to homeowners. Individuals may receive grants through their state or local government funded by a CDBG, but that is highly uncertain. Local governments have enormous flexibility in how they use these funds and only in a few instances have they been used to make large grants to households simply for repair. Kousky and Shabman (2012) also noted federal disaster aid might not be disbursed for many months after the event.^a

For any significant damage, it would appear that the property owner must bear the bulk of the financial responsibility. Clearly some may be unable to do so. Insurance can thus be resiliency enhancing in that it can make the funds needed for rebuilding available to disaster victims. In summary, reliance on disaster aid seems likely to produce only partial recovery and that only after some delay. For both reasons, some community resiliency is lost.

In a policy simulation, the best metric for representing community resilience may simply be the takeup rate (expressed as a percent of properties) of flood insurance. It is a metric that can be affected by a policy change and is measurable, at least in principle. And it has a logical connection to the basic concept to be represented. Communities with high takeup rates can be expected to be more resilient than those that rely on self-funding and government assistance. High takeup rates will be associated with not only more complete recovery of community structure and function, but also more timely recovery.

^a There are also several programs post-disaster to fund investments in hazard mitigation, such as the Hazard Mitigation Grant Program, the Increased Cost of Compliance coverage of the NFIP, and at times CDBGs. This discussion, however, was about funding simply repair, and not investments in mitigation.

The baseline can be defined on the assumption that fully implemented BW 2012 does not trigger behavioral responses by floodplain property owners and occupants. This may not be the most likely outcome through time, however. Most obviously, increasing premiums might change the number of policies in force. If this possibility is to be included in the baseline, then a prediction equation will be needed to relate policies in force to changes in the cost of premiums attributable to BW 2012 (see Box 2-6).

BOX 2-6

Premiums, Insurance Purchase, and Mitigation

The call for an affordability framework in HFIAA 2014 reflected a congressional interest in whether higher premiums might result in reduced purchase of flood insurance^a and conversely whether a premium assistance program might maintain purchase by those who might drop coverage or encourage purchase by those who never had coverage before. BW 2012, as well as HFIAA 2014, reflected congressional intent that FEMA encourage property owners to implement mitigation actions, including but not limited to structure elevation that FEMA would credit toward premium reductions.

The cost of flood insurance is the premium paid when the policy is purchased. The benefit is the promise of compensation in the form of a claims payment, bounded by the chosen deductible and coverage amount. Each property owner must decide how much insurance coverage to purchase or maintain so that the perceived expected benefit justifies the cost. In many cases, the outcome of that decision is to purchase no insurance at all.

Many factors, other than premiums, affect the insurance purchase decision. Benefits are evaluated by property owners based on their estimates of the probability of flooding and the estimated loss should flooding occur. Those estimates may differ substantially from the FEMA-estimated probability and loss. Other factors affecting purchase may include

- expectations for disaster aid,
- income available to pay the premium in consideration of other expenses,
- mandatory purchase requirement, and
- risk attitudes.

These factors all need to be considered when trying to isolate the effect of premiums on the insurance purchase decision. Despite the interest in the effect of premiums on takeup, a review of the literature in Report 1, Chapter 4, concluded that any prediction of the effect of premium levels on the decision to buy insurance would be accompanied by substantial uncertainty. For this reason, the North Carolina report did not simulate changes in takeup rate or in mitigation adoption due to changes in premiums.

However, absent a reliable prediction model, an alternative is to have the baseline assume that BW 2012 will not affect policies in force and then recognize that possibility as part of a qualitative discussion of the analytical results. The choice of future baseline conditions is a judgment for the analysts and may play an important role in analyzing alternative policy options for addressing affordability issues.⁹

⁹ Given that projections will be highly speculative, FEMA analysts may want to consider more than one baseline, with a “base baseline” being no change and one or more alternative baselines allowing for changes (e.g., in the takeup rate).

The literature reviewed suggests that premium price elasticity of demand for insurance—the sensitivity of the quantity demanded to changes in the price—is quite inelastic. This means that a 1 percent increase in price will bring about a reduction in policies in force of less than 1 percent, perhaps significantly less than one-half percent. This conclusion, however, cannot be made with confidence, so for the purposes of microsimulation, further review of the literature, or perhaps new empirical studies, may be needed on the decision processes.

There are additional complicating factors. For one, the actual price elasticity may differ from one location to another. For example, policyholders in coastal high-risk zones such as areas in the special flood hazard area that are subject to additional hazards due to storm induced wave action may be less sensitive to changes in premium levels, due to a greater sense of risk. Policyholders in multi-unit buildings may be more sensitive, due to a lower perception of risk. In addition, some of the price changes that may be considered are larger than what has been observed in the past. In these cases, it is unclear whether the demand response is reasonably predictable using past data.

Now consider the effect of premium levels on the decision to implement mitigation. All mitigation measures present the same problem: how to justify a capital investment at the present time on the basis of insurance premium reductions expected in the future. This is a benefit-cost problem, although the property owner may not see it as such. A way to proceed is to identify any mitigation measures likely to be feasible for a particular structure, determine the upfront cost and any continuing maintenance cost for each identified measure, and then obtain an insurance premium quotation that may reflect a lower price due to the reduced expected flood losses from undertaking the mitigation measure.

If insurance purchase and adoption of mitigation is a matter of policy concern then it will be necessary for microsimulation to build behavioral response modules using assumed premium price elasticity estimates. The elasticity estimates used in microsimulation under these conditions would be based on best available information and would report the sensitivity of the simulation results to different elasticity assumptions.

^a Policies in force across the nation were 5,646,144 in 2011; 5,620,017 in 2012; 5,568,642 in 2013; and 5,350,887 in 2014. Data source available at <http://www.fema.gov/total-policies-force-calendar-year> (accessed on October 29, 2015).

Formulate Alternative Policy Options

Report 1 (Chapter 6) presented six design decisions (questions) and associated options for designing an assistance program within an affordability framework. These questions are reproduced in Figure 2-1 below. In addition, Report 1 (Chapter 7) described options for providing direct assistance to cost-burdened policyholders, as well as policy options that could reduce premiums for all policyholders.

Affordability policy options can be one or multiple combinations of direct assistance and other reforms (premium reductions) (Figure 2-1). If a

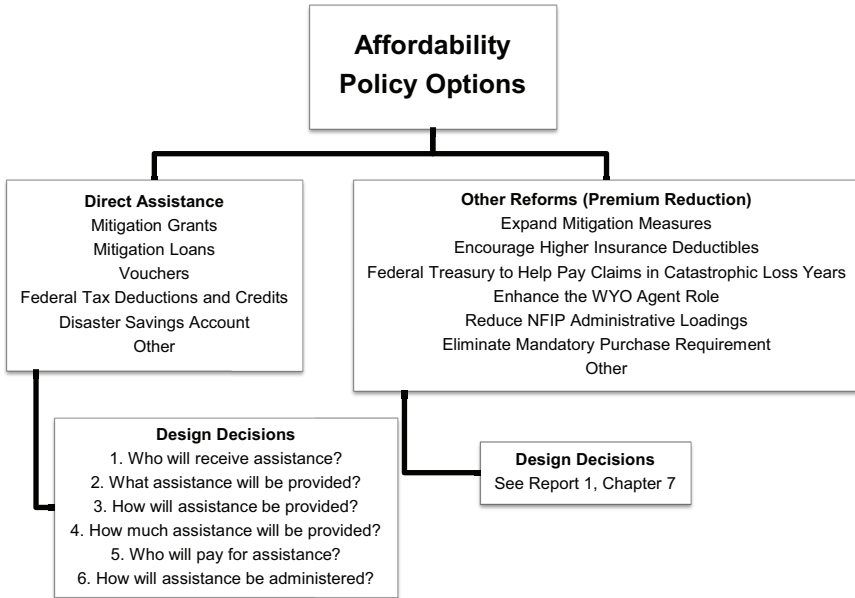


FIGURE 2-1 Affordability Policy Options

SOURCE: Adapted from NRC, 2015a (Report 1, Chapters 6 and 7).

direct assistance program is included, then answers to each of the six design decision questions must be provided to define the specific features of the assistance program. As one example, an alternative option might be limited to allowing flood insurance premiums to be included as a federal income tax deduction, based on specified conditions of the taxpayer. As another example, a cash assistance program (whether for premiums or mitigation) combined with NFIP risk-based premiums will need to specify conditions that can be used to define who is eligible and the amount of assistance received. If other policy reforms are to be included, then their provisions must be completely specified. For example, if the federal treasury is to pay all claims that exceed a specified level in a given year, then that level needs to be specified.

Numerous affordability policy options can be identified early in the evaluation process and then become more refined in their design as the analysis proceeds; additional options may be introduced at any time. Analysis may show that some options may be incompatible and cannot be included in an affordability policy option.

Conduct Simulations

Microsimulation as an analytical approach can predict how a given policy option might affect an evaluation metric relative to a baseline condition. Also recall that the modifier “micro” in microsimulation means that effects of an alternative policy option are first estimated at the level of the property owner and occupant if not the owner and then aggregated. If applied to an analysis of NFIP affordability policy options the database must include data for individual properties and their owners. The properties can be a sample that represents the larger population of interest up to and including every property in the population. It is understood that data may be sparse at first; that is, the information about the characteristics of properties and owners may be limited. As such, it might not be possible to answer some questions at all, while answers to some other questions are incomplete or otherwise limited.

The effect of data limitations is demonstrated by the experience of the North Carolina proof-of-concept analysis. In that work the question posed was, “How many policyholders will be cost burdened by higher rates?” For any individual property owner, the answer requires a definition of cost burden (see Report 1, Chapter 6). Only then is it possible to develop a description of whether a policyholder is faced with an unaffordable premium increase or not. In the North Carolina study, the available data used to define cost burden were values of the ratio of flood insurance premium to insurance coverage expressed as a percent, and values greater than 1 percent were defined as cost burdensome. This cost-burden measure was chosen because policyholder income and annual housing costs were not available; however, the committee does not recommend this as a measure of cost burden. Although the analysis was not able to use an income-referenced measure of cost burden, the effort to answer this question focuses attention on this most important data gap. One result was to stimulate discussion among the committee on use of assessed property values as a reference for measuring ability to pay higher premiums, in recognition that such data are available in all communities. This possibility is discussed in detail in Chapter 4. Options for filling data gaps are described in Chapter 3.

Generally, the North Carolina analysis had to predict metrics (Table 2-2) for the baseline and then predict the metrics with specified policy options in effect. An example can illustrate. Two of the questions addressed in the North Carolina report were, “How many policyholders will be cost burdened by higher rates?” and “What would be the cost to the federal treasury of a premium assistance program?” Analyzing these questions required first narrowing their focus to a particular subpopulation of policyholders. In this application, the focus was narrowed to policyholders who at the time BW 2012 first went into effect would lose their eligibility for a pre-FIRM sub-

sidized rate or grandfathered rate. This focus then meant that a descriptive tabulation was required to estimate how many policies were grandfathered and how many were paying pre-FIRM subsidized rates prior to BW 2012. In the North Carolina analysis pre-FIRM subsidized policies were identified in the NFIP database, but an algorithm had to be developed for tabulating which policies were grandfathered.

Then an “if-then” calculation was made for those affected policyholders. Each policyholder’s coverage selections reported in the NFIP database, as well as property characteristics (flood zone, first-floor elevation), were data inputs to the appropriate NFIP rating tables. The result was an estimate of the NFIP risk-based premium for that property. Subtracting the estimated payment made prior to BW 2012¹⁰ from the new premium estimate was the increased payment to the NFIP for each policyholder. Summing over all affected policies resulted in an estimate of the new premium revenues to the NFIP from BW 2012, specifically from these policyholders. However, which of the policyholders would be cost burdened by the higher rates? This required defining a measure of cost burden (see Chapter 4, section on The Ability to Pay Flood Insurance Premiums) and then tabulating the number of cost-burdened policyholders with BW 2012.

Next an affordability policy option had to be described. For ease of simulation and given available data that policy was to restore pre-FIRM subsidized rates and grandfathered rates to eligible policyholders; also, any forgone revenue to the NFIP from that restoration would be paid to the NFIP from the federal treasury. Eligibility was defined by two criteria: (1) having a PFS or grandfathered rate prior to BW 2012 and (2) being cost burdened by the NFIP risk-based rate under BW 2012. Based on the predicted NFIP risk-based rate (as the baseline) and the predicted rate paid prior to BW 2012 (the alternative policy option of restoring pre-FIRM subsidies and grandfathering for those eligible), estimates would need to be made of how many policyholders would receive assistance (that is, have their rate discounted) and how much revenue would be provided by the treasury to the NFIP.

Compare and Display Effects of Alternative Policy Options

The estimated effects of an alternative policy option (e.g., an affordability assistance program) are changes in the chosen outcome metrics relative

¹⁰ Although the NFIP policy database included premiums paid, the estimate of pre-BW 2012 premiums based on North Carolina’s own data and the value recorded in the NFIP database frequently disagreed, often substantially. So estimates based on North Carolina’s own data were used for premiums both without and with BW 2012 in effect (see Chapter 3 for further discussion).

to the specified baseline. The North Carolina study identified, defined, and described a baseline with removal of pre-FIRM subsidized and grandfathered rates under BW 2012 and illustrative alternative affordability policy options (Table 2-3). The analysis was constrained by available data, time for completing the study, and models available to predict metrics that represent selected outcomes under the baseline and alternative policy options. The policy options described are a small subset of the numerous possibilities suggested previously in Figure 2-1.

The NCFMP databases and models were used to simulate the baseline and alternative policy options. Output results were displayed in tabular form to compare the alternative policy options with the baseline. Three examples of model output results are shown for illustrative purposes below.

EXAMPLE 1. How cost burdened are policyholders by their flood insurance premiums?

	Number and Percent of Policies			
Severity of Cost Burden	Baseline		Alternative Policy Option	
Not cost burdened				
Cost burdened				
Severely cost burdened				
Total				

EXAMPLE 2: Does NFIP pricing follow actuarial principles regarding net revenues and cross-subsidization?

	Baseline	Alternative Policy Option
NFIP net revenue		
Percent of revenues from cross subsidies		

EXAMPLE 3: How does an alternative policy option affect federal spending?

	Baseline	Alternative Policy Option
Annual payment to NFIP for forgone revenue		
Annual total payment to eligible policyholders for premium assistance		
Annual total payment to eligible policyholders for mitigation assistance		

TABLE 2-3 Illustrations of Baseline Condition and Alternative Policy Options

Baseline Condition	Immediate NFIP risk-based rates for selected policyholders	<p>All policyholders who were paying pre-FIRM subsidized or grandfathered premiums will now pay NFIP risk-based premiums. The preferred risk policy and specific rate policy rates are unchanged. No change in the number of policies in force as a result of BW 2012 implementation.</p> <p>Cost burden was defined for illustrative purposes as when premiums exceeded 1 percent of flood insurance coverage. The committee is not endorsing this as a measure of cost burden.</p>
Alternative Policy Option: Premium assistance so that policyholders pay what was paid before BW 2012	<p>Provide premium assistance by reducing premiums for those policyholders who meet two eligibility criteria:</p> <ol style="list-style-type: none"> 1. NFIP risk-based premium will exceed 1 percent of flood insurance coverage. 2. Had received pre-FIRM subsidized or grandfathered rates before. 	For policyholders meeting the two eligibility criteria, their premiums are restored to the amounts paid prior to BW 2012 (that is, the pre-FIRM subsidized or grandfathered amounts).
Alternative Policy Option: Premium assistance so that policyholders pay no more than 1 percent of coverage	<p>Provide premium assistance by reducing premiums for those policyholders who meet two eligibility criteria:</p> <ol style="list-style-type: none"> 1. NFIP risk-based premium will exceed 1 percent of flood insurance coverage. 2. Had received pre-FIRM subsidized or grandfathered rates before. 	For policyholders meeting the two eligibility criteria, premiums are capped to 1 percent of total flood insurance coverage.
Alternative Policy Option: Premium or mitigation assistance	<p>Provide premium assistance <i>or</i> mitigation assistance grant to those policyholders who meet two eligibility criteria:</p> <ol style="list-style-type: none"> 1. NFIP risk-based premium will exceed 1 percent of flood insurance coverage. 2. Had received pre-FIRM subsidized or grandfathered rates before. 	<p>Premium assistance is a payment equal to the difference between the NFIP risk-based rate and the previous pre-FIRM subsidized or grandfathered rate if a policyholder is eligible. Mitigation assistance grant is amount required to elevate property to base flood elevation plus 2 feet for those property owners who meet the eligibility criteria.</p>

SUMMARY

FEMA was directed by Congress to conduct a study on how BW 2012 would affect the affordability of flood insurance premiums. Currently FEMA does not have a modeling approach in place that can be used to answer the kinds of questions that follow from BW 2012. The most promising way forward is to initiate a process for building modeling capacity over time.

Finding 2.1. FEMA's capability to evaluate affordability policy options is very limited but can be substantially advanced by embracing a microsimulation modeling approach and building the model incrementally through time. This would begin with conceptual microsimulation model design and the writing of computational algorithms for the self-contained modules, as necessary data are identified and data gaps filled.

Finding 2.2. Conducting the initial affordability analysis and building longer-term capacity following a six-element or similarly structured planning and evaluation process can focus the analysis activities on key questions, aid in the identification of the most policy-relevant evaluation outcomes, ensure that policy options and outcome metrics are described in ways that are amenable to empirical representation in a microsimulation model, identify modeling and data needs as well as gaps, and, as a result, expedite the execution and enhance the quality of the initial policy analysis and continuing development of analytical capabilities.

Data for Analyses of National Flood Insurance Program Policy Options

Congress, through the Biggert-Waters Flood Insurance Reform Act 2012 (BW 2012) and Homeowner Flood Insurance Affordability Act 2014 (HFIAA 2014), requested the Federal Emergency Management Agency (FEMA) to undertake a suite of complicated and technical tasks to propose a draft affordability framework for the National Flood Insurance Program (NFIP). The analytical calculations needed to do such analysis were described in Chapter 2. Making these calculations requires the construction of one or more microlevel databases with the necessary data for analysis of representative properties in the nation's floodplains. Ideally, the database(s) will include data on property characteristics, the socioeconomic characteristics of the property owner and occupant (if different from the owner), and the NFIP policy (if there is a policy in force on that property).

At present, FEMA has access to the NFIP policy database that includes some of these data and to flood insurance rate maps (FIRMs) that in some places could be used to characterize the likelihood of floods that reach different stages in different areas of the floodplain. To evaluate affordability policy options, however, additional data on variables not in the NFIP database and existing FIRMs will be needed.¹ This chapter describes the data

¹ The content of this chapter is consistent with findings of several other reports that document the need for additional data pertinent to the NFIP (i.e., GAO, 2014a; King, 2013; PwC, 1999). For example, GAO (2014a) could not calculate forgone premiums—the difference between subsidized policies and full-risk premium policies—as there was a lack of property elevation data for pre-FIRM subsidized policyholders.

in the NFIP policy database and the data that can be derived from FIRMs. With this as background, data gaps needed for conducting the kinds of analyses described in Chapter 2 are identified, and means for filling such gaps discussed.

THE NFIP POLICY DATABASE

FEMA's NFIP policy database includes about 4.5 million records and 76 data fields. The database was created for tracking NFIP policies insured by the Federal Insurance and Mitigation Administration (FIMA) that resides within FEMA.² The flood insurance policies in the database include those written by direct servicing agents, the Write-Your-Own (WYO) Program agents, and private insurance agents in companies not associated with the WYO program. In May 1998, the NFIP created a manual that insurance companies must abide by when collecting and submitting policyholder information. All of the policy information submitted is compiled into the NFIP policy database, which is updated on a monthly basis (NFIP, 2013).

Depending on the type of structure being insured, the NFIP uses three different forms for flood insurance policy applications:

1. Dwelling forms are used for homeowners, residential renters, or owners of residential buildings that contain one to four units.
2. General property forms are used for owners of residential buildings with five or more units, as well as for owners or lessees of non-residential buildings or units.
3. Lastly, residential condo building association forms are provided to residential condo associations on behalf of the association and their unit owners (FEMA, 2014).

The review of the NFIP policy database for this report was based on a snapshot of the NFIP policy data from October 2013.³ The October 2013 NFIP policy database includes the following information and attributes as categorized below.

Policies. The NFIP policy database includes general identifying information about the policyholder, including name and address. Since FEMA

² The NFIP maintains a claims database that was not part of this review.

³ The assessment of the NFIP data reported in this chapter was complicated by difficulties in accessing and understanding the NFIP database. For example, neither a data dictionary nor metadata was available for the database. By following ISO 8000 and 9001 standards, as well as Federal Geographic Data Committee metadata standards, the NFIP could adopt a well-recognized process of data management that will help users access and understand the content of the NFIP database.

tracks policies by the individual, rather than by the property, unique policy numbers are assigned to each policyholder and property holder. When a policyholder moves, a new policy number is assigned. Some aspects of the policy are protected by FEMA under privacy concerns, such as names and addresses, and are not available to the public. Other general policy information within the NFIP policy database includes

- policy status (active, canceled, etc.);
- number of policy terms (number of years the policy is effective: 1 year, 3 years, etc.);
- whether the policy was required for disaster assistance, and if so, by which agency;
- company code of the WYO company responsible for the policy (where applicable);
- whether the policy is for a single-family or multifamily property; and
- whether it is for a residential or nonresidential property.

Location. Several attributes related to the spatial location of the insured property can be found in the NFIP policy database, including the latitude and longitude coordinates of the property; the property address, city, state, and zip code; the FEMA region; and which Census block (and block group) the property falls within. Information on how accurate the horizontal geocoding is for the property is also provided so the user knows how well the policy is located. The NFIP application does not contain the latitude and longitude coordinates of the property. This information is generated by FEMA using outside firms to geocode the property address. In addition, FEMA includes the attributes from the FIRMs as part of the policy database. The NFIP community and county that the insured structure is located within, as well as the map panel number and flood zone, as obtained from the FIRMs, are also provided.

Chosen Coverage. Insurance deductible and coverage amounts for both the property and the contents are included within the policy database, as are premiums. Policy endorsement dates, original effective dates (for rollover policies), current effective dates, and expiration dates are also provided.

Premiums/Policy Type. Several attributes within the NFIP policy database are utilized for the insurance premium calculations. Some of these elements include

- whether it is a new policy or a renewed policy;
- what flood zone was used for rating the policy;

- if the policy has a V zone (which are areas within the special flood hazard area (SFHA) with additional hazards associated with storm-induced waves) risk-factor rating, where a qualified professional assesses the building's location, its support system, and its ability to withstand wind and wave action. If the professional certifies that the property has a lower risk of flood damage based on these three factors, then the property becomes eligible for a premium discount;
- whether it is a pre- or post-FIRM property;
- type of residence;
- whether the policy falls under any BW 2012 categories and, if so, which BW 2012 category it would fall under. Some examples of the BW 2012 categories include single-family nonprincipal residences, businesses, severe repetitive loss pre-FIRM subsidized properties, and multifamily residences;
- whether the property is in a Community Rating System (CRS) community, and if so, which CRS class that provides premium discounts to all homeowners in the community ranging from 5 percent (Class 9) to 45 percent (Class 1);
- the policy's NFIP community program type (regular or emergency);
- the location of the contents within the structure; and
- any obstruction types/categories associated with the structure. Some of the factors used to establish the obstruction categories include the size of the structure (less than or greater than 300 square feet), whether the structure has breakaway walls, if the building has an enclosure or crawl space with proper openings, whether there is machinery or equipment and is it above or below the base flood elevation, whether there is an elevator and is it above or below the base flood elevation, and whether the building is elevated.

Building Characteristics. The policy dataset provides several building attributes that can be used to review and assess flood risk at the structure level. Some of these characteristics include when the structure was built, whether the property is in the course of construction, the number of units within the property, the number of floors in the building, the type of basement or enclosure it has (if any), and whether the building is elevated and/or flood proofed.

Elevation Data. The following fields are provided in the NFIP policy database, but the information within them is not fully populated for all policies:

- Base flood elevation (BFE) from the FIRMs
- Whether there is an elevation certificate for the property and, if so, what the diagram number is

- Elevation of the lowest floor
- Elevation difference between the BFE and the lowest floor
- Lowest adjacent grade

FEMA utilizes many of the policy attributes listed above, in addition to building characteristics and elevation information discussed below, to establish a risk-rating method for each elevation-rated policy. Policies issued for properties outside the SFHA are not risk rated, as is the case for pre-FIRM subsidized policies that are now being phased out. For properties outside the SFHA, elevation data will be missing.

Miscellaneous Attributes. There are a few other fields included within the NFIP policy database that do not necessarily fit within the categories mentioned above, but that may still be of value for an affordability analysis. These include

- whether the property is state owned,
- the federal policy fee,
- the community probation surcharge amount, and
- the insurance to value indicator.

Most of the fields included in the NFIP policy database are well populated. The October 2013 policy database had a 95 percent completion rate or better in regard to general information about the policy and policyholder, the geographic location of the insured structures, data from the community's FEMA FIRMs, the insurance deductible and coverage amounts for each policy, the policy premiums and risk ratings, and insured building characteristics under each policy. Although this information is needed for constructing a database as inputs for evaluating the affordability of insurance policies, there were some limitations related to the completeness of the policy data as well. Most importantly, about 70 percent of the policy records lack information about structure elevation relative to the BFE.

For assessing current risk, it is necessary to know the current flood zone for the property. The reported flood zone in the database, however, is the one that was used for the initial policy risk rating. To identify the actual current NFIP flood zone that the structure lays within, a geospatial analysis would need to be performed whereby all of the NFIP policies are intersected with FEMA's National Flood Hazard Layer (NFHL). This can be a time-consuming process at the national level that can take a geographic information system (GIS) specialist 4 to 6 weeks to complete, but it would provide accurate location information for assessing actual policy risk ratings and any premium adjustments that may be needed as a result. Appendix H

reports the data fields found within the October 2013 version of the NFIP policy database.

Finding 3.1. Simulating premium increases if NFIP risk-based rates are charged requires having elevation data for each insured property. Such data are now being requested for properties that were previously paying pre-FIRM subsidized rates. Because flood insurance premiums for policies on properties outside the SFHA are not elevation rated, elevation data for those properties are missing and are not currently being collected.

FLOOD INSURANCE RATE MAPS

FEMA has completed an ambitious program to provide the nation with coverage of digital flood insurance rate maps (DFIRMs) for approximately 1 million of the 3.2 million stream miles in the nation; the 1 million miles are located where the majority of the nation's population lives. The first phase of this program, called Flood Map Modernization, operated from 2003 to 2008, and a subsequent phase, called Risk Mapping Assessment and Planning (Risk MAP), is now in operation (FEMA, 2009a, 2009b). Currently, following instructions from BW 2012, a technical mapping advisory council is preparing a report on several mapping topics including how to improve, in a cost-effective manner, (a) accuracy, general quality, ease of use, and distribution and dissemination of FIRMs and risk data; and (b) performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States.

Lenders use FIRMs to determine whether flood insurance is required by property owners. Private insurance agents use the FIRM to help quote a policy premium. This determination is made on the basis of a horizontal criterion: Does the building lie within or outside the mapped SFHA? The current FIRMs, by showing the boundary of the SFHA, adequately support this flood insurance purchase requirement determination.⁴ For quoting a premium, an essential component of FIRMs is the BFE, which is the water surface elevation that would result from a flood having a 1 percent chance of being equaled or exceeded in any year at the mapped location.⁵ The BFE is a vertical, rather than a horizontal, criterion used in flood insurance purchase requirement determinations. The NFIP risk-based premium

⁴ If a property owner whose building is classified as being within the floodplain wishes to protest that determination, a procedure is available, for both the owner and the NFIP, to process a Letter of Map Amendment.

⁵ In addition, local communities regulating land development are expected by the NFIP to require the first-floor elevation of buildings to be at or above the base flood elevation.

(elevation-rated premium) is based on the difference between the lowest habitable floor elevation of the property and the BFE for the zone within the SFHA, as well as a limited number of other property characteristics. Base flood elevations are shown on floodplain maps that have been prepared with high-quality land surface elevation information and detailed flood modeling studies.

The implementation of FEMA's Risk MAP program in 2009 began an effort to provide communities with flood information and tools to enhance mitigation planning, providing more information than the boundary of the SFHA and the BFE. Risk MAP continued the focus on technological advancements that included elevation data acquisition and more accurate mapping of areas impacted by levees and coastal flood hazards (FEMA, 2009a). Of note for affordability analysis is the inclusion of flood risk assessment products (also known as nonregulatory products) with the maps. Nonregulatory products were an additional feature of the mapping process and FEMA provides a package of nonregulatory products under Risk MAP. Examples of such products include changes since the last FIRM (if digital flood data are available from the previous study), water surface elevation grids and flood depth grids, percent annual chance grids and percent 30-year chance grids (the percent chance that an area will flood over the course of a typical 30-year mortgage), flood risk assessments, and areas of mitigation interest. One of the benefits of these products is that many of these studies include elevation data from the 10 percent, 4 percent, and 2 percent annual chance flood events in addition to the 1 percent (SFHA or 100-year floodplain) and 0.2 percent annual chance flood events (500-year floodplain).

Finding 3.2. In some areas of the nation, all stream miles have not been mapped and in places that have been mapped many FIRMs do not yet include the BFE. Furthermore, DFIRMs do not describe the full range of flood stages and associated probabilities, unless their content has been supplemented by local community investments in providing additional data and analysis.

OTHER DATA SOURCES

The questions posed to FEMA will require data for policyholders and the insured properties, as well as uninsured properties and their owners, which cannot be found in the NFIP policy database or derived from the DFIRMs. Particularly important data gaps include the absence of first-floor elevation data for many policies and the absence of any data on uninsured properties. Furthermore, even if all of the data in the NFIP policy database were complete and accurate, the database could not be used to simulate affordability assistance programs that are means tested because the data-

base does not contain income, wealth, or housing cost data. This section discusses other data sources that may be available to FEMA to address these and other data needs.

Decennial Census/American Community Survey Information

The decennial census of population and the continuing American Community Survey (ACS) are sources of information that may help FEMA answer some kinds of policy questions. The census provides complete population counts for the nation and subnational geographic areas down to census tracts (small, relatively stable geographic areas of about 2,500 to 8,000 people), block groups (statistical divisions of census tracts of about 600 to 3,000 people), and individual blocks once every 10 years. The data collected in the census are limited to basic demographic information (age, gender, race/ethnicity, and household relationship) and housing tenure (owner or renter). The data provide the basis for population estimates that are updated each year for states, counties, cities, and towns. These estimates can help FEMA identify population growth in flood-prone areas in a general way.

More helpful to FEMA is likely to be the information provided each year from the ACS, which, beginning in 2005, has collected detailed social and economic characteristics across the nation from a large sample of households. The ACS is conducted monthly, and data products are released every year for small areas down to census tracts and block groups. The content of the ACS questionnaire is roughly the same as what used to be in the once-a-decade decennial census “long-form” sample. There are questions on education, place of birth, citizenship, household relationship, income, employment, housing costs (mortgage/rent, utilities), housing characteristics (number of rooms, number of units in the structure, when the house was built, etc.), and other topics (NRC, 2007, 2015a). See Appendix F for a table of currently available ACS information for census tracts and block groups of potential relevance for FEMA.⁶

All data for census tracts and block groups released each fall are summarized over the preceding 5 calendar years (60 months); there are no 1-year (12-month) products available as there are for larger geographic areas (no data are available at all for blocks from the ACS). The latest census tract and block group data available are for 2009-2013, which covers the Great Recession and some economic recovery. The next round of data

⁶ Public-use microdata samples (PUMS) from the ACS, which would allow FEMA to specify additional tabulations, are not useful for FEMA's purposes because no area is identified in the PUMS with fewer than 100,000 people.

for tracts and block groups, for 2010-2014, will be available at the end of 2015.

Although the ACS has a large sample (about 2.3 million responding households each year), even cumulated over 5 years, the ACS sample is only about two-thirds of the census long-form sample. This means that variability due to sampling error is higher than in the long-form sample for small geographic areas, and sampling variability in the long-form sample is itself high for very small areas (see NRC, 2007, Tables 2.7 and 2.8). Moreover, the need to cumulate over 5 years creates challenges when interpreting estimates and, especially, tracking changes over time. The ACS also has different residence rules from the census—the ACS asks people to indicate where they have been living in the past 2 months; the census asks people for their “usual” residence. For areas with seasonal populations, such as beach or lake communities, the ACS estimates may represent the “usual” (year-round) population if the “season” is short, or a combination of year-round and seasonal residents if the “season” is more than 2 months (as is likely to be the case, for example, for “snowbirds” moving between northern states and Florida, Arizona, etc.).

Even with high sampling variability and the issues with 5-year accumulations, the ACS provides a low-cost way for FEMA to overlay characteristics of interest for households in small areas (e.g., home ownership, median rent and mortgage amounts, median house value, median income, and age of housing stock) on maps of current and projected future flood-prone areas. FEMA could also reimburse the Census Bureau to prepare special tabulations by reaggregating the underlying ACS data to conform to geographic areas defined by FEMA to match floodplain boundaries. Such special tabulations could provide a clearer picture of areas in which there may be households at risk of floods and of inability to afford flood insurance premiums. Such areas could not be smaller in population size than block groups, which are the smallest areas currently released from the ACS, but the specially defined areas could have more relevant boundaries for analyzing flood risk and insurance affordability.

Published ACS data represent the aggregate of household characteristics in a block group, census tract, town, township, village, or city (or special tabulation area) and are not at the level of the individual policyholder. Consequently, care must be taken when using ACS small-area data in policy analysis of the likely effects of alternative flood insurance program provisions. For example, median household income could be the same in an area of homogeneous incomes and in an area with both very-high-income and very-low-income households, so that it would not be appropriate to impute the median value to all households without additional information. A more telling indicator of the distribution of income is to examine ratios of household income to the poverty level, such as the percentage of house-

holds with income at or below the poverty level and with income at more than twice the poverty level. Using the poverty level also takes account of the fact that households differ in size and composition and hence in income needs. The ACS currently provides ratios of household income to poverty level for census tracts but not block groups, and might be able to provide them for FEMA-defined flood-prone areas.⁷

Possible uses of ACS data for flood insurance program policy analysis could include the following:

- In small areas containing large numbers of current policyholders, ACS data for those areas could help indicate the likely affordability of premiums for the remaining households by using a combination of what is known about the policyholders (although currently very little information is available on policyholders) and all residents in a model to predict characteristics of interest for nonpolicyholders.
- In small areas that have no or small numbers of current policyholders but are in areas that are likely to face increased flood risk, ACS data could help FEMA identify areas with residents who may be at high risk of not being able to afford flood insurance premiums. FEMA could then decide to invest resources in those areas for additional targeted information from surveys, administrative records, and commercial sources to support an affordability analysis.

Given that many small areas are likely to have a mix of policyholders and nonpolicyholders, the use of ACS data for flood insurance program policy analysis is limited due to this heterogeneity, unless and until FEMA obtains additional data on policyholders for modeling purposes.

Federal Agency Administrative Records

It could be possible for FEMA to make arrangements to obtain information on household income and other characteristics for policyholders and other owners of at-risk properties from another federal agency. Access to federal administrative information would take time to arrange but, once established, could provide an inexpensive timely flow of key information that is regularly updated. For example, adjusted gross income could be

⁷ For such areas, tables could display, for example, the percentage of families below 100 percent of poverty, the percentage between 100 and 200 percent of poverty, the percentage between 200 and 300 percent of poverty, the percentage between 300 and 400 percent of poverty, and the percentage above 400 percent of poverty. Of course, even in flood-prone areas, probably not all and maybe not even a high percentage of families with incomes that are low relative to the poverty level or other families will face premiums that are high relative to their income.

available from the Internal Revenue Service (IRS) or covered earnings and Social Security benefits from the Social Security Administration (SSA). Such access would require justification of a federal purpose that would accord with IRS or SSA regulations about allowable access, and it would also likely require that FEMA use the data and conduct its policy modeling under the terms of a memorandum of understanding in a secure environment, similar to that of a Federal Statistical Research Data Center (RDC),⁸ to protect the confidentiality of the information.

Commercial Sources

Several commercial enterprises now collect data at the individual property level and perform their own internal analyses to predict home prices using GIS and related statistical modeling software. Some of these companies provide analytical services to the NFIP and also serve as data providers. Making arrangements to obtain information on, say, building elevation from remote sensing technologies and GIS or property values from local property records or realty sites would require a sustained effort, but could have substantial benefits for FEMA. Once experience is gained with such data sources, they could provide an inexpensive way of regularly updating key characteristics for at-risk properties. If these commercial entities have data that FEMA can use in a microsimulation they could sell such data to FEMA, as an alternative to expecting FEMA to gather new data. As one other example, there are private firms that maintain databases on mortgage balances at the individual property level. These data would be used to establish whether the property owner faces a mandatory flood insurance purchase requirement. However, getting access to the data which are proprietary can be expensive or maybe even not possible.

Local Tax Assessment Records and Other Related Sources

Most tax assessor offices maintain information needed for estimating and collecting property taxes. Of potential interest to an affordability study, this includes an assessment of the property's value, usually an estimate of the improved value (just the structures), as well as the land value. The extent to which such data are well organized, digitized, and easily made available to the public will vary among communities.

⁸ An RDC is a location where a user (with appropriate clearance) can have access to restricted-use data (e.g., microdata) that would not otherwise be accessible. Analyses would be performed using the center's computer, and results would still be subject to all of an agency's disclosure rules. The Census Bureau originally established a network of RDCs around the country; these RDCs now house data from other agencies as well. Available at http://www.census.gov/about/adrm/fsrdc/about/available_data.html (accessed on October 7, 2015).

Municipalities will generally make assessors' data available (either for free or for a fee), although for most this will require contacting the office and making a formal request. While online tools to look up assessors' information are increasingly common, most communities do not simply provide their entire database for download just on their website. There is also substantial variation in whether communities maintain historical data on past sales, or only the current assessment. Furthermore, assessment practices can vary and some communities will maintain both the appraised value and the assessed value (when these differ), but others may only provide the assessed value, which may require calculations to convert back to the appraised value.

U.S Army Corps of Engineers

Many coastal and riverine areas of the United States have recently received new FIRMs or have new flood studies planned under the Risk MAP program or both, but not all of these FIRMs will include information of flood likelihoods and stages needed for the estimation of damage claims. There are other sources for securing such information. The U.S. Army Corps of Engineers (USACE) has multiple flood risk assessment tools available from its Hydrologic Engineering Center (HEC) that are used by engineers worldwide. HEC-HMS (Hydrologic Modeling System), which is a computer modeling software package, computes design flood hydrographs for specified return periods, such as 10-year or 100-year floods. HEC-RAS (River Analysis System) takes the highest discharge from the design flood hydrograph and calculates the corresponding flood water surface elevation above geodetic datum, using a map of land surface terrain and channel morphology often derived from light detection and ranging (LiDAR) data.

The USACE also has made available depth-damage curves for estimating property damage from flood events. Such curves give estimates of damages to a structure or its contents as a percent of its value based on the depth of water at the site. These are used for USACE flood damage reduction studies, but are publicly available for other uses as well. The most up-to-date curves available are generic, nationwide functions for residential structures with basements based on damage estimates from major flood events in the United States between 1996 and 2001.⁹

Hazus

Hazus-MH is a national, GIS-based software model developed for FEMA by the National Institute of Building Sciences. The objective of

⁹ See <http://planning.usace.army.mil/toolbox/library/EGMs/egm04-01.pdf>.

Hazus is to provide an analytical platform for estimating the effects of natural disasters in a standardized way across the nation for use by public officials in planning and evaluating mitigation measures. It is designed to estimate damages from multiple types of hazards. In the flood model, Hazus couples a flood hazard analysis, which estimates the depth of flooding in the user-defined study area, with an estimate of economic damages from the flood. Hazus has also been used in academic studies (e.g., Dierauer et al., 2012; Kousky and Walls, 2014).

Hazus includes likelihoods of different flood depths for use in estimating flood hazard as well as depth-damage curves that can be used to estimate damages for different kinds of structures. The hazard component of Hazus can be used to fill in hazard information that may be missing from FIRMs for particular locations. Hazus uses depth-damage curves to relate depth of flooding to building and contents damages for each representative property. Hazus has many such curves in its library, which varies by property type (e.g., single-family residential, mobile home, and light industrial). Damage curves may also vary by characteristics of the structure. For example, for single-family properties these are year built, number of stories, and type of basement. These curves can be applied to individual structures. Hazus does not, however, have data on individual structures in its database. Instead, the properties in Hazus are what is reported from the U.S. Census of Population and Housing at the census block level, while nonresidential data come from Dun & Bradstreet.¹⁰ Hazus assumes the building stock is evenly distributed throughout a census block. This makes the database ill suited for microsimulation. Therefore, only the hazard and damage procedures can be used in microsimulation modeling.

LiDAR

Building elevation data are often missing from the NFIP policy database and information available on building characteristics for properties that do not have an NFIP policy can only be acquired from other sources. LiDAR, which is a remote sensing detection system using light from a laser to measure distance, can be used to obtain ground elevations and other property data. One application of this technology uses lasers mounted on a fixed-wing airplane along with other instruments to determine the elevation of the earth surface. LiDAR has become the industry standard for obtaining accurate ground elevations efficiently. For example, in the early 2000s North Carolina acquired statewide, high-resolution LiDAR-derived topography and imagery. Table 3-1 shows the different accuracy levels and the monetary cost depending on how much LiDAR is obtained. In general,

¹⁰ Dun & Bradstreet is an American public company.

TABLE 3-1 Cost of LiDAR for Various Levels of Accuracy

Quality Level	Point Density	Nominal Point Spacing	Root Mean Square Error of Vertical Accuracy (RMSEz)	\$ per square mile (mi ²) for 500-1000 mi ²	\$ per mi ² for 1000-5000 mi ²	\$ per mi ² for >5000 mi ²
	Units are points per m ²	Units are meters	Units are centimeters			
QL1 LiDAR	8	0.35	9.2	\$602.50	\$497.00	\$453.25
QL2 LiDAR (USGS base specification)	2	0.7	9.25	\$374.50	\$310.75	\$277.00
QL3 LiDAR	0.25-1	1-2	18.5	\$291.50	\$238.00	\$209.25

NOTE: USGS, U.S. Geological Survey.
SOURCE: <http://nationalmap.gov/3DEP/nea.html> (accessed on October 7, 2015).

the minimum LiDAR order is 500 square miles, but significant savings can result if acquisition areas are greater than 5,000 square miles. For flood insurance study-related information, QL2 is the quality standard that is typically used.

LiDAR-based structure elevations can be used along with the BFE to determine the risk the structure has in relation to flooding. LiDAR technology has become one of the basic building blocks to determine ground surface elevations.

FILLING DATA GAPS

Gaps in the NFIP policy database and from DFIRMs are (a) elevation data for policies that are not elevation rated, needed to estimate future premiums, claims, and NFIP revenues; and (b) policyholder socioeconomic characteristics, needed for establishing cost burden and simulating eligibility, benefits, and costs of means tested assistance programs. There are no data—including the data in (a) and (b)—for properties, property owners, and occupants that are located in at-risk areas but are not covered by NFIP policies. These data may be needed for evaluation of policy options that might expand take-up.

These, as well as other less significant data gaps, might be filled using some of the other data sources described above. However, if other data sources are not sufficient then the approaches described in this section may

be needed. It is likely that a combination of the strategies will be needed not only for constructing an initial database, but also for creating future versions of the database.

Proxy Variables

A proxy means using one measure to stand in for another, when one measure is readily available and the other is not. For example, ground elevation at a property might be known from a DFIRM. A local tax assessment database, or a LiDAR report, might include the style of the building or the presence of a basement for that structure. This information about the property might allow for adding height to ground elevation and using that as a proxy for the elevation of the first habitable floor.

As another example, BW 2012 called for an affordability study to focus on “individuals who cannot afford” to pay NFIP risk-based rates. Policy makers may prefer to use household income as the measure of ability to pay. However, such a measure for the policyholder may not be available, but data on assessed property value may be.

Although a proxy variable might be used when the originally intended variable is very difficult and expensive to obtain, the two variables might be weakly correlated, suggesting that the proxy variable is measuring something substantially different from what had been intended. Analysts will be expected to explain the reasons for the use of proxy variables and any cautions about how results of the analysis should be interpreted by policymakers.

Sample Survey

The FEMA website states that the agency only collects the minimum amount of information necessary to administer the NFIP. Compliance with the requirements of BW 2012 and HFIAA 2014 and the need to evaluate NFIP policy option alternatives over time provide a reason for FEMA to collect information beyond what is currently collected.

FEMA could commission a spatial sample of homeowner/at-risk properties selected from the NFIP policy database. Particular data needs are elevation data for non-elevation-rated properties (may have to pay for the elevation certificate) and homeowner and occupant characteristics. For those selected, a survey might be administered to obtain such data. Alternatively, for those selected the needed data might be obtained through changes to the insurance application form (e.g., a supplementary form). In all cases, the survey results would be confidential and would not be entered into the NFIP database. Of course, this only will get information from current policyholders. To obtain data for properties that are not covered,

an additional spatial sample might be drawn for addresses in the nation's floodplains, with data collected by surveying the owners/residents at the selected addresses.¹¹

A survey has the advantage that it can be professionally designed to obtain the desired information on a consistent basis. A drawback of a survey is its monetary cost. Depending on the interviewing mode (and personal interviews could be desirable for a FEMA survey because of the ability to capture information by observation) and the extent of follow-up needed to bring response rates up to acceptable levels, the cost of a completed survey case could be at least \$200 to \$300 per interview. Survey response rates have been falling for several decades in the United States and other countries; indeed, public opinion polls conducted by telephone may typically only obtain a 10 percent response. U.S. Office of Management and Budget guidelines require federal surveys to plan sufficient nonresponse follow-up to obtain an 80 percent response rate or, if this rate is viewed as unattainable, to plan for a study of a sample of nonrespondents to permit estimation of any nonresponse biases and their effects on key estimates. In the case of a FEMA survey, the information on current NFIP policies could help in modeling nonresponse adjustments for that portion of the sample, but it could not help for the portion comprising at-risk properties without flood insurance coverage.

How many completed survey cases are needed for a FEMA survey will be a function of the extent of disaggregation of microsimulation model results that is desired (greater disaggregation requires a larger sample to attain adequate precision of estimates) and the budget the agency can allocate to the effort. Arguably, FEMA can justify a one-time investment in a sample survey—even an expensive one—as providing the most accurate basis for an NFIP policy options microsimulation model. But the need for policy modeling is continuing and would not be used only one time. Flood risk will change for currently covered properties, other currently at-risk properties, and properties that at present are minimal risk. Finally, even with a large well-executed survey, there will be missing items for some

¹¹ Spatial sampling involves selecting a limited number of locations (a sample) in geographic space for faithfully measuring phenomena that are subject to “dependency” and “heterogeneity.” Dependency refers to the phenomenon that observations at neighboring locations are more similar to one another than are observations at locations farther apart. Dependency suggests that a value at one location can predict the value at another location. Spatial heterogeneity refers to attributes of geographical variation. Spatial heterogeneity suggests that dependencies can change across space (also referred to as “nonstationary”) and, therefore, it may be unwise to trust an observed degree of dependency beyond a region that may be small. Spatial sampling techniques are more efficient than conventional sampling when surveying spatially distributed targets, where spatial autocorrelation and heterogeneity are prevalent (Banerjee et al., 2004).

properties. Surveys typically impute such missing values from the information provided by other respondents.

Finding 3.3. Information available from the NFIP policy database and from FIRMs are missing data critical to a comprehensive analysis of policy options. Numerous other sources of information, including new survey data collection, could be used to conduct microsimulation policy analyses. Although the data for a national affordability study initially will be limited, numerous opportunities for database improvement for answering NFIP policy questions can be secured as budget resources permit.

SUMMARY

A task of the committee was to discuss data needs and data gaps—the completeness and quality of data needed for policy analysis. Data needed to evaluate alternative options include data about flood insurance policies, property characteristics, and property owner/resident socioeconomic characteristics. At present, FEMA has ready access to two internal databases: the NFIP policy database and FIRMs. To evaluate affordability policy options, additional data on variables not presently available or that might replace or supplement the FEMA data are needed.

A particularly important gap in the data for many policies is the absence of first-floor elevation data that are necessary for estimating the damage to the structure from floods of different magnitudes. Although some of those data are now being collected for properties inside the SFHA, such data are not available and are not being collected for properties outside the SFHA. Also, even if all of the data in the NFIP policy database were complete and accurate, the database cannot be used to simulate affordability assistance programs that are means tested because the database does not contain income, wealth, or housing cost data. Furthermore, the NFIP database does not contain information for nonpolicyholders located in flood-prone areas and cannot be used to analyze whether an alternative policy option that would reduce premiums or provide assistance might promote takeup among such households. These and other data gaps need to be filled, and the report discusses approaches to filling those data gaps.

Finding 3.1. Simulating premium increases if NFIP risk-based rates are charged requires having elevation data for each insured property. Such data are now being requested for properties that were previously paying pre-FIRM subsidized rates. Because flood insurance premiums for policies on properties outside the SFHA are not elevation rated,

elevation data for those properties are missing and are not currently being collected.

Finding 3.2. In some areas of the country, all stream miles have not been mapped and in places that have been mapped many FIRMs do not yet include the BFE. Furthermore, DFIRMs do not describe the full range of flood stages and associated probabilities, unless their content has been supplemented by local community investments in providing additional data and analysis.

Finding 3.3. Information available from the NFIP policy database and from FIRMs are missing data critical to a comprehensive analysis of policy options. Numerous other sources of information, including new survey data collection, could be used to conduct microsimulation policy analyses. Although the data for a national affordability study initially will be limited, numerous opportunities for database improvement for answering NFIP policy questions can be secured as budget resources permit.

Analytical Next Steps and Further Findings for Affordability Policy Options

This is the second of two reports from this National Academy of Sciences committee. Report 1 discussed, among other topics, how to identify when National Flood Insurance Program (NFIP) premiums would result in a cost burden on policyholders, decisions that must be made by policy makers when designing an assistance program, and policy options for delivering assistance or for reducing premiums for all policyholders. In this report—Report 2—the task was to propose alternative approaches for evaluating affordability policy options. This second report describes analytical methods to evaluate affordability policy options and how the Federal Emergency Management Agency (FEMA) might expand its analytical capabilities; discusses data issues, which include data needs and availability of data; draws examples from a proof-of-concept pilot analysis conducted for a state with relatively rich data; and discusses how the data needs for a national affordability study might be addressed.

The first section in this chapter suggests some near-term analyses FEMA might complete as it is building its analytical capacity. The content of the remaining sections is the result of committee discussions and insights gained in the process of preparing Report 2. Those next sections include findings that add to or refine those in Report 1, Chapters 3 through 7.

NEAR-TERM ANALYSIS OF POLICY OPTIONS

FEMA is required to propose an affordability framework to Congress 18 months after submitting the affordability study.¹ In doing so, it must choose among numerous possible policy options. Ideally, FEMA would formulate alternatives for consideration, conduct an evaluation of the alternative options, and propose a preferred alternative. For FEMA to conduct an affordability analysis, both supporting data and an analytical platform are needed. Chapters 2 and 3 discussed the design of analytical procedures and the necessary supporting data to conduct an affordability analysis. In those chapters, specific observations and findings were presented. As a general matter, the findings in Chapters 2 and 3 suggest that FEMA will not be able to conduct a comprehensive analysis in the near term. There are analyses, however, that FEMA can undertake in the near term while building its analytical capacity in the longer term. First, based on Reports 1 and 2, some of the questions likely to be posed can be answered in a nonquantitative way. For example, one question (raised previously in Report 1) is, “Who might administer the [assistance] program?” This question might raise additional questions, such as, What legal authorities would the agency need to implement an alternative policy option or what other agencies would need to be partners in executing the option? The answers to such questions might affect the decision to pursue or not pursue an alternative policy option. FEMA may choose to narrow the range of options as it prepares answers to such questions.

Second, some alternatives might be initially removed from consideration (maybe to be reintroduced at a later date) based on a deductive and conceptual argument. For example, some of the options discussed in Report 1, such as disaster savings accounts, tax credits and deductions, and capping the NFIP responsibility to pay claims in high-loss years, might be put aside as viable near-term alternatives if the alternative would have little applicability to low-income property owners, if the alternative would require specialized legislation and execution by another agency, or if FEMA concluded that the alternative would have limited political acceptability.

Third, after this initial screening, some alternatives will remain candidates for inclusion in an affordability framework and, by Section 100236 of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW 2012) direction, could be subject to quantitative analysis. Given FEMA’s current

¹ The Homeowner Flood Insurance Affordability Act (HFIAA) 2014, Section 9, states that “Not later than 18 months after the date on which the Administrator submits the affordability study referred to in subsection (a), the Administrator shall submit to the full Committee on Banking, Housing, and Urban Affairs and the full Committee on Appropriations of the Senate and the full Committee on Financial Services and the full Committee on Appropriations of the House of Representatives the draft affordability framework required under subsection (a).”

analytical capabilities and available data, however, the immediate prospects for a quantitative analysis of formulated alternatives are limited. Nonetheless, NFIP operations are well understood and the policy questions FEMA is expected to answer are well understood. In fact, the North Carolina proof-of-concept pilot analysis illustrates that computational modules can be built to determine premiums, predict future claims, and make estimates of NFIP net revenues for a limited range of alternative policy options. Based on the North Carolina analysis, FEMA could begin the conceptual development of a microsimulation framework that represents the operation of the NFIP and that can be ready to evaluate affordability policy options as data gaps are filled (see Chapter 3).²

Fourth, some analyses can be completed with data now available, or with limited investments in database development. To illustrate:

- Some descriptive questions might be answered. As examples, how many policies will lose pre-flood insurance rate map (FIRM) subsidies under BW 2012; using algorithms developed for the North Carolina analysis, how many current NFIP policies are paying grandfathered rates; using American Community Survey (ACS) data, where are the census block groups that have a high percentage of policies losing pre-FIRM subsidized (PFS) rates on primary residences and have low median income or a high poverty rate relative to surrounding areas? This latter kind of analysis, perhaps with different criteria, might be a way to identify geographic areas of possible high cost burden.
- Some questions can be answered using existing or readily obtainable national data. For example, prior to BW 2012 about 10 percent of all policyholders (about 500,000) were paying pre-FIRM subsidized rates, and were also primary residences (see Report 1). Under BW 2012, as well as HFIAA 2014, these 500,000 properties over time will be required to pay NFIP risk-based rates. Some policyholders are not going to be cost burdened (whatever the definition) because (a) premiums will not rise substantially, (b) the policyholder has the ability to pay the higher premium, or both. However, FEMA has not been able to answer questions about how high these rates might go, how many of the approximately 500,000 policyholders will find the NFIP rates unaffordable, or how much an assistance program targeted to these policyholders might cost. Some initial analyses

² The North Carolina analysis found that the model-predicted premium for a given property often differed—sometimes substantially—from the premium being paid, as reported in the NFIP policy database. This demonstrates one challenge in developing a simulation model that can replicate how the NFIP operates in terms of calculating premiums and, in turn, for analyzing policy changes regarding how premiums are actually quoted by Write-Your-Own agents or how an assistance program might improve the affordability of flood insurance premiums.

may contribute to a better understanding of what may be the final answers to these questions.

A key data gap for such analysis is the absence of first-floor elevation data for pre-FIRM properties. Such data are now being requested for properties that were previously paying pre-FIRM subsidized rates. As authorized by the Homeowner Flood Insurance Affordability Act in 2014 (HFIAA 2014), FEMA is now increasing rates by 18 percent per year and will keep doing so until an elevation certificate is provided. FEMA might use the data from those certificates to impute first-floor elevations on structures for which elevations are not yet known.³ Then, one near-term analysis would use current rating tables, available information on the properties and policies, and recently acquired data on first-floor elevations to estimate the range of premium increases. Knowing the size distribution of increases can be the basis for a policy discussion of whether the increases are “large” and for those that are deemed significant whether those policies are concentrated in particular areas. Also, knowing the total increase for all policies provides an upper-bound estimate of the new revenues that would flow to the NFIP (if all policies remained in force) and at the same time is an upper-bound cost estimate for a premium assistance program that would fully offset the increased cost for all PFS policyholders.

- Some questions can be answered using North Carolina data, building on the North Carolina analysis. For example, the costs of simply designed premium and mitigation grant assistance programs within North Carolina were estimated. More complex program designs could be formulated and evaluated for North Carolina.⁴ Depending on study resources and schedule, the socioeconomic data gaps that now exist in North Carolina might be filled with a sample survey of flood-prone property owners in that state. Having such data would make it possible to compare the different measures of cost burden. Specifically, the cost burden definition in the North Carolina analysis was premium as a percent of coverage. The committee, in the following sections on cost burden, finds that this measure is not a measure of ability to pay and other measures of cost burden will need to be developed. If an income-referenced measure of cost burden is desired, imputing income characteristics of an aggregate

³ For such an analysis, it would be important to capture the error introduced by imputation.

⁴ Some options for the affordability framework might still be put aside for later study because the technical foundation for simulation of effects is lacking. For example, there are no available estimates of the relationship between premium levels and mitigation actions other than structure elevation in the NFIP rating tables (see Report 1).

census unit (e.g., a census block group) to individual policyholders using ACS data is not defensible. Therefore, a sample survey or a match to administrative income records within North Carolina may be required to obtain income data, although it may be unlikely that such a survey or records match could be undertaken in the near term. Alternatively, an analysis could use already available data on assessed property values for measuring cost burden, a possibility discussed in the next section. Such an analysis could examine, for example, how the number of property holders eligible for assistance and the amount of assistance that they receive varies when different percentage thresholds (for premium to property value) are used to identify who is cost burdened.⁵ The results of any North Carolina analysis can be realized quickly and can make an important contribution to the design of an affordability framework. However, these results will be specific to the state and might have limited generalizability for making inferences to the nation, an important limitation that would have to be recognized.

- Fifth, the absence of some basic data for current policyholders (i.e., first-floor elevations of structures and household incomes of policyholders) and the lack of data for at-risk properties that are not currently covered by policies mean that the ability to use a micro-simulation model to quantitatively analyze policy options presently will be limited in scope and prone to uncertainty. As FEMA uses the North Carolina proof-of-concept analysis to guide its model building it can, at the same time, use that effort to identify data needs, and strategies and priorities for data collection at the national level.

Finding 4.1. Some decision-relevant analyses can be completed with currently available analytical tools and data, or with limited investments in methods and database development. In the process of doing such analyses, FEMA also will make progress toward building analytical capacity to conduct more comprehensive policy analyses in the future.

FURTHER THOUGHTS AFTER REPORT 1

As Report 2 was being prepared, the committee's attention was on the analytical challenges to doing an affordability analysis. As ways to address those challenges were investigated, additional insights into the topics

⁵ In addition, an analysis could assess the sensitivity of results to different behavioral assumptions about which policyholders would drop coverage when rates go up and would resume coverage when provided with assistance.

covered in each chapter of Report 1 were gained. As a result, the committee developed additional findings or refinements to those findings. These further findings that are relevant to the statement of task for Report 1 are reported in this section. To make the relationship to Report 1 clear, its chapter titles are used as the section headings below.

National Flood Insurance Pricing, Policies, and Premiums

Grandfathering

Grandfathered properties are those that were built in compliance with the flood hazard map in effect at the time of building construction, and the properties are allowed to maintain a lower flood insurance premium rate if a new map moves the property into a higher flood-risk zone or new base flood elevation. These policyholders would face increases if, as BW 2012 specified, grandfathering was no longer available and NFIP risk-based rates were to be paid. In addition, properties newly mapped in the special flood hazard areas (SFHAs) would be subject to the mandatory purchase requirement. For future NFIP-proposed changes pertaining to grandfathering, see footnote below.⁶

HFIAA 2014 reinstated grandfathering; however, Report 1 found that there is no reliable way to estimate the number of currently grandfathered policies and FEMA currently has no mechanism to identify grandfathered properties going forward. In addition, as was the case prior to BW 2012, HFIAA 2014 allowed grandfathered rates to transfer with the property by documenting that the structure was grandfathered by one of two ways. This was done by demonstrating the structure was built in compliance with the map at the time of construction and that continuous coverage has been maintained since the map change. Preferred risk policy (PRP) rates, however, cannot be grandfathered. When newly mapped into an SFHA, PRPs can apply for the newly mapped procedure. This gives formerly PRP properties 1 year of a PRP rate plus a reserved fund assessment and a federal policy fee, to comply with HFIAA 2014. For properties eligible for grandfathering, after this year they will be transitioned to a grandfathered rate, which would be a zone X (areas outside the 500-year floodplain) rate, even though they have now been mapped into an SFHA.⁷

Prior to BW 2012 and HFIAA 2014, all the NFIP rating tables included

⁶ FEMA will be making program changes in early 2016. In doing so, they will be capturing additional information on grandfathered policies. A summary of program changes are available at <http://nfipiservice.com/Stakeholder/FEMA7/W-15046.html>.

⁷ Information sourced from and additional information available at https://www.fema.gov/media-library-data/1428947341380-23a056704409206c86cc89ac72f9f070/FEMA-HFIAA_NewlyMappedFS_041015.pdf.

an explicit addition to premiums to account for forgone revenues from grandfathering. This cross-subsidy is being maintained by the NFIP and does support the BW 2012 expectation that NFIP revenues through time cover claims paid plus expenses (see Chapters 2 and 3 of Report 1). However, this cross-subsidy violates the actuarial principle that each property pays rates commensurate with its flood risk. Looking ahead, climate change, land development, and improved flood mapping mean that, in the future, some properties will be mapped into SFHAs when they are not currently, or will see higher base flood elevations. The owners of those properties will have the opportunity to pay grandfathered rates under HFIAA 2014 (in addition to those paying grandfathered rates prior to HFIAA 2014). The NFIP practice of increasing rates for all policyholders to account for revenue loss from grandfathering (i.e., cross-subsidizing rates) may result in an ever-increasing violation of the actuarial principle that rates paid should be in relation to risk.⁸ Specifically, the result will be that for policies that are grandfathered, premiums will be too low, and for those who bear the cross subsidy, premiums will be too high.⁹

Finding 4.2. HFIAA 2014's reinstatement of grandfathering, which will perpetuate cross-subsidies in the NFIP, will result in the program increasingly violating actuarial pricing principles if flood risks increase in the future.

NFIP Risk-Based Premiums

Chapters 2 and 3 in Report 1 discussed NFIP rates and rate setting and the changes called for by BW 2012 and HFIAA 2014. With specific reference to rates and BW 2012, Congress instructed the NFIP to move toward flood insurance premiums that better reflected the full risks of flooding at a given location, following actuarial pricing principles. As noted, grandfathering was to be eliminated, but HFIAA reinstated that practice with the result that rates for those properties may not be risk based. However, PFS rates, even with HFIAA 2014, will be phased out. Another gap in attaining risk-based rates is pricing of policies that are outside of the SFHA. Outside

⁸ Through time, some properties that had been paying grandfathered policies will either drop the policy or move to NFIP risk-based rates (for example, the policy lapsed and the property was sold). However, if risks increase through time that number may be small relative to the increase in newly grandfathered policies.

⁹ One approach to making premiums affordable is to increase the number of communities participating in the Community Rating System (CRS). As discussed in Report 1, revenue losses from offering premium discounts in CRS communities are currently made up by cross-subsidization. If promoting CRS enrollment is an affordability option then, as with grandfathering, NFIP rates will increasingly violate actuarial pricing principles.

of the SFHA, FEMA does not rate based on elevation and, as a result, elevation data are not available for those properties. The result is that zone X and PRP rates are not risk based; specifically, those properties at much higher risk in these zones may be paying rates that are lower than their true risk and those at lower risk could be paying rates that are higher. BW 2012 does not specifically direct FEMA to review and modify PRP and zone X rates to make them risk based. One result is that the rates charged may continue to fail in providing accurate risk information on these properties to their owners.

For the NFIP to move toward risk-based rates for all policies, it will be necessary to take at least two actions:

- Obtaining first-floor elevation data for all insured properties including those outside the SFHA. New technologies can make collection of elevation data easier on a wide scale. In the future, communities or FEMA would be in a position to use a technique such as vehicle-based light detection and ranging (LiDAR), which is a remote sensing technology that measures distance, to obtain first-floor elevations for multiple properties instead of requiring each property owner to obtain an elevation certificate. This possibility was discussed in a recent National Research Council (NRC) report on tying flood insurance to flood risk for low-lying structures in the floodplain (NRC, 2015b) and has been used throughout the state of North Carolina.¹⁰
- Have flood maps depict the spectrum of risk that properties face rather than focusing only on the boundary of the SFHA. The existing focus on the boundary is an artifact of the program where mandatory insurance purchase requirements are defined by the location of the boundary. Digital flood insurance rate maps, however, have emphasized not only defining the boundaries of the SFHA, but also mapping risk zones within the SFHA. Delineating risk across the floodplain would enable FEMA to provide better information for local zoning and minimize possible neglect or misunderstanding of risk by property owners. Risk-based pricing will require maps to include new zones outside the SFHA that reflect the different likelihood and magnitude of flood insurance claims as a structure is further removed from the SFHA boundary. If rates changed continuously with flood risk across the landscape, there would not be a dramatic change in rates from just crossing the SFHA line.

¹⁰ In areas where basements are common, LiDAR data will need to be supplemented with building information data.

Finding 4.3. Full implementation of BW 2012 will not result in NFIP risk-based rates for properties located outside the SFHA.

The Insurance Purchase Decision

Promoting Takeup Through Assistance Programs

Prior to BW 2012, the NFIP had about 5.3 million policies in force. Some number of those (that number cannot be determined) was the result of the mandatory flood insurance purchase requirement based on the policyholder having a federally backed mortgage and the insured property being located in a SFHA. Report 1 reviewed the limited evidence available, which suggested that some property owners were not purchasing insurance even when the purchase of flood insurance was mandatory. As rates increase, compliance with the mandatory purchase requirement may be further reduced, especially for those households where the costs of the premium exceed their ability to pay, given their income and other living expenses. To address both compliance and affordability concerns, an assistance program could focus on aid to policyholders who are required to purchase flood insurance. Such a focus could also include aid for currently uninsured households who would be required to pay NFIP risk-based premiums (or pay grandfathered premiums) in the future as a result of map changes.

Among the affordability concerns expressed in BW 2012 and HFIAA 2014 there was a desire to keep premiums affordable, not only to discourage dropping of mandatory coverage, but also to motivate the voluntary purchase of flood insurance. The rationale for having high takeup rates was discussed in Report 1. If the goal is to expand the number of policies in force both within and outside the SFHA, providing assistance may encourage voluntary purchase when the insurance premium exceeds a household's ability to pay, using some chosen criterion for defining cost burden.¹¹

Finding 4.4. In designing an assistance program and considering the goal of increased flood insurance takeup, aid may need to be extended to property owners who are not required to purchase flood insurance.

¹¹ Willingness to pay may be the barrier to purchase. See Chapter 4 of Report 1 on takeup rates for further discussion. Further, from October 1, 2013, through September 30, 2014, flood insurance policy growth across the nation decreased by about 4 percentage points (FEMA, 2015). Policies in force across the nation were 5,568,642 and 5,350,887 in 2013 and 2014, respectively. Contributing factors could include premium rate increases from reform legislation adopted by Congress in 2012 and 2014.

BOX 4-1
Illustrative Example of Messaging to Homeowner

Your property at X location has a Y percent chance of being flooded in any given year. This amounts to a Z percent chance of at least one major flood event during the next 30 years. Given this risk, the NFIP risk-based premium for your property for 2016-2017 would be \$W.^a Due to provisions enacted by Congress, however, you will be charged only \$V for your flood insurance.

^a FEMA will implement HFIAA Section 28 (Clear Communications) starting April 2016 and will be providing a notice about flood risk versus how it is being rated.

Information Dissemination

Congress, in Section 9 of HFIAA 2014, directed that FEMA give consumers accurate information about the flood risk associated with their properties. If property owners are not asked to pay NFIP risk-based rates (for example, through grandfathering or the offering of non-elevation-rated rates), FEMA might still make estimates of those rates and inform the property owner about the premium discount they are receiving. To make such a calculation, however, FEMA needs access to first-floor elevation data and detailed flood risk maps.

With respect to disseminating information to homeowners, appropriate messaging would be helpful and could be included along with the annual premium letter. Any messaging could be piloted in focus groups and should draw from the literature (Kousky and Shabman, 2015). Where the specific information is available, the message could include components of an illustrative example shown in Box 4-1. Should specific information needed to estimate NFIP risk-based risks be lacking, a more general statement would be included in the annual premium letter.

Finding 4.5. Calculating and then informing policyholders of the NFIP risk-based rate may help address the direction of Congress that policyholders be provided with accurate information on the flood risks they face.

**Affordability Concepts and a Framework for
 Assistance Program Design Decisions**

The Ability to Pay Flood Insurance Premiums

BW 2012, Section 100236, states that FEMA

shall enter into a contract under which the National Academy of Sciences, in consultation with the Comptroller General of the United States, shall conduct and submit to the Administrator an economic analysis of the costs and benefits to the Federal Government of a flood insurance program with full risk-based premiums, combined with means-tested Federal assistance to aid *individuals who cannot afford*¹² coverage, through an insurance voucher program.

The phrase “cannot afford” can be understood as exceeding an individual’s ability to pay an NFIP risk-based premium. This focus on ability to pay requires FEMA to define when such premiums impose a cost burden on an individual.

The ability of a property owner to bear a particular cost, such as a flood insurance premium, is often described in terms of some measure of household gross or net income.

For implementing an assistance program, individuals can be required to submit tax returns, W-2s, or other documents as proof of having a qualifying income. For policy simulations and other analytical purposes, however, analysts must rely on survey or administrative data, which often do not have measures of the specific income concept used by the assistance program. Therefore, other measures of income or proxies are often employed.

An alternative approach to defining ability to pay is the use of household wealth, rather than income. Wealth consists of the tangible and intangible assets owned by a household. It may be closely tied to income in some cases, but it is not the same as income. It can be argued that it takes income to produce wealth (e.g., investments) and that wealth can create income (e.g., return on investments). Monetary measures of wealth are generally expected to be positively correlated with income (high-wealth households tend to have high income; low-income households tend to have low wealth), but the correlation may be only moderately strong because there are sufficiently many low-income/high-wealth and high-income/low-wealth households.

Because it can take multiple forms, wealth is not always directly observable. Some components of wealth may vary quite slowly over time (e.g., value of housing stock) but other components can be more volatile (e.g., unrealized capital gains on investments, etc.).¹³ For premium affordability, wealth can be seen as a proxy for income, or instead as a useful measure of ability to pay. There is a particular connection between household wealth and flood insurance that argues for the latter view. In the event of a flood, an uncompensated loss is, in the first instance, a loss of wealth. To the extent that a structure is repaired or rebuilt out of current income,

¹² Emphasis is not in the original text.

¹³ With respect to difficulties in measuring wealth, see, for example, Boskin (1988) and Stiglitz (2015); on the treatment of capital gains, see Armour et al. (2013).

the loss of wealth is converted to a loss of disposable income. But if that is not the case, all or part of the damage remains as a loss of wealth. The role of flood insurance is to help the household avoid possible flood-related wealth losses, converting them to a much smaller and stable reduction in disposable income (the insurance premium).

Attempts to measure wealth encounter many of the same problems associated with income measurement. Although household wealth may consist of many different components, the principal component for those low-wealth households that might be the target of an affordability policy is the equity in the residence. A more readily available metric is the assessed valuation of real estate property, which includes not only the household's equity in the property, but also the debt-financed portion. The use of this metric as an affordability-related premium cap relies on the relatively strong correlation of home equity in lower-wealth households with household wealth¹⁴ and the less well understood correlation of assessed valuation with home equity. Therefore, at least for the lower-wealth households usually associated with affordability issues, property value may be a useful indicator of ability to pay, especially given that data on property values are much more readily available than data on income or broader measures of wealth.

Defining Cost Burden for Assistance Program Design

Report 1 noted that there were many possible measures of cost burden and discussed three specific measures, two of which were related to an individual's income. Specifically, Report 1 discussed an income approach and a housing cost as percent of income approach to identify those who would be cost burdened by their NFIP premiums. Report 1 also discussed a "capped premium" approach based on the premium as a percent of flood insurance coverage, as suggested by HFIAA 2014, as a measure of cost burden. This report revisits the insurance coverage-based capped premium approach and, in light of the analytical needs and data gaps discussed in Chapters 2 and 3 of this report, introduces a new type of capped premium based on property value.

¹⁴ 2011 data published by the Bureau of the Census (available at <http://www.census.gov/people/wealth>, "Table 1. Median Value of Assets for Households, by Type of Asset Owned and Selected Characteristics: 2011") showed that for all groupings of households with net worth (wealth) below \$250,000, the median value of home equity was in the range of 60 to 74 percent of median net worth. Above \$250,000, this share fell rapidly to less than 30 percent.

Cost Burden Measured by Premium as a Percent of Coverage

The capped premium approach based on the amount of flood insurance coverage purchased requires policy makers to specify a threshold percentage—premium relative to flood insurance coverage—at which the premium is judged to become cost burdensome.¹⁵ The HFIAA 2014 legislation suggested that this threshold could be 1 percent. If this approach is chosen, policy makers will have to select that value or some other value. Using this criterion, a household whose risk-based premium exceeds the specified percentage of coverage would be deemed cost burdened and might be provided with assistance, potentially enough assistance to bring the premium down to the chosen threshold percentage.¹⁶

Consider a household which has (or is considering the purchase of) \$100,000 in flood insurance coverage requiring an NFIP risk-based premium of \$3,000. Using the criterion of 1.0 percent of total value of coverage for determining whether the household is cost burdened, the capped premium would be \$1,000 and, if assistance is provided to eliminate the entire cost burden, the amount of assistance provided to this household would be between \$3,000 and \$1,000, or \$2,000.

A property owner's income or wealth characteristics do not enter into this calculation. In the previous example (\$100,000 of coverage for a premium of \$3,000 and a cost burden threshold of 1 percent), a household with income of \$500,000 would be considered just as cost burdened as a household with income of \$50,000. Furthermore, if an assistance program provided assistance—a voucher, say—to eliminate the entire cost burden (\$2,000 in this example), both households would receive the same amount of assistance. More generally, if assistance is provided to eliminate the entire cost burden measured by this particular approach, the amount of assistance is independent of income and only sometimes related to the wealth of a household.¹⁷ In addition, this definition would make most assistance available to the highest-risk properties, since these are the policyholders for which the premium as a percentage of coverage would be the greatest. High-risk property owners may or may not face challenges with ability to pay.

¹⁵ The committee was explicitly asked to evaluate and say if the approach (premium as a percent of flood insurance coverage) could be justified as a way to measure cost burden (affordability) in a letter to the committee from then-Senator Landrieu (see Appendix E for a copy of the letter).

¹⁶ The amount of assistance is a separate decision that must be made by policy makers, as discussed in Report 1 (Chapter 6).

¹⁷ Insurance coverage may reflect the asset value of the insured structure, a component of household wealth. However, coverage is limited to \$250,000, so this association does not exist for more valuable structures. Also, some policyholders subject to the mandatory coverage provision may choose to purchase insurance for the (smaller) mortgage principal, rather than the asset value.

Finding 4.6. The use of premium as a percent of insurance coverage does not, by itself, satisfy the congressional directive to FEMA to consider providing “targeted assistance to flood insurance policyholders based on their financial ability.”¹⁸ Therefore, if ability to pay is the congressional concern, then FEMA will still need to develop a measure of cost burden based on policyholder income or wealth or both.

Cost Burden Measured by Premium as a Percent of Property Value

This approach defines the premium cap as a specified percentage of the assessed valuation of the insured real property.¹⁹ Property value, which is a substantial component of total wealth for many households, especially low-wealth households, is used as a proxy for wealth. Wealth, in turn, is employed as a metric for ability to pay for flood insurance. Consider a property with an assessed valuation of \$50,000 for the land and \$100,000 for improvements. The household purchases a flood insurance policy with coverage of \$100,000, at a cost of \$3,000. Suppose that households are considered cost burdened if the insurance premium exceeds 0.67 percent of the property value; in this case, \$1,000.²⁰ Assistance needed to lower the premium to the cap would be between \$3,000 and \$1,000, or \$2,000.

Now suppose that a different (and perhaps higher-income) household has a home on an identical tract of land, but the assessed value of the improvements is \$750,000. Total assessed valuation is \$750,000 plus \$50,000 = \$800,000 and the NFIP risk-based premium for \$250,000 of coverage is \$5,000. (NFIP coverage is capped at \$250,000 although the homeowner may be able to buy excess coverage on the private market.) The land value is still \$50,000. The premium cap for \$250,000 coverage is now 0.67 percent times \$800,000, or \$5,360. This property owner is not considered to be cost burdened and would receive no assistance.²¹

A principal advantage of this approach is that data on property values

¹⁸ HFIAA, Sec. 9, (b) (2).

¹⁹ This approach was not presented in Report 1.

²⁰ Because the cap is based on land value as well as structure value, 0.67 percent is used for comparability with the coverage-based cap. The actual percentage would be determined by FEMA, consistent with its directions from Congress to base assistance on financial ability as well as thorough empirical analysis.

²¹ The alternative measure of cost burden discussed here takes the logic of the capped-premiums approach and uses property value rather than coverage for gauging the size of a premium. Yet another alternative would be to use property value like income in the income approach discussed in Report 1. For example, premiums could be deemed burdensome to those with relatively low property values (e.g., below some specified percentage of the median).

are relatively readily available.²² This availability of assessed valuations for all structures in a floodplain, presently insured or not, creates another advantage—a microsimulation database that includes properties that are not currently insured but might become insured if premiums became more affordable. In the event that FEMA implements an assistance program based on property values, it will have the ability to anticipate assistance needs that may be associated with increased takeup rates. Along with its advantages, this approach has the problem of potentially granting unneeded assistance to low-wealth/high-income households, just as income-based cost burden measurements can lead to unneeded assistance for high-wealth/low-income households. Another problem with this wealth-based approach is not providing assistance to low-income households who have very limited wealth aside from the equity in their homes. This could be addressed through additional eligibility criteria or an appeals process.

Alternative Measures of Premium Cost Burden Compared

This report and the prior report (Report 1) present four different approaches to define the cost burden associated with NFIP premiums. Table 4-1 summarizes the four measures of cost burden, along with selected pros and cons for each.

Finding 4.7. For the purpose of implementing an assistance program, policy makers will decide whether they want to define cost burden with reference to income, housing costs in relation to income, premium paid in relation to property value, or some other measure. This decision can be informed by technical analysis of the alternatives, but the final selection is a policy judgment.

Loss of Property Value from Eliminating Pre-FIRM Subsidized Rates

Prior to passage of BW 2012, 20 percent of policyholders were paying less than NFIP risk-based premiums for properties located in the SFHA. BW 2012, as modified by HFIAA 2014, will increase those premiums until they reach the NFIP risk-based rate. The result is to increase the annual cost of ownership for the affected properties, which in turn should reduce the market price of the property. Any loss in market value will be incurred by the property owner at the time of the announced rate change and realized when the property is sold.

²² In carrying out the planning process for enhancing its modeling capabilities, FEMA would still need to assess the resources required to obtain, prepare for use, and regularly update data on assessed property values.

TABLE 4-1 Advantages and Disadvantages of Four Measures of Cost Burden

Cost Burden Measures	Advantages	Disadvantages
Annual premium is unaffordable if it exceeds a specified percentage of insurance coverage. (Report 1 and Report 2)	<ul style="list-style-type: none"> Requires no new data. 	<ul style="list-style-type: none"> Fails to reflect ability to pay, providing assistance to high-income and high-wealth households. Assistance can go to high-risk properties, regardless of ability to pay. No precedent for using such an approach for targeting assistance.
Annual premium is unaffordable if annual income is less than a specified amount. (Report 1)	<ul style="list-style-type: none"> Income correlated with ability to pay for immediate needs. Precedent for using income for means-tested programs. 	<ul style="list-style-type: none"> Burden on households and administrative cost to FEMA for collecting income information. May give unnecessary assistance to low-income/high-wealth households.
Annual premium is unaffordable if total housing expenses, including premium, exceed a specified percentage of income. (Report 1)	<ul style="list-style-type: none"> Takes into account both income and other housing expenses in assessing ability to pay for flood insurance. The Department of Housing and Urban Development uses a similar metric that could be adopted for this purpose. 	<ul style="list-style-type: none"> Burden on households and administrative cost to FEMA for collecting data on income and housing cost. May give unnecessary assistance to low-income/high-wealth households or high-income households with excessive housing expenses.
Annual premium is unaffordable if it exceeds a specified percentage of assessed real property value. (Report 2)	<ul style="list-style-type: none"> Burden on households and administrative cost to FEMA are low as assessed property value is readily available. Property value correlated with wealth, especially for low-wealth households. 	<ul style="list-style-type: none"> Does not account for income and thus may not fully reflect ability to pay. Assessments can be many years old and may not reflect current market value. May give unnecessary assistance to high-income/low-wealth households. No precedent for using such an approach for targeting assistance.

Isolating premium increase effects from other determinants of market price will be difficult, even if the best data for making such a calculation were available. For example, suppose there is a rise in mortgage interest rates coincident with the rise in flood insurance premiums. Both would tend to reduce property values, but isolating the specific effect of either will be analytically difficult. Hedonic price analysis could, in principle, be employed to isolate the effect of subsidy removal on property prices. Some studies have documented a reduction in the price of property located in SFHAs after controlling for other determinants of housing prices (Harrison et al, 2001; Shilling et al., 1989). The property price effects of removing pre-FIRM subsidies may be harder to detect than those described in the literature, since data are not available on the specific properties that paid less than NFIP risk-based rates or how much the NFIP risk-based premium would have been. Indeed, the uncertainty about the level of the new rates will certainly influence the extent of capitalization of higher premiums that occurs.

One way to illustrate the effect is to use a simple capitalization calculation as might be done by a property assessor. For example, a \$1,000-per-year increase in premiums from losing a pre-FIRM subsidized rate could result in a \$20,000 reduction in property value (5 percent discount rate); a \$2,000 increase might be \$40,000. The loss in property value could be a small or large part of total asset value and could be a small or large part of the property owner's total wealth, recognizing that the property owner may have other assets.

These effects can be mitigated. One option would be to cap rates at a level less than NFIP risk-based rates for all properties that had pre-FIRM subsidized rates and also allow that cap on the premium to transfer with the property to all future owners, without regard to the future owners' ability to pay. On the other hand, if a property owner was allowed to pay a reduced annual premium, but not transfer that reduced premium to the next owner upon sale of the property, the value of the property will be reduced by the capitalized value of the increase in future NFIP premiums, as though the premium reduction had never occurred. This option would be contrary to the goals of BW 2012 to have property owners pay NFIP risk-based rates and would result in lost revenues to the NFIP unless offsetting increases in revenues were provided by the federal treasury or by cross subsidy. Another option would be for FEMA to buy the affected property at the market price that would be realized if the below NFIP risk-based rate was continued. FEMA could also provide a grant, allowing the property owner to implement flood damage reduction measures that would reduce NFIP risk-based rates to levels that would restore some or all of the property's market value. Both of these policy options would be challenging to implement and could require significant budget expenditures.

Finding 4.8. The negative effect on property values from allowing PFS rates to rise to NFIP risk-based rates is a market-driven reality but would be analytically difficult to isolate from other determinants of property price. A policy decision to compensate for some amount of property value loss may require significant public expenditure.

Cost Burden and Multifamily Properties

Multifamily rental apartments are a business and premiums for the building are paid by the property owner (landlord). Based on the data used for Report 1, about 70,000 apartment buildings nationwide were paying PFS rates. Following BW 2012 and HFIAA 2014, FEMA chose to define multifamily buildings as primary residences for purposes of applying the rate increases under HFIAA 2014. As rates increase, one possibility is that landlords may pass on the cost of increased NFIP premiums to renters, some of whom may be low income. Passing on the premium increase might make rents less affordable. The amount of rent increase that may be passed on, however, will depend on the number of comparable rental units in the same market area that would not have such increases. If comparable rental units are few, then landlords may be able to pass on the increased insurance costs.

Many of these flood insurance policies are for buildings concentrated in urban areas and were constructed in ways that make flood mitigation through elevation impractical. In lieu of elevating structures to mitigate flood loss, abandonment of commercial or rental use of the current first floor might be a mitigation action (to reduce premiums). In theory, this would impose a cost in the form of forgone rental income that may not be justified by premium savings. And even if justified by premium savings, vacating retail space (if that was the use) may diminish the mix and pattern of retail and residential space that defines “neighborhood character.”

Finding 4.9. Because of variable building-specific circumstances and the limited number of policies affected, FEMA may choose to only extend assistance to landlords whose buildings include some to-be-defined percentage of low-income residents, provided that the landlord offers evidence, based on FEMA developed reporting requirements, that the savings were passed on to renters.

Policy Alternatives for an Affordability Strategy

Linking Mitigation with Premium Assistance

Report 1 recognized that linking mitigation with premium assistance can lead to property owners having a cost-effective combination of mitiga-

tion and insurance coverage. However, mitigation measures, particularly elevating structures, can be quite costly and a policyholder may not have the necessary up-front funds.²³ As a result, mitigation implementation costs might be initially paid for by taking a loan from a newly created mitigation loan program or by taking a commercial loan. Further, mitigation costs may also be paid for by a one-time governmental grant.

Report 1 also described how assistance might be offered for making premium payments, for paying for some or all of the mitigation that can lead to reduced premiums, or for a combination of the two. An annual assistance payment could be used for making an annual loan payment and paying some share of the NFIP risk-based premium (the financial logic was described in Report 1). Alternatively, it may be that the property owner receives a mitigation grant and then receives no further premium assistance, or minimal assistance, in future years.

One way to link premium assistance and mitigation is through provision of an annual payment that the property owner can use for paying the premium or for paying off the mitigation loan. If the property owner is to make this decision then the owner needs clear information on available options to reduce risk, how such measures could be financed, and the impact of adopting one or more measures on premium reductions. This type of information is not currently available to homeowners and would require FEMA to develop a new outreach and communication effort.

Another approach would be for the NFIP to make the calculation to determine the most cost-effective mitigation; NFIP does the calculation based on an analysis that the marginal dollar spent on mitigation justifies a reduction in premiums (and also restoration of property values). If assistance was offered, the NFIP could require that some level of mitigation be implemented. The assistance offered could be a combination of a mitigation grant, plus access to a loan with a commitment to an amount of assistance that would be used to make the annual loan payments and premium payment assistance for any remaining (after mitigation) cost burden imposed by paying the NFIP risk-based insurance premium. The argument for a mandatory linking, is that people lack the information to make a financial calculation about mitigation, so the assistance program makes it for them as an eligibility requirement.

Finally, there is a broader array of potential mitigation measures beyond elevation that merit consideration for reduced premiums. This includes measures for structures that cannot be elevated, such as row homes, as well as less costly measures that can still help lower flood losses. FEMA may wish to focus future studies on how to appropriately price a broader range

²³ Currently, policyholders can receive a reduction in flood insurance premiums for elevating their structure and a small set of other measures.

of flood mitigation measures. When there are no data to support premium reductions for measures across the country, a framework could be developed for communities to submit proof of the efficacy of such measures in lowering claims to obtain a flood insurance premium discount. This could be useful if such measures have the possibility of helping to lower premiums to more affordable levels while at the same time reducing flood losses.

Finding 4.10. Linking mitigation with premium assistance can lead to property owners having a cost-effective combination of mitigation and insurance coverage. Identifying that combination, however, requires complex calculations and the roles and responsibilities of FEMA in assisting with that calculation need to be assessed and, potentially, enhanced.

SUMMARY

HFIAA 2014 directs FEMA to propose an affordability framework for the NFIP. In doing so, it must evaluate affordability policy options. To do this, both supporting data and an analytical approach are needed. In the near term, FEMA can undertake analyses while building its analytical capacity over the long term.

As the committee focused on analytical challenges during preparation of Report 2, additional findings and refinements to findings that were presented in Report 1, specific to each of the chapters in Report 1, were identified.

Finding 4.1. Some decision-relevant analyses can be completed with currently available analytical tools and data, or with limited investments in methods and database development. In the process of doing such analyses, FEMA also will make progress toward building analytical capacity to conduct more comprehensive policy analyses in the future.

Finding 4.2. HFIAA 2014's reinstatement of grandfathering, which will perpetuate cross-subsidies in the NFIP, will result in the program increasingly violating actuarial pricing principles if flood risks increase in the future.

Finding 4.3. Full implementation of BW 2012 will not result in NFIP risk-based rates for properties located outside the SFHA.

Finding 4.4. In designing an assistance program and considering the goal of increased flood insurance uptake, aid may need to be extended to property owners who are not required to purchase flood insurance.

Finding 4.5. Calculating and then informing policyholders of the NFIP risk-based rate may help address the direction of Congress that policyholders be provided with accurate information on the flood risks they face.

Finding 4.6. The use of premium as a percent of insurance coverage does not, by itself, satisfy the congressional directive to FEMA to consider providing “targeted assistance to flood insurance policyholders based on their financial ability.”²⁴ Therefore, if ability to pay is the congressional concern, then FEMA will still need to develop a measure of cost burden based on policyholder income or wealth or both.

Finding 4.7. For the purpose of implementing an assistance program, policy makers will decide whether they want to define cost burden with reference to income, housing costs in relation to income, premium paid in relation to property value, or some other measure. This decision can be informed by technical analysis of the alternatives but the final selection is a policy judgment.

Finding 4.8. The negative effect on property values from allowing PFS rates to rise to NFIP risk-based rates is a market-driven reality, but it would be analytically difficult to isolate from other determinants of property price. A policy decision to compensate for some amount of property value loss may require significant public expenditure.

Finding 4.9. Because of variable building-specific circumstances and the limited number of policies affected, FEMA may choose to only extend assistance to landlords whose buildings include some to-be-defined percentage of low-income residents, provided that the landlord offers evidence, based on FEMA-developed reporting requirements, that the savings were passed on to renters.

Finding 4.10. Linking mitigation with premium assistance can lead to property owners having a cost-effective combination of mitigation and insurance coverage. Identifying that combination, however, requires complex calculations, and the roles and responsibilities of FEMA in

²⁴ HFIAA, Section 9(b)(2).

assisting with that calculation need to be assessed and, potentially, enhanced.

A FINAL REFLECTION

Floodplains and coastal areas across the United States will continue to be inhabited. These areas will sustain damages from future riverine floods and coastal storms. The costs of these losses will be borne in three possible ways, or in some combination. Individual NFIP policyholders will bear location cost in the form of insurance premiums paid and damages falling within policy deductible amounts. The federal taxpayer might bear floodplain location costs if the federal treasury develops a premium assistance program, makes up for NFIP premium revenue shortfalls, or makes post-flood disaster assistance payments to individual households. Property owners and other floodplain or coastal zone inhabitants will bear costs for the losses that are uninsured or otherwise uncompensated.

An original intent of the NFIP was to replace disaster aid payment with flood insurance purchase to the maximum extent possible, shifting the cost of floodplain location onto those persons who occupy such places (Report 1, Charter 2). If this goal is to be pursued, then requests for premium assistance or mitigation grants and loans may increase due to future possible premium increases and from changes in flood risk stemming from changes in climate and changes in watershed runoff due to development. As an affordability framework is developed for the NFIP, FEMA and Congress will confront the central question, “Who will bear the costs of floodplain occupancy in the future?” With specific reference to the goal of “affordable premiums,” that question will be answered in recognition of the available governmental budget for premium or mitigation assistance and the adherence to the actuarial principle of minimizing cross-subsidies within the NFIP.

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List of Acronyms

ACS	American Community Survey
BFE	Base flood elevation
BW	Biggert-Waters Flood Insurance Reform Act
CDBG	Community development block grant
CRS	Community Rating System
DFIRM	Digital flood insurance rate map
DHS	Department of Homeland Security
FEMA	Federal Emergency Management Agency
FIMA	Federal Insurance and Mitigation Administration
FIRM	Flood insurance rate map
GAO	Government Accountability Office
GIS	Geographic Information System
HEC	Hydrologic Engineering Center
HEC-HMS	Hydrologic Engineering Center-Hydrologic Modelling System
HEC-RAS	Hydrologic Engineering Center-River Analysis System
HFIAA	Homeowner Flood Insurance Affordability Act
HUD	Department of Housing and Urban Development
LiDAR	Light detection and ranging

NAS	National Academy of Sciences
NCFMP	North Carolina Floodplain Mapping Program
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NRC	National Research Council
PFS	Pre-FIRM subsidized
PRP	Preferred risk policy
PUMS	Public use microdata sample
RDC	Research Data Center
Risk MAP	Risk Mapping Assessment and Planning
SBA	Small Business Administration
SFHA	Special Flood Hazard Area
USACE	U.S. Army Corps of Engineers
WYO	Write-Your-Own

Appendix A

Affordability of National Flood Insurance Program Premiums: Report 1 Summary

The National Flood Insurance Program (NFIP), established in 1968 and housed within the Federal Emergency Management Agency (FEMA), offers insurance policies that are marketed and sold through private insurers, but with the risks borne by the U.S. federal government. In July 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act (BW 2012), which was designed to initiate several changes within the NFIP. A core principle of the 2012 legislation was to move toward an insurance program with NFIP risk-based premiums that better reflected expected losses from floods at insured properties.¹ This entailed eventual removal of discounts from NFIP policies known as “pre-FIRM [flood insurance rate map] subsidized” and “grandfathered” policies. Paying the claims for such policies contributed in part to the NFIP having to borrow from the U.S. Treasury to pay for claims after Hurricane Katrina and late storms. That debt was also a motivation for provisions in BW 2012 that directed FEMA to consider actions that had the potential to improve the financial foundation for the program through premium increases that would better reflect flood risks.

BW 2012 Section 100236 called for an “affordability study” from FEMA that would include “methods to aid individuals to afford risk-based premiums under the National Flood Insurance Program through targeted

¹ Some of the terms used in this report may be unfamiliar to the reader or may have been used in inconsistent ways in writing and testimony about the NFIP through the years. Terms specific to the NFIP were taken from FEMA to the extent possible, but other terms were developed by the committee to ensure their consistent use throughout the report. A List of Terms is included at the end of this report for the reader's convenience.

assistance rather than generally subsidized rates, including means-tested vouchers.” The study was to inform the development of an affordability framework by FEMA to help inform NFIP policy decisions. However, implementation of BW 2012 rate increases was expected to take effect without awaiting the study and the development of an affordability framework, including an assistance program (see Appendix C for full language of BW 2012 Section 100236).

As BW 2012 went into effect, constituents from multiple communities expressed concerns about the elimination of lower rate classes, arguing that it created a financial burden on policyholders. Some concerns reflected the reality that purchase of the more expensive insurance was in some instances mandatory. Other concerns were based on expectations that higher premiums would depress home values, and on the question of whether higher premiums would thwart attainment of a long-standing objective of the NFIP to expand the number of properties covered by flood insurance. In response to these concerns, Congress passed the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA 2014). The 2014 legislation changed the process by which pre-FIRM subsidized premiums for primary residences would be removed and reinstated grandfathering. In addition, Section 9 of HFIAA 2014 once again called on FEMA to report to Congress with a draft affordability framework. Specifically, the legislation stated

the Administrator shall prepare a draft affordability framework that proposes to address, via programmatic and regulatory changes, the issues of affordability of flood insurance sold under the National Flood Insurance Program, including issues identified in the affordability study required under Section 100236 of the Biggert-Waters Flood Insurance Act of 2012.

Section 100236 of BW 2012 mandated both the aforementioned FEMA affordability study and a study from the National Academy of Sciences (NAS) to provide input into FEMA’s work. In response, the National Research Council (NRC)² convened the Committee on the Affordability of National Flood Insurance Program Premiums. The statement of task guiding this NRC committee calls for two reports and explains the content of and distinctions between them:

The first report, due in February 2015, will discuss the underlying definitions and methods for an affordability framework and describe the affordability concept and applications, and program policy options.

² The National Research Council is the working arm of the National Academies. The National Academies is the collective entity that includes the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), and the Institute of Medicine (IOM), along with the National Research Council. For more information, see <http://nationalacademies.org>.

The second report, due in September 2015, will propose alternative approaches for a national evaluation of affordability program policy options, based in part on lessons gleaned from a proof-of-concept pilot study to be guided by the NRC committee.

See Box 1-1, Chapter 1, for the full statement of task.

Consistent with its statement of task, Chapter 6 describes alternatives for determining when the premium increases resulting from BW 2012 would make flood insurance unaffordable and describes key design decisions and policy options for creating an assistance program. Chapter 7 discusses policy alternatives that may lower the cost of flood insurance for eligible households. To set the stage for Chapters 6 and 7, Chapter 2 describes the history of the NFIP, emphasizing the effects of that history on premium setting prior to BW 2012. Chapter 3 describes the NFIP pricing practices that were in place when BW 2012 was passed and how BW 2012 might increase premiums. Chapter 4 describes the demand for insurance and offers findings about the challenge of increasing the purchase of flood insurance policies, a long-standing objective of Congress for the NFIP. Chapter 5 identifies places in the nation where the effects of BW 2012 may be most pronounced.³

NATIONAL FLOOD INSURANCE PROGRAM HISTORY

Original proposals for a national flood insurance program date back to the 1950s. The original 1968 legislation that established the program, and implementation of the NFIP over the years that led up to passage of BW 2012, reflected an intent to make flood insurance part of a multifaceted national program for flood risk management. That intent, in turn, affected NFIP premium-setting practices that were used prior to BW 2012. The following findings are based on a review of that history.

- **From the inception of the NFIP, and continuing until BW 2012, Congress sought to achieve multiple objectives for the program. The objectives have been to (1) ensure reasonable insurance premiums for all, (2) have NFIP risk-based premiums that would make people aware of and bear the cost of their floodplain location choices, (3) secure widespread community participation in the program and substantial numbers of insurance policy purchases by property**

³ This report does not attempt to specify programs or actions to promote flood insurance affordability, nor does it advise on how national flood risks might be reduced through insurance or other actions.

- owners, and (4) earn premium and fee income that, over time, covers claims paid and program expenses. These objectives, however, are not always compatible, and at times may conflict with one another.
- The premium-setting practices and procedures that were in place before Biggert-Waters 2012 reflected the multiple objectives of the NFIP, and in some cases reflected premium-setting practices that were put in place when the NFIP was created. BW 2012 increased the emphasis on setting NFIP rates that reflected flood risk, and on charging premiums that would cover claims paid and other related expenses.

NATIONAL FLOOD INSURANCE PROGRAM POLICY PRICING AND EFFECTS OF BIGGERT-WATERS 2012

Well-established actuarial principles require that the combination of insurance premiums and other income sources yield revenues that will pay expected future claims and insurance program expenses (costs). These principles also hold that premiums for an individual policy, to the administratively feasible extent, should be based on expected claims plus fees for the policy. Further, the principles hold that there should be no cross subsidy whereby one group of policyholders has higher premiums so that others will have lower premiums. Finally, premiums should be no higher than necessary to ensure that these principles are met; regulation of private insurers is expected to limit premiums to costs of providing coverage plus a competitive return on invested capital. The NFIP, although not a private company, seeks to employ actuarial principles when setting premiums. However, historical precedent and congressional desire for premiums to be reasonable constrained application of these principles. BW 2012 sought to remove constraints on the NFIP's ability to follow actuarial pricing principles.

As a result, BW 2012 had the potential to increase premiums for three types of NFIP policies: NFIP risk-based, grandfathered, and pre-FIRM subsidized. Pre-FIRM subsidized policies have premiums that are less than those of NFIP risk-based policies for structures that were in place before a local FIRM was available. The NFIP realizes foregone revenues, relative to NFIP risk-based premiums, for this type of policy. To accommodate that reality, FEMA had adopted a revenue target whereby all premium income would equal claims paid on the historical average loss year (HALY). BW 2012 phases out this policy type; as a result, FEMA no longer uses the HALY in NFIP premium setting. The increases may be especially important for the 20 percent of properties that are eligible for pre-FIRM subsidized premiums.

The grandfathered premiums within the NFIP allow a given rating class to continue for a property even if a new FIRM may indicate a higher level of flood risk. To make up for revenue losses due to grandfathering, the NFIP

loads (adds a charge) to other policies in its policy base. Grandfathering—and as a result the cross subsidy—was phased out by BW 2012. HFIAA 2014 reinstated grandfathering.

The Community Rating System (CRS) is a FEMA program that encourages communities to adopt a variety of measures to help reduce flood risks. It allows discounted premiums for some properties when the community adopts one or more NFIP-prescribed flood risk management actions. CRS-discounted premiums are cross-subsidized by charges levied on all NFIP policyholders and were unaffected by BW 2012. The findings that follow are based on a review and discussion of NFIP pricing and the effects of BW 2012 and HFIAA 2014.

- Prior to BW 2012, the NFIP goal was to offer reasonable premiums, but at the same time premiums were expected to follow actuarial principles and cover claims and expenses over the long term. As a matter of practice, the historical average loss year (HALY) became a total premium revenue target. Rates were set so that the total revenue from all policies was sufficient to replace the premium revenue loss from offering pre-FIRM subsidized policies.
- After BW 2012, use of HALY is to be replaced by charging all pre-FIRM properties NFIP risk-based rates. The increase in cost of insurance for policyholders as a result of phasing out pre-FIRM subsidized premiums and the resulting premium revenue increases to the program may be significant, but can be estimated only when additional data are available.
- HFIAA 2014 delayed but did not reverse the BW 2012 requirement to eliminate pre-FIRM subsidized rates and to consider changes to NFIP risk-based rate-setting practices.
- HFIAA 2014 reinstated grandfathering. Revenue losses caused by offering grandfathered premiums, and by CRS discounted premiums, which continue to be offered, are expected to be offset by increasing premiums for all policies. Whether the revenue earned from these cross subsidies compensates for the forgone premium income is uncertain. If grandfathering or CRS discounting expands, the result will be that NFIP premiums increasingly violate the actuarial principle that premiums should be related to risk.

INSURANCE DEMAND

A long-standing objective of the NFIP has been to increase purchases of flood insurance policies. The national flood risk management objective of widespread NFIP purchase was one motivation for keeping NFIP premiums reasonable, with the premise that the level of the premium determines the

willingness and ability to purchase flood insurance. However, property owners' decisions to purchase insurance include other considerations and influences unrelated to price. A review of the economics and behavioral sciences literature identified no single strategy that will increase purchase of NFIP policies.

- The original NFIP legislation expected NFIP premiums to be priced at reasonable levels to promote voluntary purchase of NFIP policies. Empirical studies have found that premium prices may affect takeup rates although the size of that effect is small. The effect of the availability of disaster aid on insurance purchase decisions is uncertain.
- Studies have found that people may use intuitive thinking, as opposed to systematic consideration of the cost of premiums in relation to expected claim payments, when choosing to forgo insurance or to cancel an existing policy.
- The combination of acknowledgment of intuitive thinking and the limited effects of premiums on insurance purchase decisions suggests that lower premiums alone will not increase takeup rates substantially.
- Keeping NFIP premiums at reasonable levels can be part of any strategy to maintain compliance with mandatory purchase requirements and increase voluntary takeup rates. A multipart strategy to motivating purchase of NFIP policies can be designed using insights from the behavioral sciences literature.

NATIONAL FLOOD INSURANCE PROGRAM POLICIES: LOCATIONS OF POTENTIAL AFFORDABILITY CHALLENGES

The NFIP policy database can be used to describe the locations of policies and areas of concentration. Knowing the location of all policies, pre-FIRM subsidized policies, and grandfathered policies could aid in formulating alternative strategies to provide assistance to households that find NFIP risk-based premiums to be affordable. Likewise, knowing the location of policies can provide insight into places where takeup rates are low.

- About 60 percent of the approximately 5.5 million NFIP policies are in three states: Florida, Texas, and Louisiana. The rest are distributed widely throughout the nation. Any effects of BW 2012 therefore will be more concentrated in some places, but will appear throughout the nation.
- Available estimates of takeup rates suggest that they are low, especially outside special flood hazard areas. Meeting the long-standing goal of high takeup rates for flood insurance would therefore require a large increase in purchases.

- The extent and location of premium increases that might result from elimination of grandfathering can be determined by further analysis of the policy data, but cannot be estimated now.
- Slightly more than 1 million NFIP policyholders—or 19 percent of all policyholders—are paying pre-FIRM subsidized rates and will potentially see rate increases if the provisions of BW 2012 remain in effect. Pre-FIRM subsidized policies are found throughout the nation, but there are areas of concentration.

DECISIONS WHEN DESIGNING ASSISTANCE PROGRAMS TO ENHANCE AFFORDABILITY

Both BW 2012 and HFIAA 2014 reflect concerns that NFIP risk-based premiums may be unaffordable for some households. FEMA is directed to review that possibility and suggest policy actions that would make premiums affordable for households that are financially burdened by the cost of flood insurance. If a premium is deemed unaffordable, the household paying that premium might receive assistance. The assistance may offset part of the cost of the premium, may be for mitigation actions that would reduce the risk and in turn the premium, or may be some combination of the two. HFIAA 2014 suggests that premiums are unaffordable if the premium exceeds 1 percent of the insurance coverage. Other measures of affordability can be defined by relating household income to the cost of housing or simply be based on when a household income is below a specified level. Whatever measure used, it will be only one consideration in the design of an assistance program. The form and amount of assistance provided, if any, will need to be determined.

- There are no objective definitions of affordability. Although the concept is substantially subjective, the choice of a definition can be informed by research evidence and experience in administering means-tested programs that, for example, provide housing and other assistance.
- There are many ways to measure the cost burden of flood insurance on property owners and renters. Policymakers have to select which measure(s) will be used in the NFIP for targeting assistance to enhance flood insurance affordability. This decision is not amenable solely to technical analysis.
- To design a program that provides assistance in making flood insurance more affordable to NFIP policyholders, policy makers face several choices, including who will receive assistance, what type of assistance will be provided, how assistance will be provided, how much assistance will be provided, who will pay for assistance, and how an assistance program will be administered.

- The decisions that must be made in designing an affordability assistance program entail tradeoffs that will have to be resolved by policy makers.

OPTIONS FOR DELIVERING ASSISTANCE TO ENHANCE FLOOD INSURANCE AFFORDABILITY

With passage of BW 2012, Congress asked FEMA to increase rates but at the same time to suggest ways to make premiums affordable through direct assistance programs that are based on ability to pay and means testing. Vouchers in particular were called out for attention. In addition to assistance with paying premiums, means-tested assistance can support mitigation that would reduce expected claims and premiums. Proposals for policies that might reduce the burden of premium payments or that might direct mitigation assistance toward households that qualify for assistance have been presented in legislation, in congressional testimony, and in professional literature. The committee reviewed the proposals and concluded the following:

- The NFIP can strive for risk-based premiums while addressing affordability by implementing a combination of policy measures including means-tested mitigation grants, mitigation loans, vouchers, and encouragement of higher premium deductibles.
- Reforms to mitigation grant programs can be implemented so that means testing, as a replacement for the current benefit-cost test, is the basis for setting priorities for mitigation grant spending.
- A mitigation loan can make it financially attractive and feasible for low-income residents to invest in mitigation measures without having to rely on mitigation grants.
- Vouchers are an administratively simple way to direct payments to cost-burdened policyholders for use in paying premiums or for offsetting mitigation costs.
- The few mitigation measures that result in lower NFIP premiums tend to be expensive, such as elevating homes. As a result of BW 2012, FEMA will consider whether lower-cost mitigation of structures will result in lower premiums. Determining the effect of lower-cost mitigation on NFIP risk-based rates will require additional analyses.
- If Congress authorized supplements from the Treasury to be used for making NFIP claim payments in catastrophic-loss years, this could allow lower NFIP risk-based premiums and, in turn, less spending for assistance.

- Some policies that have been advanced to lower NFIP risk-based premiums for cost-burdened households either will not have that effect, or may not be easily accessed by cost-burdened policyholders. These include reducing administrative fees, disaster savings accounts, and income tax credits and deductions.
- Community measures can lower insurance premiums through mitigation actions that benefit clusters of structures and through the CRS. These might be particularly important in mitigation related to multifamily properties.

Choosing among affordability policy options, alone or in combination, requires an evaluation of their effects not only on premiums for households for which NFIP risk-based premiums create a cost burden but on NFIP net revenues, expenditures from federal general revenues, and takeup rates. This committee's second report, to be published later in 2015, will suggest analytical protocols that FEMA might use to evaluate affordability policy options.

Appendix B

Recent Reports Produced by the
Government Accountability Office and
the Congressional Research Service

TABLE B-1 Recent studies undertaken and reports produced by the Government Accountability Office and the Congressional Research Service between 2011 and 2015.

Year	Produced By	Title	Key Questions and What Was Done
2011	GAO	FEMA: Action needed to improve the administration of the National Flood Insurance Program	Extent to which FEMA's management affect NFIP administration; lessons learned from canceling FEMA's attempt to modernize NFIP's insurance management system; limitations on FEMA's authority that could affect NFIP's financial stability.
2012	CRS ^a	National Flood Insurance Program: background, challenges, and financial status	NFIP borrowing, flood insurance premiums, repetitive loss, mandatory purchase, mapping, floodplain management, reauthorization of NFIP, and a suite of policy options.
2013	GAO	Flood Insurance: More information needed on subsidized properties	Number, location, and characteristics of properties that receive subsidized rates compared with full-risk rate properties; information needed to estimate the historic cost of subsidies and establish rates for previously subsidized policies that reflect risk; options to reduce the financial impact of remaining subsidized policies.
2013	CRS ^a	The National Flood Insurance Program: Status and remaining issues for Congress	Premium subsidies, repetitive loss, participation rates, hazard maps, floodplain management regulations, risk assessment and mapping, hazard and disaster assistance, options for managing and financing flood risk.
2014b	GAO	Flood Insurance: Forgone premiums cannot be measured and FEMA should validate and monitor data system changes	Examined the forgone premiums associated with subsidies during 2002-2013 along with data reliability issues.
2014a	GAO	Flood Insurance: Strategies for increasing private sector involvement	Conditions needed for private-sector involvement; strategies for increasing private-sector involvement.

TABLE B-1 Continued

Year	Produced By	Title	Key Questions and What Was Done
2014c	GAO	National Flood Insurance Program: Progress made on contract management but monitoring and reporting could be improved	Examined: FEMA's progress in updating its process for monitoring NFIP contractors since previous reports, the extent to which FEMA followed its monitoring process for the largest NFIP contractors.
2014d	GAO	Hurricane Sandy FEMA: FEMA has improved disaster aid verification but could act to further limit improper assistance	Discussed: the extent to which FEMA implemented controls to help prevent individuals and household program payments that are at risk of being improper or potentially fraudulent; the challenges FEMA and states faced obtaining information to help prevent individuals and household payments from duplicating or overlapping with other sources in its response to Hurricane Sandy.
2014e	GAO	Overview of GAO's past work on the NFIP	Summarized work on finances, premium setting, community and property owner participation, flood mapping, flood mitigation, administration, and information management.
2015a	GAO	Flood Insurance: Status of FEMA's implementation of the Biggert-Waters Act, as amended	Described: FEMA's management of the Act's implementation and associated challenges; the status of FEMA's implementation of selected requirements from the Act.
2015b	GAO	High-Risk Series: An update	GAO maintains a high-risk program to focus attention on government operations that it identifies as high risk due to their greater vulnerabilities. Five criteria for removal are leadership commitment, agency capacity, an action plan, monitoring efforts, and demonstrated progress.

^aAuthor on both reports was R. O. King.

Appendix C

Biggert-Waters Flood Insurance Reform Act of 2012—Section 100236

SEC. 100236. STUDY OF PARTICIPATION AND AFFORDABILITY FOR CERTAIN POLICYHOLDERS

- (a) **FEMA STUDY.**—The Administrator shall conduct a study of—
- (1) methods to encourage and maintain participation in the National Flood Insurance Program;
 - (2) methods to educate consumers about the National Flood Insurance Program and the flood risk associated with their property;
 - (3) methods for establishing an affordability framework for the National Flood Insurance Program, including methods to aid individuals to afford risk-based premiums under the National Flood Insurance Program through targeted assistance rather than generally subsidized rates, including means-tested vouchers; and
 - (4) the implications for the National Flood Insurance Program and the Federal budget of using each such method.
- (b) **NATIONAL ACADEMY OF SCIENCES ECONOMIC ANALYSIS.**—To inform the Administrator in the conduct of the study under subsection (a), the Administrator shall enter into a contract under which the National Academy of Sciences, in consultation with the Comptroller General of the United States, shall conduct and submit to the Administrator an economic analysis of the costs and benefits to the Federal Government of a flood insurance program with full risk-based premiums, combined with means-tested Federal assistance to aid individuals who cannot afford coverage, through an insurance voucher program. The analysis shall compare the

costs of a program of risk-based rates and means-tested assistance to the current system of subsidized flood insurance rates and federally funded disaster relief for people without coverage.

(c) **REPORT.**—Not later than 270 days after the date of enactment of this Act, the Administrator shall submit to the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Financial Services of the House of Representatives a report that contains the results of the study and analysis under this section.

(d) **FUNDING.**—Notwithstanding section 1310 of the National Flood Insurance Act of 1968 (42 U.S.C. 4017), there shall be available to the Administrator from the National Flood Insurance Fund of amounts not otherwise obligated, not more than \$750,000 to carry out this section.

Appendix D

Homeowner Flood Insurance Affordability Act of 2014—Section 16

SEC. 16. AFFORDABILITY STUDY AND REPORT

(a) **STUDY ISSUES.**—Subsection (a) of section 100236 of the Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957) is amended—

- (1) in paragraph (3), by striking “and” at the end;
- (2) in paragraph (4), by striking the period at the end and inserting a semicolon; and
- (3) by adding at the end the following new paragraphs:
 - “(5) options for maintaining affordability if annual premiums for flood insurance coverage were to increase to an amount greater than 2 percent of the liability coverage amount under the policy, including options for enhanced mitigation assistance and means-tested assistance;
 - “(6) the effects that the establishment of catastrophe savings accounts would have regarding long-term affordability of flood insurance coverage; and
 - “(7) options for modifying the surcharge under 1308A, including based on homeowner income, property value or risk of loss.”.

(b) **TIMING OF SUBMISSION.**—Notwithstanding the deadline under section 100236(c) of the Biggert-Waters Flood Insurance Reform Act of 2012

(Public Law 112–141; 126 Stat. 957), not later than 18 months after the date of enactment of this Act, the Administrator shall submit to the full Committee on Banking, Housing, and Urban Affairs and the full Committee on Appropriations of the Senate and the full Committee on Financial Services and the full Committee on Appropriations of the House of Representatives the affordability study and report required under such section 100236.

(c) **AFFORDABILITY STUDY FUNDING.**—Section 100236(d) of the Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112–141; 126 Stat. 957) is amended by striking “\$750,000” and inserting “\$2,500,000”.

Appendix E

Biographical Sketches of Committee Members

LEONARD A. SHABMAN, *Chair*, joined Resources for the Future in 2002 as a resident scholar after three decades on the faculty of Virginia Polytechnic Institute and State University. His research and communications efforts focus on programs and responsibilities for flood and coastal storm risk management, design of payment for ecosystem services programs, and development of evaluation protocols for ecosystem restoration and management projects, especially in the Everglades, coastal Louisiana, and Chesapeake Bay. Among the specific topics related to those themes are applied research on permitting under Section 404 of the Clean Water Act, creating market-based incentives for water quality management and provision of ecosystem services, and design of collaborative water management institutions. He served for 8 years on the National Research Council Water Science and Technology Board, has chaired or been a member of several National Research Council (NRC) committees, and has been recognized as an Associate of the National Academy of Sciences. Dr. Shabman received a Ph.D. degree in agricultural economics from Cornell University.

SUDIPTO BANERJEE is professor and chair of biostatistics at the University of California, Los Angeles. His research, dissertation advising, and mentoring activities focus on statistical modeling and analysis of geographically referenced datasets, Bayesian statistics, the interface between statistics and geographical information systems, and statistical computing. He received a National Institutes of Health challenge grant in 2009. In the same year he was honored with the Abdel El Sharaawi Award of the International Environmetrics Society, and in 2011 he received the Mortimer Spiegelman

Award of the American Association of Public Health. He is an elected fellow of the American Statistical Association and an elected member of the International Statistical Institute. Dr. Banerjee received a B.S. degree from Presidency College and an M.S. degree in statistics from the Indian Statistical Institute, both in Calcutta, and M.S. and Ph.D. degrees in statistics from the University of Connecticut.

JOHN J. BOLAND is an engineer and economist and is professor emeritus in the Department of Geography and Environmental Engineering of Johns Hopkins University. His fields of research include water and energy resources, environmental economics, benefit-cost analysis, and public utility management. Dr. Boland has studied resource problems in more than 20 countries, has published more than 200 papers and reports, and is a coauthor of two books on water demand management and three more on environmental management. He has served on several NRC committees and is a founding member and past chair of the Water Science and Technology Board. Dr. Boland received a Ph.D. degree in environmental economics from Johns Hopkins University.

PATRICK L. BROCKETT is the Director of the Risk Management and Insurance Program and the Gus S. Wortham Memorial Chair in Risk Management and Insurance of the University of Texas at Austin. He conducts research in risk management and insurance, financial risk, actuarial science, decision analysis, management science and operations management and research, statistical analysis, and business applications. Dr. Brockett is an elected member of the International Statistical Institute and a fellow of the Institute for Risk Management, the American Statistical Association, the Institute of Mathematical Statistics, and the American Association for the Advancement of Science. In 2006, he received the American Risk and Insurance Association Outstanding Achievement Award for furthering the science of risk management through promotion of education, research, and communication during his tenure as editor of the *Journal of Risk and Insurance*. He is the editor of the *North American Actuarial Journal*. Dr. Brockett received his B.S. degree in mathematics from California State University-Long Beach, and his M.S. and Ph.D. degrees in mathematics from the University of California, Irvine.

RAYMOND J. BURBY is professor emeritus of city and regional planning at the University of North Carolina at Chapel Hill. He is a fellow of the American Institute of Certified Planners and has received the biannual Distinguished Educator Award of the Association of Collegiate Schools of Planning. He is the author, co-author, and editor of 14 books and more than 150 publications on hazard mitigation, environmental management,

and land use planning and management. Dr. Burby served as co-editor of the *Journal of the American Planning Association* from 1983 to 1988 and was an associate editor of the *Natural Hazards Review*. He has served on NRC committees on pipeline safety, dam and levee safety, and lessons from Hurricane Katrina. His research interests include federal and state hazard mitigation planning mandates, integration of hazard mitigation plans with local comprehensive plans, and improvements in code enforcement to create disaster resilient communities. Dr. Burby received an A.B. degree in government from George Washington University and M.R.P. and Ph.D. degrees in city and regional planning from the University of North Carolina at Chapel Hill.

SCOTT A. EDELMAN is the director of the AECOM Water Resources team for North America. He has 32 years of experience devoted to flood insurance studies and floodplain mapping. Mr. Edelman has been responsible for overseeing AECOM's floodplain mapping and mitigation work for the Federal Emergency Management Agency and many state and local partners, including Georgia, Alabama, North Carolina, South Carolina, Mississippi, Maryland, and California. He was a contributor to such FEMA projects as the initial Multi-Year Flood Hazard Identification Plan, developing initial concepts for the Mapping Information Platform, and contributing to Guidelines and Specifications. He has managed riverine and coastal flood insurance studies for the past 23 years, including more than 15,000 digital Flood Insurance Rate Map panels, which represents approximately 10 to 15 percent of the floodplain maps in the nation. Mr. Edelman is a licensed professional engineer in five states. He served on the NRC Committee on Floodplain Mapping Technologies. He received his B.S. degree in civil engineering from Pennsylvania State University.

W. MICHAEL HANEMANN, NAS, is a professor of economics and holds the Wrigley Chair in Sustainability at the School of Sustainability of Arizona State University. He is also a professor in the graduate school and Chancellor's Professor Emeritus in the Department of Agricultural and Resource Economics of the University of California, Berkeley. Elected to the National Academy of Sciences in 2011, Dr. Hanemann is an environmental economist who works in nonmarket valuation, water economics and policy, and climate change. A focus of his current research on water is the distinctive physical and institutional features of water, the evolution of water rights and institutions in the American West, legacy effects with respect to obstacles to promoting better uses of water, balancing extractive versus in-stream uses of water, and adapting water rights to face the challenges of climate change. He is a lead author and coordinating lead author in Working Group III of the Intergovernmental Panel on Climate Change

Fifth Assessment Report. He received his Ph.D. degree in economics from Harvard University.

CAROLYN KOUSKY is a fellow at Resources for the Future in Washington, D.C. She has published numerous articles, reports, and book chapters on the economics and policy of natural disasters and disaster insurance markets. Her research focuses on decision making under uncertainty, natural resource management, and individual and societal responses to natural disaster risk. She has evaluated the demand for natural disaster insurance, the functioning of the National Flood Insurance Program, policy responses to potential changes in extreme events with climate change, and how individuals learn about risk. She is the recipient of the 2013 Tartufari International Prize of the Accademia Nazionale dei Lincei. She received a B.S. degree in Earth systems from Stanford University and a Ph.D. degree in public policy from Harvard University.

HOWARD C. KUNREUTHER is the James G. Dinan Professor of the University of Pennsylvania's Wharton School of Business and co-director of the Wharton Risk Management and Decision Processes Center. He has a long-standing interest in how society can better manage low-probability, high-consequence events related to technologic and natural hazards. Dr. Kunreuther is a Fellow of the American Association for the Advancement of Science and a Distinguished Fellow of the Society for Risk Analysis, having received the society's Distinguished Achievement Award in 2001. He recently served on the NRC committee on Increasing National Resilience to Hazards and Disasters. He is a coordinating lead author of the upcoming report, *Integrated Risk and Uncertainty Assessment of Climate Change Response Policies*, to be released by the Intergovernmental Panel on Climate Change. His most recent book is *Insurance and Behavioral Economics: Improving Decisions in the Most Misunderstood Industry* (with M. Pauly and S. McMorro, 2013). Dr. Kunreuther received his Ph.D. degree in economics from the Massachusetts Institute of Technology.

SHIRLEY LASKA is a professor emerita of sociology and was founding director of the Center for Hazards Assessment, Response and Technology of the University of New Orleans. She has been conducting research on the social-environmental interface of natural and technological hazards, and disaster response, for 25 years. Her work includes studies of residential flood mitigation, hurricane response, coastal land loss effects, coastal fisheries, community risk assessment and risk management for coastal hazards, and evacuation of the vulnerable. Since Hurricane Katrina her work has focused on lessons learned from the event, especially in the realm of community recovery and hazard resiliency. Dr. Laska is the 2008 recipient

of the American Sociological Association's Public Understanding of Sociology Award for her collaboration with physical scientists and presentations on Katrina and Rita impacts. She was a member of the NRC Committee on Integrating Dam and Levee Safety and Community Resilience. She received her Ph.D. degree in sociology from Tulane University.

DAVID R. MAIDMENT is the Hussein M. Alharthy Centennial Chair in Civil Engineering of the University of Texas at Austin, where he has been on the faculty since 1981. His research focuses on surface water hydrology, particularly in the application of geographic information systems to hydrology, and floodplain mapping. He has chaired or been a member of 10 NRC committees, including the Committees on FEMA Flood Maps and FEMA Floodplain Mapping Technologies. Dr. Maidment has received awards for outstanding contributions to hydrology from the American Society of Civil Engineers, the American Water Resources Association, and the American Institute of Hydrology. He received his Ph.D. degree in civil engineering from the University of Illinois at Urbana-Champaign.

DAVID I. MAURSTAD is a director and senior vice-president with Optimal Solutions and Technologies, Inc., Washington, D.C., which provides management consulting, integrated information technology, engineering services, and business process outsourcing. He previously served as director of water policy and planning for a nationally recognized engineering firm that specialized in flood mapping and floodplain management. He has more than 30 years of experience with the private insurance industry and federal, state, and local government. In June 2004, he was appointed by President George W. Bush to lead some of the nation's prominent multi-hazard risk reduction programs. In that role, he was the federal insurance administrator charged with management of FEMA's National Flood Insurance Program. He previously served as director of FEMA Region VIII from 2001 to 2004, coordinating federal, state, tribal, and local management of emergencies through planning, preparedness, mitigation, response, and recovery. Mr. Maurstad is a former lieutenant governor and state senator of Nebraska and served as mayor of Beatrice, Nebraska. He received his B.S. degree in business administration and his M.B.A. degree from the University of Nebraska.

ALLEN L. SCHIRM is the director of methods and a senior fellow of Mathematica Policy Research in Washington, D.C. His principal research interests include small-area estimation, census methods, and sample and evaluation design, with application to studies of child well-being and welfare, food and nutrition, and education policy. For the NRC Committee on National Statistics, he chaired the Panel on Estimating Children Eligible

for School Nutrition Programs Using the American Community Survey and was a member of the Panel on the Design of the 2010 Census Program of Evaluations and Experiments, the Panel on Research on Future Census Methods, the Panel on Formula Allocations, and the Panel on Estimates of Poverty for Small Geographic Areas. He is a fellow of the American Statistical Association and a former chair of its Social Statistics Section. Dr. Schirm received an A.B. degree in statistics from Princeton University and a Ph.D. degree in economics from the University of Pennsylvania.

Appendix F

Letter to the Committee from Senator Mary L. Landrieu, Louisiana

MARY L. LANDRIEU
LOUISIANA

United States Senate

WASHINGTON, DC 20510-1804

March 27, 2014

Mr. Jeffrey Jacobs
Director
Water Science and Technology Board
National Research Council
500 Fifth Street NW
Washington, DC 20001

Dear Members of the National Research Council Committee on the Analysis of Costs and Benefits of Reforms to the National Flood Insurance Program—Phase 1:

Thank you and your fellow National Research Council committee members for donating your time and energy to the Analysis of the Costs and Benefits of the National Flood Insurance Program (NFIP) authorized by the Biggert-Waters Flood Insurance Reform and Modernization Act of 2012 (P.L. 112-141). This review shall include an economic analysis that compares and contrasts the merits of charging full risk-based premiums versus the subsidized flood insurance policies that were a centerpiece of the program prior to 2012. The review shall assess the impacts each approach will have on Federal disaster response costs and the budget at large, and I appreciate this opportunity to offer my perspective on this important study.

The Federal Emergency Management Administration (FEMA) estimates that the NFIP saves American taxpayers \$1.6 billion annually in avoided disaster response costs. Despite the fact that between 1978 and 2011, the program experienced just nine loss years in which flood loss payments exceeded premiums written, Section 100211 of Biggert-Waters gives FEMA the conflicting mandate of including catastrophic loss years when calculating average historical loss years in accordance generally accepted actuarial principles. I encourage the Committee to consider the viability and actuarial soundness of this methodology in the affordability study.

Section 7 of the Homeowner Flood Insurance Affordability Act (P.L. 113-89) directs the Administrator of FEMA to strive to minimize the number of policies with annual premiums that exceed one percent of the total coverage provided by the policy and report any instances in which premiums exceed that threshold. Section 16 of the same bill amends FEMA's portion of the affordability study authorized under Biggert-Waters to include additional criteria such as the options for maintaining affordability if annual premiums exceed two percent of the liability coverage provided by the policy. It is clear that Congress has significant concerns about the overall affordability of flood insurance, and I urge this Committee to specifically evaluate the viability of different affordability thresholds as defined by the percentage each premium represents of the total coverage provided by the policy.


During a March 12, 2014 hearing of the U.S. Senate Committee on Appropriations Subcommittee on Homeland Security, Secretary Jeh Johnson acknowledged the importance of affordability and overall participation in the long-term solvency of the National Flood Insurance Program. As my colleague Congressman Steve Scalise (R-LA) said so eloquently on the floor of the House, "Sending somebody a \$10,000 or a \$20,000-a-year bill on a \$200,000 house that never flooded is not an actuarially sound rate. It's a death sentence." While we have anecdotal data indicating poor compliance rates around 60% with the NFIP mandatory purchase requirement, it is imperative that this Committee provides reliable data about compliance and market penetration in this study to ensure the risk pool can sustain the program's liabilities.

Lastly, I represent many coastal communities that are intimately familiar with flood risks and actively invest their own resources in mitigating their exposure to floods. Although FEMA has initiated a pilot program that is designed to give these communities credit for existing flood protection infrastructure, as it stands today, a \$450 million, 40 mile levee that has never failed was literally wiped off the map in the new FEMA flood map was released for Lafourche Parish in 2008. This Committee should consider programs and initiatives that incentivize local investments in mitigation and reward communities that take a proactive approach to flood protection.

Over 55% of our nation's Global Domestic Product is produced by the 15% of U.S. counties that are located directly on open ocean, the Great Lakes or in coastal floodplains. The National Flood Insurance Program was created with the explicit goal of making flood insurance available on reasonable terms and conditions so that people could live where they needed to work to power our nation's economy. While I am proud of the progress we have made with the Homeowner Flood Insurance Affordability Act (P.L. 113-89), nothing is perfect. Nothing is permanent. We must remain vigilant and ensure people get the relief they need and deserve. I appreciate the opportunity to engage with the Committee and look forward to a timely delivery of the Phase I report later this year.

With warm regards, I am

Sincerely,



Mary L. Landrieu
United States Senator

MLL:jwk

Appendix G

American Community Survey 5-Year Data Products

Tables of ACS 5-year data for census tracts and block groups are available through the American FactFinder web site (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>). Block group tables are fewer in number and less detailed than the full table set, both to protect the confidentiality of respondents and because of small sample sizes (and, thus, imprecision) at the block group level. Table G-1 below lists some of the 5-year tables of potential interest for the Federal Emergency Management Agency, indicating which ones are available for census tracts only and which for both tracts and block groups.

TABLE G-1 Selected Tables Available for ACS 5-Year Data Products

Table Number	Table Title (Universe in parentheses except where part of table title)	Available for Census Tracts	Also Available for Block Groups
B11001	Household type, including living alone (households)	Yes	Yes
B11011	Household type by units in structure (households)	Yes	No
B11012	Household type by tenure (owner/renter) (households)	Yes	Yes
B11016	Household type by household size (households)	Yes	Yes
C17002	Ratio of income to poverty level (persons in poverty universe)	Yes	Yes
B17019	Poverty status of families by household type by tenure	Yes	No
B17026	Ratio of income to poverty level (families)	Yes	No
B19001	Household income (households)	Yes	Yes
B19013	Median household income (households)	Yes	Yes
B19051	Earnings for households	Yes	Yes
B19054	Interest, dividends, or net rental income for households	Yes	Yes
B19055	Social Security income for households	Yes	Yes
B19056	Supplemental Security Income for households	Yes	Yes
B19057	Public assistance income for households	Yes	Yes
B19059	Retirement income for households	Yes	Yes
B19081	Mean household income of quintiles (households)	Yes	No
B19301	Per capita income (persons)	Yes	Yes
B22003	Receipt of food stamps by poverty status (households)	Yes	No
B25002	Occupancy status (housing units)	Yes	Yes
B25003	Tenure (owner/renter) (occupied housing units)	Yes	Yes
B25004	Vacancy status, housing units (vacant units)	Yes	Yes
B25005	Vacant—current residence elsewhere (vacant units)	Yes	No
B25021	Median number of rooms by tenure (occupied housing units)	Yes	Yes
B25024	Units in structure (housing units)	Yes	Yes
B25032	Tenure by units in structure (occupied housing units)	Yes	Yes
B25034	Year structure built (housing units)	Yes	Yes
B25035	Tenure by year structure built (occupied housing units)	Yes	Yes
B25037	Median year structure built by tenure (occupied housing units)	Yes	Yes
B25042	Tenure by bedrooms, housing units (occupied housing units)	Yes	Yes

TABLE G-1 Continued

Table Number	Table Title (Universe in parentheses except where part of table title)	Available for Census Tracts	Also Available for Block Groups
B25049	Tenure by plumbing facilities (occupied housing units)	Yes	No
B25053	Tenure by kitchen facilities (occupied housing units)	Yes	Yes
B25058	Median contract rent (renter-occupied housing units paying cash rent)	Yes	Yes
B25064	Median gross rent (renter-occupied housing units paying cash rent)	Yes	Yes
B25078	Median value (owner-occupied housing units)	Yes	Yes
B25081	Mortgage status (owner-occupied housing units)	Yes	Yes
B25091	Mortgage status by selected monthly owner costs, as a percent of income	Yes	Yes
B25092	Median selected monthly owner costs, as a percent of income	Yes	Yes
B25097	Mortgage status by median value (owner-occupied housing units)	Yes	No

Appendix H

Tables of Data Fields Found in the NFIP Policy Database October 2013 Version

TABLE H-1 Summary of NFIP Policy Database Field Completeness

Policy Data Category	Data Assessment
Building Characteristics	Data available for most of the policy records
Elevation Data	Up to 60% of records have null values for some fields
General Policy Info	Data available for most of the policy records
Location	Data available for most of the policy records. Some secondary fields in this category are not well populated
Miscellaneous	Data are very well populated. Some secondary fields in this category are not well populated
Policy Term Info	Data available for most of the policy records
Premium / Coverage Info	Data available for most of the policy records. Some secondary fields in this category are not well populated
Risk Rating Factor	Data available for most of the policy records. Some secondary fields in this category are not well populated

TABLE H-2 NFIP Policy Database Field Completeness

Policy Field Name	Policy Feed Description	Comments on Policy Field Values	Data Category
COMPANY_CD	Insurance Company Code	All records populated but approx. 2% of records have invalid values	General Policy Info
POL_NO	Policy Number	All records populated	General Policy Info
END_EFF_DT	Endorsement Effective Date	All records populated	Policy Term Info
T_PREMIUM	Total Annual Premium	Almost all records populated; less than 1% null	Premium / Coverage Info
N_EXP_CST	Expense Constant—NFIP Calculated	All records populated	Miscellaneous
POLICY_FEE	Federal Policy fee	All records populated	Miscellaneous
PREM_PAY_I	Premium Payment Indicator	Approx. 73% of records have null values	Miscellaneous
POL_EFF_DT	Policy Effective Date	All records populated	Policy Term Info
N_POL_TERM	NFIP Number of Policy Terms	Almost all records populated; less than 1% null	Policy Term Info
W_POL_TERM	Write Your Own Number of Policy Terms	Almost all records populated; less than 1% null	Policy Term Info
POL_STATUS	Policy Status	All records populated	General Policy Info
REGION	FEMA Region	All records populated	Location
PROGRAM	Community's Program Type (Regular or Emergency)	All records populated	General Policy Info
OCCUPANCY	Occupancy Type	All records populated	Risk Rating Factor
T_COV_BLDG	Total Amount of Insurance Coverage for Building	All records populated	Premium / Coverage Info
T_COV_CONT	Total Amount of Insurance Coverage for Contents	All records populated	Premium / Coverage Info

TABLE H-2 Continued

Policy Field Name	Policy Feed Description	Comments on Policy Field Values	Data Category
ROLLOVER	Rollover Indicator	Almost all records populated; less than 1% null and/or invalid	General Policy Info
ORG_NB_DT	Original Policy Effective Date (New Business Date)	All records populated	Policy Term Info
CUR_POL_EF	Current Policy Effective Date	All records populated	Policy Term Info
COMMUNITY	Concatenated Number of Community No. + Panel + Suffix	All records populated	Location
PANEL_SUF	DFIRM Panel Suffix	Almost all records populated; less than 1% null and/or invalid	Location
CONDO_UNIT	Number of units covered by condo policy	All records populated	Building Characteristics
RATE_METHO	Type of Risk Rating Method	Almost all records populated; less than 1% null and/or invalid	Risk Rating Factor
POL_EXP_DT	Policy Expiration Date	All records populated	Policy Term Info
FIRST_NAME	Policy Holder First Name	Almost all records populated; less than 1% null	General Policy Info
LAST_NAME	Policy Holder Last Name	All records populated	General Policy Info
NAME	Name (N) or Descriptive (D) Property Information	Almost all records populated; less than 1% null	General Policy Info
ADDRESS1	Secondary Address Field	Approx. 94% of records have null values	Location
ADDRESS2	Primary Address Field	Almost all records populated; less than 1% null and/or invalid	Location
CITY	City	Almost all records populated; less than 1% null and/or invalid	Location
STATE	State (2 Letter Abbreviation)	All records populated	Location

continued

TABLE H-2 Continued

Policy Field Name	Policy Feed Description	Comments on Policy Field Values	Data Category
ZIP1	7 Digit Zip	All records populated	Location
ZIP2	4 Digit Zip Extension	Approx. 7% have null and/or invalid records	Location
ADDRESSKEY	Address Key	Almost all records populated; less than 1% null and/or invalid	Location
N_ZIP_CODE	FEMA Geocoded 5 Digit Zipcode (9 Digit Zipcode in Some Cases)	Almost all records populated; less than 1% null and/or invalid	Location
FLOOD_ZONE	Flood Zone on DFIRM	Almost all records populated; less than 1% null and/or invalid	Risk Rating Factor
POST_FIRM	Is the Parcel Post-FIRM (Yes/No)	Almost all records populated; less than 1% null and/or invalid	Risk Rating Factor
DEDUCT_BLD	Deductible for Building	Almost all records populated; less than 1% null and/or invalid	Premium / Coverage Info
DEDUCT_CON	Deductible for Contents	Approx. 11% of records have null values	Premium / Coverage Info
ELEV_DIFF	Elevation Difference Between Lowest Floor and BFE	No null records but a lot of invalid attributes (ex. elevation differences of \pm 1,000 feet)	Elevation
AS_OF_DT	As of Date (Currentness of Policy Database)	All records populated	General Policy Info
ORIG_CONST	Original Construction Date / Substantial	Almost all records populated; less than 1% null and/or invalid	Building Characteristics
BUILDING	Building Number of Floors / Building Type	Almost all records populated; less than 1% null and/or invalid	Building Characteristics
BASEMENT	Type of Basement or Enclosure	Almost all records populated; less than 1% null and/or invalid	Building Characteristics
SMALL_BUS	Small Business Indicator	All records populated	Miscellaneous
CONDO	Indicates If Condo Type	All records populated	Risk Rating Factor
FILE_IND	File Indicator	All records are null	Miscellaneous

TABLE H-2 Continued

Policy Field Name	Policy Feed Description	Comments on Policy Field Values	Data Category
BASE_FLOOD	Base Flood Elevation	All records populated, but approx. 64% had invalid values	Elevation
LOW_FLOOR	Elevation of Lowest Floor	All records populated, but approx. 64% had invalid values	Elevation
ELEV_BLDG	Is the Building Elevated (Yes/No)	All records populated	Building Characteristics
LOC_CONT	Location of Contents	About 30% of records are null	Premium / Coverage Info
INS_VAL_IN	Insurance to Value Indicator	Approx. 58% of records have null values	Premium / Coverage Info
OBSTRUCTIO	Obstruction	Approx. 78% of records have null values	Risk Rating Factor
ELEV_CERT	FEMA Elevation Certificate Indicator	Approx. 58% of records have null values	Elevation
POST_V_CER	Post V Zone Certification Indicator	Approx. 18% of records have null values	Risk Rating Factor
COMM_PROB	Community Probation Surcharge Amount	All records populated	Miscellaneous
CRS_CLASS	Community Rating System Class	All records populated	Risk Rating Factor
CRSE_CONST	Course of Construction Indicator	All records populated; less than 1% null and/or invalid	Building Characteristics
STATE_OWN	State Owned Indicator	Almost all records populated; less than 1% null and/or invalid	Miscellaneous
DIS_ASST	Disaster Assistance Type	All records populated	General Policy Info
FLOOD_PROO	Flood-Proofed Indicator	Almost all records populated; less than 1% null and/or invalid	Building Characteristics
RLTRGTGP_I	Repetitive Loss Target Group Indicator	All records are null	Risk Rating Factor
DIAGRAM_NO	Elevation Certificate Diagram Number	Approx. 53% of records have null values	Elevation

continued

TABLE H-2 Continued

Policy Field Name	Policy Feed Description	Comments on Policy Field Values	Data Category
LOWADJ_GRA	Lowest Adjacent Grade	All records populated, but approx. 69% had invalid values	Elevation
N_PREM_ICC	NFIP Premium ICC Coverage	All records populated	Premium / Coverage Info
N_COV_ICC	NFIP ICC Coverage	All records populated	Premium / Coverage Info
ADDR_UP_DT	Address Update Date	Almost all records populated; less than 1% null and/or invalid	Location
GIS_LONGI	GIS Longitude of Property	Almost all records populated; less than 1% null and/or invalid	Location
GIS_LATI	GIS Latitude of Property	Almost all records populated; less than 1% null and/or invalid	Location
GIS_GEORES	FEMA GIS Geocode Result	All records populated	Location
GIS_GEOCEN	FEMA GIS Geocoded Census Block	Almost all records populated; less than 1% null records but an additional 3% with invalid data	Location
PRINCIPAL	Principal Residence Indicator	All records populated	Risk Rating Factor
BW12	Biggert-Waters 12 Values	All records populated	Risk Rating Factor
CBGFIPS	Census Block Group FIPS (Taken from GIS_GEOCEN Field)	Almost all records populated; less than 1% null records but an additional 3% with invalid data	Location
STCO_FIPS	State, County FIPS (Taken from GIS_GEOCEN Field)	Almost all records populated; less than 1% null records but an additional 3% with invalid data	Location

Appendix I

Task Statements for Affordability of National Flood Insurance Program Premiums— Report 1 and Report 2

STATEMENT OF TASK

The Federal Insurance and Mitigation Administration (FIMA) is a component of the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), which operates the National Flood Insurance Program (NFIP). On March 21, 2014, President Obama signed the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 into law. This law repeals and modifies certain provisions of the 2012 Biggert-Waters Flood Insurance Reform Act, and makes additional program changes to other aspects of the program not covered by that Act. One modification regards a study being conducted by the National Research Council (NRC) of the National Academy of Sciences (NAS). HFIAA requires the submission of the Affordability Study by the FEMA Administrator 18 months from enactment of the Act.

FEMA has asked the NAS to provide two reports as part of the NFIP Affordability Study.

The first report, due in February 2015, will discuss the underlying definitions and methods for an affordability framework and describe the affordability concept and applications, and program policy options.

The second report, due in September 2015, will propose alternative approaches for a national evaluation of affordability program policy options, based in part on lessons gleaned from a proof-of-concept pilot study to be guided by the NRC committee.

An ad hoc committee under the auspices of the National Research Council will prepare both reports according to the following statements of task:

First Report

The first report will discuss the underlying definitions for an affordability framework and describe the affordability concept and applications and program policy options.

The first report shall discuss

- Methods for establishing an affordability framework, including means-tested vouchers, for the National Flood Insurance Program;
- Appropriate and necessary assumptions and definitions, including “affordability” and “full risk-based premiums.”

Second Report

The second report will propose alternative approaches for a national evaluation of affordability program policy options. The second report will include lessons for the design of a national study from a proof-of-concept pilot study.

The second report shall discuss

- Data issues such as needs, availability, quantity, and quality;
- Appropriate analytical methods and related considerations, including models, computing software, and geographic areas to be analyzed;
- A proof-of-concept pilot analysis to be subcontracted as part of the study. This analysis will apply different methods for conducting a flood insurance affordability analysis for a state (North Carolina) in which data on elevations of structures and hydrologic flood hazards are readily available. This analysis will inform the committee’s deliberations and findings regarding the possibilities for a national-level flood insurance affordability study, for which these data on elevations and flood hazards are less readily available;
- National implications from the proof-of-concept pilot results including, but not limited to, possible impacts on participation rates (the analytical work for the proof-of-concept pilot may be carried out by the NRC directly or using subcontractors as necessary).

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APPENDIX I. ESA-RELATED PERFORMANCE STANDARD: IMPACT ASSESSMENT

The following is an assessment of the impact resulting from establishing a specific ESA-related performance standard in the floodplain management criteria that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat was mitigated to the maximum extent possible.¹

The impacts associated with implementing the ESA-related floodplain management criteria include a community cost to incorporate the ESA-related criteria into their local ordinances in addition to maintenance of ESA-related documentation. FEMA impacts would include costs to monitor compliance with these new criteria through Community Action Visits (CAVs) and Community Action Contacts (CACs).

INCORPORATION OF ESA-RELATED FLOODPLAIN MANAGEMENT CRITERIA

FEMA believes including specific ESA-related criteria into the floodplain management criteria will establish an ESA performance standard that would help ensure that the implementation of the National Flood Insurance Program (NFIP) does not indirectly facilitate floodplain development that jeopardizes the continued survival of ESA-listed species. While FEMA currently requires compliance with all Federal law, this provision will establish a specific ESA-related performance standard to focus communities' awareness of the ESA and establish a documentation requirement across all NFIP communities.

Communities will incur costs to incorporate the ESA-related floodplain management criteria into their local ordinance(s). Such efforts may be more or less costly depending on the rigor of the adoption process, the complexity of the local ordinances, as well as other complicating factors (e.g. population size, contentiousness of the change, or political climate). Based on community input, FEMA estimates that communities with populations of 5,000 or below would incur costs of approximately \$1,000 to \$2,000; communities with populations between 5,001 and

¹ ESA relates to the Endangered Species Act.

50,000 would incur costs of approximately \$5,000 to \$10,000; communities with populations between 50,001 and 100,000 would incur costs of approximately \$10,000 to \$25,000; and communities with populations above 100,000 would incur costs of approximately \$15,000 to \$40,000 to incorporate new items into their ordinances. Based on FEMA 2014 NFIP community information, 63 percent (13,916) of NFIP communities have populations between 1 and 5,000; 32 percent (7,068) of NFIP communities have populations between 5,001 and 50,000; 3 percent (663) of NFIP communities have populations between 50,001 and 100,000; and 2 percent (442) of NFIP communities have populations greater than 100,000. This results in a low incorporation cost of \$62,516,000 and a high incorporation cost of \$132,767,000 with a mid incorporation cost estimate of \$97,641,500.²

ESA-RELATED DOCUMENTATION

Communities would incur an annual cost to maintain ESA-related documentation. FEMA estimates that a community would spend an average of approximately 30 minutes (0.5 hours) reviewing, processing, filing, and maintaining ESA documentation. This increased burden estimate is small because FEMA believes much of the necessary documentation already exists and anticipates that communities would simply check to ensure there is sufficient documentation and place a copy of that information into an existing file. FEMA assumes this action would be completed by the equivalent of a general and operations manager (Standard Occupational Classification code 11-1021). According to the Bureau of Labor Statistics, May 2015 Occupational Employment Statistics, the mean hourly wage for a general and operations

² Low incorporation cost estimate equals: $((13,916 \times \$1,000) + (7,068 \times \$5,000) + (663 \times \$10,000) + (442 \times \$15,000))$. High incorporation cost estimate equals: $((13,916 \times \$2,000) + (7,068 \times \$10,000) + (663 \times \$25,000) + (442 \times \$40,000))$. Mid incorporation cost estimate equals: $((13,916 \times \$1,500) + (7,068 \times \$7,500) + (663 \times \$17,500) + (442 \times \$27,500))$.

manager is \$57.44.³ To account for benefits, the mean hourly wage is multiplied by 1.46 resulting in a fully loaded mean hourly wage of \$83.86.⁴

FEMA estimates that communities process a total of approximately 88,069 development proposals in the special flood hazard area (SFHA) per year.⁵ FEMA reviewed and categorized a sample of Conditional Letter of Map Revision (CLOMRs) and Conditional Letter of Map Revision Based on Fill (CLOMR-Fs) to estimate the distribution of development proposals into three evidence documentation categories.⁶ The resulting distribution based on identifiable ESA documentation was that in 46 percent (121/261) of the sample, no ESA-listed species or designated critical habitat were present (no species); in 43 percent (112/261) of the sample, ESA-listed species or designated critical habitat were present, but there were no direct, indirect, or cumulative adverse impacts (no impact); and in 11 percent (28/261), of the sample, ESA-listed species or designated critical habitat were present, but all direct, indirect, or cumulative adverse impacts were mitigated to the maximum extent practicable (mitigation). Applying this sample distribution to the number of development proposals per year results in an estimated 40,512 permits per year with no species; 37,870 permits per year with no impact; and 9,688 permits per year with mitigation.⁷

However, current community retention of ESA-related documentation levels are unknown. For the purposes of analysis, FEMA assumes a low of 10 percent and a high of 90 percent for the current ESA document non-retention rate with a mid assumption of 50 percent non-retention.

³ The general and operations manager (Standard Occupational Classification 11-1021) mean hourly wage of \$57.44 was taken from the Bureau of Labor Statistics, May 2015 Occupational Employment Statistics; retrieved from http://www.bls.gov/oes/2015/may/oes_stru.htm.

⁴ To account for the full costs, \$57.44 was multiplied by 1.46 for a fully loaded wage of \$83.86 ($\$57.44 \times 1.46 = \83.862). A load factor of 1.46 was used based on Bureau of Labor Statistics, Employer Costs for Employee Compensation, Table 1. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Civilian workers, by major occupational and industry group, June 2014” by dividing total compensation for all workers of \$31.96 by wages and salaries for all workers of \$21.95 per hour. Retrieved from http://www.bls.gov/news.release/archives/ecec_09102014.htm.

⁵ 88,069 is the annual average number of development proposals identified in the Information Collection Request under OMB number 1660-0004 uploaded 06/05/2014.

⁶ A sample of CLOMR and CLOMR-F were used as current FEMA policy directs such activities to include ESA documentation.

⁷ Annual estimated number of no species permits equals $88,069 \times 0.46 = 40,511.74$ but decreased by 1 to account for rounding. Annual estimated number of no impact permits equals $88,069 \times 0.43 = 37,869.67$. Annual estimated number of mitigation permits equals $88,069 \times 0.11 = 9,687.59$.

To estimate the cost impacts for communities to retain ESA-related documentation, FEMA multiplies the non-retention rates by the number of development proposals (88,069) by the estimated community time to review, process, file, and maintain the documentation (0.5 hours) and a community official fully loaded wage rate (\$83.86). The resulting additional annual ESA-related documentation cost ranges from \$369,278 to \$3,323,456 with a mid estimate of \$1,846,388.⁸

FEMA would also experience costs to monitor documentation compliance through CAVs and Community Assistance Contacts (CACs). FEMA currently attempts to conduct 1,000 CAVs and 2,000 CACs per year.⁹ FEMA anticipates that the effort to monitor compliance with the new documentation requirements would entail a similar effort to monitoring compliance with other floodplain management criteria. Based on experience in Region 10, where there has been an increased ESA compliance focus resulting from a RPA provided by the Services, FEMA estimates an increase of 5 to 15 percent of FEMA CAV ESA-related effort which includes monitoring and providing technical assistance. However, FEMA anticipates that the total time spent with the community would not change and, thus, would not impose any additional community costs.

FEMA estimates an average CAV cost of approximately \$11,000, which includes preparation time prior to the CAV, time spent conducting the CAV, and time spent after the CAV to write

⁸ The low cost estimate for communities to retain ESA-related documentation equals $((88,069 \times 0.1 \text{ [rounded to nearest whole number]}) \times 0.5 \times \$83.86)$. The high cost estimate for communities to retain ESA-related documentation equals $((88,069 \times 0.9 \text{ [rounded to nearest whole number]}) \times 0.5 \times \$83.86)$. The mid cost estimate for communities to retain ESA-related documentation equals $((88,069 \times 0.5 \text{ [rounded to nearest whole number]}) \times 0.5 \times \$83.86)$.

⁹ 1,000 CAVs and 2,000 CACs are the anticipated annual average number identified in the Information Collection Request under OMB number 1660-0023.

the CAV report and follow up on any outstanding items with the community.¹⁰ Applying the increased ESA-related effort estimated above results in a cost increase for CAVs of \$550 to \$1650, with a primary estimate of \$1,100.¹¹ This increase is multiplied by the estimated number of CAVs per year (1,000) to calculate an annual ESA-related CAV cost increase. The resulting annual ESA-related CAV cost increase ranges from \$550,000 to \$1,650,000 with a primary of \$1,100,000.

FEMA assumes a similar percentage increase in the level of ESA-related effort for CACs. FEMA estimates an average CAC cost of \$500, which includes preparation time before the CAC, conducting the CAC, and time spent after the CAC to write up the notes and follow up on any outstanding items with the community.¹² Applying the increased ESA-related effort results in a cost increase for CACs of \$25 to \$75, with a primary estimate of \$50. This increase is multiplied by the estimated number of CACs per year (2,000) to calculate an annual ESA-related CAC cost increase. The resulting annual ESA-related CAC cost increase ranges from \$50,000 to \$150,000 with a primary of \$100,000.

¹⁰ FEMA estimates the average CAV cost as the equivalent of 180 hours of a General Schedule (GS) 12 step 5 employees time at the average fully loaded hourly wage across all regions of \$60.15 which FEMA rounds to \$11,000 ($180 \times \$60.15 = \$10,827$). 2015 GS annual wages are provided by the Office of Personnel Management at <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/2015/general-schedule/>. The average GS 12 step 5 wage is calculated as the average of (\$86,968 (Boston, MA), \$89,700 (New York, NY), \$84,871 (Philadelphia, PA), \$83,128 (Atlanta, GA), \$87,177 (Chicago, IL), \$84,090 (Denton, TX), \$79,554 (Kansas City, MO [rest of US]), \$85,379 (Denver, CO), \$94,181 (Oakland, CA), \$84,885 (Bothell, WA)) divided by 2087 hours which equals \$41.20. A load factor of 1.46 was applied based on the Bureau of Labor Statistics, Employer Costs for Employee Compensation, Table 1. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Civilian workers, by major occupational and industry group, June 2014” by dividing total compensation for all workers of \$31.96 by wages and salaries for all workers of \$21.95 per hour. Retrieved from http://www.bls.gov/news.release/archives/eccec_09102014.htm.

¹¹ Low CAV increase equals $\$11,000 \times .05$ which equates to \$550.00. High CAV increase equals $\$11,000 \times .15$ which equates to \$1,650.00. Mid CAV increase equals $\$11,000 \times .1$ which equates to \$1,100.00.

¹² FEMA estimates the average CAC cost as the equivalent of 8 hours of a General Schedule (GS) 12 step 5 employees time at the average fully loaded hourly wage across all regions of \$60.15 which FEMA rounds to \$500 ($8 \times \$60.15 = \$10,827$). 2015 GS annual wages are provided by the Office of Personnel Management at <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/2015/general-schedule/>. The average GS 12 step 5 wage is calculated as the average of (\$86,968 (Boston, MA), \$89,700 (New York, NY), \$84,871 (Philadelphia, PA), \$83,128 (Atlanta, GA), \$87,177 (Chicago, IL), \$84,090 (Denton, TX), \$79,554 (Kansas City, MO [rest of US]), \$85,379 (Denver, CO), \$94,181 (Oakland, CA), \$84,885 (Bothell, WA)) divided by 2087 hours which equals \$41.20. A load factor of 1.46 was applied based on the Bureau of Labor Statistics, Employer Costs for Employee Compensation, Table 1. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Civilian workers, by major occupational and industry group, June 2014” by dividing total compensation for all workers of \$31.96 by wages and salaries for all workers of \$21.95 per hour. Retrieved from http://www.bls.gov/news.release/archives/eccec_09102014.htm.

ESA-RELATED PERFORMANCE STANDARD BENEFITS

Incorporation of a specific ESA-related performance standard into the minimum floodplain management criteria would help further and support the purposes of the ESA, National Flood Insurance Act (NFIA), and EO 11988 on floodplain management, within the confines of FEMA's legal authority, by more directly addressing ESA related requirements of communities undertaking floodplain development. Specifically, this would include improved documentation of ESA compliance and the affirmation by communities of project proponent compliance with the ESA. FEMA believes this would give communities a bigger stake in ensuring that floodplain development is ESA-compliant and thus support and further encourage such compliance. In addition, this increased stake may encourage communities to become more aware of ESA-related issues in their community and potentially develop holistic approaches to address such issues, rather than leaving it to project proponents to address ESA compliance on a permit-by-permit basis. Employment of such holistic approaches would likely improve a community's ability to assess and address the cumulative impacts on ESA-listed species. It may also encourage communities to work more closely with the Services to develop tools to help identify areas with species and critical habitat and to establish mitigation measures specific to the community and/or the ESA-listed species found in the community. All such actions would help support FEMA to better ensure that the implementation of the NFIP does not jeopardize the continued survival of ESA-listed species.

Furthermore, the proposed approach would create a national standard, which is consistent with the NFIA's mandate that the NFIP establish a unified program for floodplain management.¹³ Although communities may achieve the identified standard differently, they all would strive for the same standard, which is consistent with this requirement and makes FEMA's enforcement of the standard easier and more efficient. Having multiple standards based on different regions or consultations is inconsistent with FEMA's legal authorities and it would increase the complexity of implementation and the resources necessary to monitor and enforce such activities.

¹³ 42 U.S.C. 4001(c)

CONCLUSION

In summation, FEMA estimates the impacts associated with implementing ESA-related floodplain management criteria on communities and FEMA. Communities will incur costs to incorporate ESA-related floodplain criteria into their local ordinances which FEMA estimates as ranging from \$1,000 to \$40,000 per community. FEMA also estimates that communities would incur costs for maintaining ESA-related documentation which FEMA estimates as ranging from \$369,278 to \$3,323,456 across all NFIP communities. FEMA would incur costs associated with monitoring compliance with ESA-related documentation through CAVs and CACs which FEMA estimating as ranging from approximately \$600,000 to \$1,800,000, but would not increase corresponding community CAV and CAC costs. Nonetheless, FEMA believes this provision would create a national standard, which is consistent with the NFIA's mandate that the NFIP establish a unified program for floodplain management and support the purposes of the ESA, National Flood Insurance Act (NFIA), and EO 11988 on floodplain management, which would result in FEMA being better able ensure that the implementation of the NFIP does not jeopardize the continued survival of ESA-listed species.

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APPENDIX J. PUBLIC PURPOSE FLOODWAY DEVELOPMENT: IMPACT ASSESSMENT

The following is an assessment of the impact resulting from limiting the current exception to encroachments in the adopted regulatory floodway that increase the Base Flood Elevation (BFE) to encroachments that are for public purpose development.¹ The floodway is the channel of a river, or other watercourse, and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. To implement this limitation, FEMA would specifically indicate in the floodplain management regulations at 44 CFR 60.3 that the floodway encroachment exception applies only to encroachments for “public purpose development”, as defined by FEMA. This change aligns with the objectives of the floodplain management criteria, which are to protect development against flood damage and flood hazards, to assist in reducing the damage caused by floods, and to improve the long-range management and use of flood prone areas.

INTRODUCTION

Currently, 44 CFR 60.3(d)(4) provides a process for communities to allow encroachments that would result in an increase in the BFE within an adopted regulatory floodway that would otherwise be prohibited under 44 CFR 60.3(d)(3). The proposed change would limit such encroachments to only “public purpose development” as defined by FEMA. Per 2014 National Flood Insurance Program (NFIP) community information, 10,152 communities were identified as having an established floodway under 60.3(d) that would be subject to this change. However, not all of the identified communities allow encroachments in the floodway, and of those that do, not all of them allow a rise in BFE. Those communities that do not allow encroachments in the floodway or only allow “no rise” encroachments would not need to take any action in response to this change. For communities that do allow floodway encroachments resulting in a rise in BFE, the Chief Executive Officer would have to provide written assurance that the development is for a public purpose.

¹ 44 CFR 60.3(d)(4) currently creates an exception to the rule in 44 CFR 60.3(d)(3) that encroachments in the regulatory floodway may not cause an increase in the BFE.

COMMUNITY IMPACTS

FEMA anticipates that communities with floodways would experience a small onetime cost to become familiar with the public purpose term and how it may potentially impact their community.² FEMA estimates a community official would spend 1 hour at a fully loaded wage of \$83.86 to become familiar with the term and how it fits into their process.³ This equates to an upfront cost of \$851,347.⁴

FEMA also anticipates that communities allowing floodway encroachments resulting in a rise in BFE would incur costs to incorporate the public purpose provision into their local ordinance(s). FEMA floodplain management subject matter experts estimate that 75 percent of communities do not allow encroachments resulting in a rise in BFE in the floodway. This results in only 2,538 communities needing to incorporate public purpose provision changes.⁵ Community incorporation of the necessary changes may be more or less costly depending on the rigor of the adoption process, the complexity of the local ordinances, as well as other complicating factors (e.g. population size, contentiousness of the change, or political climate).⁶ Nonetheless, FEMA uses community population information to estimate a range of potential

² FEMA assumes that all communities with a floodway would at least review the public purpose provision and definition to determine if it is applicable.

³ The community official wage is calculated as the equivalent of a general and operations manager (Standard Occupational Classification 11-1021) mean hourly wage of \$57.44 taken from the Bureau of Labor Statistics, May 2015 Occupational Employment Statistics. Retrieved from http://www.bls.gov/oes/2015/may/oes_stru.htm. To account for the full costs, \$57.44 was multiplied by 1.46 for a fully loaded wage of \$83.86 ($\$57.44 \times 1.46 = \83.862). A load factor of 1.46 was used based on Bureau of Labor Statistics, Employer Costs for Employee Compensation, Table 1. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Civilian workers, by major occupational and industry group, June 2014” by dividing total compensation for all workers of \$31.96 by wages and salaries for all workers of \$21.95 per hour. Retrieved from http://www.bls.gov/news.release/archives/ecec_09102014.htm.

⁴ Familiarization costs equals 10,152 communities with floodways x 1 hour x \$83.86 per hour which equals \$851,346.72.

⁵ 10,152 communities with floodways multiplied by (1-0.75) equals 2,538.

⁶ Based on community input, FEMA estimates that communities with populations of 5,000 or below would incur costs of approximately \$1,000 to \$2,000; communities with populations between 5,001 and 50,000 would incur costs of approximately \$5,000 to \$10,000; communities with populations between 50,001 and 100,000 would incur costs of approximately \$10,000 to \$25,000; and communities with populations above 100,000 would incur costs of approximately \$15,000 to \$40,000 to incorporate new items into their ordinances.

incorporation costs.⁷ Based on community population and incorporation cost estimates, FEMA calculates a potential total incorporation cost ranging from \$9,417,000 to \$20,229,000.⁸

However, if impacted communities made necessary changes to their local ordinances in conjunction with other changes, such costs may be distributed or potentially reduced to negligible. Specifically, FEMA anticipates that incorporation costs include a level of fixed costs (e.g. reserving a meeting space) and variable costs (e.g. length of published announcement or time spent on incorporation discussions). If the proposed changes are included as part of a regularly scheduled update or review of community ordinances, FEMA anticipates the inclusion of the public purpose provision would only include minor additional variable costs that could potentially be negligible. Alternatively, if the proposed changes are incorporated as part of a specifically dedicated incorporation effort, then associated incorporation costs could be attributed proportionally based on the complexity or added cost of each newly added item to the community ordinance.

In addition, FEMA estimates communities currently spend an average of 2.5 hours processing, filing, and maintaining development proposals.⁹ FEMA believes communities will be able to determine if a proposal is public purpose as defined by FEMA within this current estimate. In addition, a community's Chief Executive Officer will have to provide written assurance that the development is for a public purpose. This assurance would be added to other assurances provided as part of the development in the floodplain process.¹⁰ FEMA believes the public purpose assurance would be completed in conjunction with other assurances and not increase community costs.

⁷ Based on FEMA community information, 46 percent of communities with floodways have populations between 1 and 5,000, 46 percent of communities with floodways have populations between 5,001 and 50,000, 5 percent of communities with floodways have populations between 50,001 and 100,000, and 3 percent of communities with floodways have populations greater than 100,000.

⁸ FEMA calculates the lower incorporation cost estimate as follows: $(2,538 \times 0.46 \times \$1,000) + (2,538 \times 0.46 \times \$5,000) + (2,538 \times 0.05 \times \$10,000) + (2,538 \times 0.03 \times \$15,000) = \$9,417,000$. FEMA calculates the upper incorporation cost estimate as follows: $(2,538 \times 0.46 \times \$2,000) + (2,538 \times 0.46 \times \$10,000) + (2,538 \times 0.05 \times \$25,000) + (2,538 \times 0.03 \times \$40,000) = \$20,229,000$.

⁹ 2.5 hours is identified as the average hour burden for floodplain development documents in the Information Collection Request under OMB number 1660-0004 uploaded 06/05/2014.

¹⁰ Such assurances will provide FEMA a mechanism to help ensure encroachments are limited to public purposes.

PROJECT PROPONENT IMPACTS

To estimate project proponent impacts, FEMA first estimates it receives an average of 1,100 Conditional Letter of Map Revisions (CLOMRs) and Letter of Map Revisions (LOMRs) a year.¹¹ Based on completed CLOMRs and LOMRs received between 2011 and 2013, approximately 26 percent were CLOMRs.¹² Applying this percentage to the annual number of CLOMRs and LOMRs (1,100) results in an estimated 286 CLOMRs per year.¹³

From the same time period (2011-2013), FEMA also identified 141 CLOMRs or 19 percent that include an increase in the floodway.¹⁴ Applying this percentage to the estimated annual number of CLOMRs per year (286) results in an estimated 54 floodway CLOMRs with a floodway increase per year.¹⁵

FEMA reviewed the 141 CLOMRs with floodway increases from 2011-2013 and determined that 98 of these, or 73 percent, would meet the definition of public purpose.¹⁶ Applying this percentage to the annual number of floodway CLOMRs with an increase per year (54) results in an estimated 39 public purpose floodway related CLOMRs per year.¹⁷ The resulting non-public purpose floodway related CLOMRs equates to 15 per year.¹⁸ Based on this information, FEMA estimates that CLOMRs for encroachments in floodways would be reduced by 15 or 1 percent of all CLOMRs and LOMRs completed.¹⁹

FEMA assumes that such non-public purpose development may be shifted elsewhere outside the floodway. However, FEMA anticipates that applicants would likely still prepare development proposals; but, if now developing outside the floodway, they may no longer require

¹¹ 1,100 is the anticipated annual average number of CLOMRs and LOMRs received identified in the Information Collection Request under OMB number 1660-0016 uploaded 05/28/2014.

¹² Percentage of CLOMRs equals 730 CLOMRs divided by 2,827 CLOMRs and LOMRs multiplied by 100 which equals 25.822 percent.

¹³ Estimated annual average number of CLOMRs equals 1,100 multiplied by 0.26 which equals 286.

¹⁴ CLOMRs that included an increase in floodway equals 141 divided by 730 multiplied by 100 which equals 19.315.

¹⁵ Number of CLOMRs with a floodway increase equals 286 multiplied by 0.19 which equals 54.34.

¹⁶ Public purpose definition percentage equals 98 divided by 134 multiplied by 100 which equals 73.134. Seven CLOMRs were excluded from the sample which resulted in a denominator of 134 (141-7=134).

¹⁷ Public purpose floodway CLOMRs per year equals 54 multiplied by 0.73 which equals 39.42.

¹⁸ Non-public purpose floodway CLOMRs per year equals 54 multiplied by (1-0.73) which equals 14.58.

¹⁹ Percentage of reduction of CLOMRs equals 15 divided by 1,100 which equals 0.01364.

a CLOMR. CLOMR fees depend upon the type of analysis being performed and can range from \$4,400 to \$6,050.²⁰ For the purposes of analysis, FEMA applies an average fee of \$5,225.²¹ Assuming all shifted non-public purpose development would no longer pursue a CLOMR, project proponents would experience an associated reduction in proposal development costs. This equates to \$78,375 in project proponent expense but does prohibit such development in the floodway.²²

FEDERAL IMPACTS

FEMA does not anticipate any monetary Federal impacts. FEMA collects fees for the processing of CLOMRs. These fees are intended to cover the costs for processing letter of map change requests. Thus, the reduction in CLOMRs would not have a monetary Federal impact. Furthermore, the resulting reduction in CLOMRs only represents 1 percent of CLOMRs and LOMRs and thus not likely to require changes to letter of map change processing structures. In addition, FEMA anticipates that efforts associated with ensuring community compliance would be completed as part of existing compliance actions and thus not increase FEMA costs.

CONCLUSION

In summation, FEMA estimates that the number of CLOMRs would be reduced by 15 per year. This would result in a project proponent cost savings of \$78,375 per year from not requesting CLOMRs but that the associated projects would not be permitted in the floodway. FEMA estimates that all communities with floodways would incur a one-time upfront community cost of \$851,347 to become familiar with the public purpose term and how it may potentially impact their community. Impacted communities may incur additional expenses to incorporate changes into their local ordinances that could range from \$9,417,000 to \$20,229,000, but that such costs may be shared or determined negligible if incorporated with other ordinance changes. Finally, FEMA does not anticipate any Federal monetary impacts.

²⁰ Flood Map-Related Fees, requests for map changes requiring special technical review, CLOMR based on new hydrology, bridge, culvert, channel, or combination thereof (\$4,400) and CLOMR based on levee, berm, or other structural measures (\$6,050). Retrieved from <https://www.fema.gov/forms-documents-and-software/flood-map-related-fees#Current Fee Schedule for Map Change and LODR Requests>

²¹ Simple average CLOMR fee equals $(\$4,400 + \$6,050)/2$ which equals \$5,225.

²² Reduction in project proponent CLOMR fees equals 15 multiplied by \$5,225 which equals \$78,375.

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APPENDIX K. TMAC FUTURE CONDITIONS RISK ASSESSMENT AND MODELING (December 2015)

TECHNICAL MAPPING ADVISORY COUNCIL



TMAC

FUTURE CONDITIONS RISK ASSESSMENT AND MODELING

December 2015

TECHNICAL MAPPING ADVISORY COUNCIL

TMAC

Future Conditions Risk Assessment and Modeling

December 2015

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Flooding in Minot, ND, 2011.



Summary of the Future Conditions Risk Assessment and Modeling Report

FLOODING IS THE most common and costly natural disaster in the United States, and flood damages are increasing due to sea level changes, changing climatological patterns, and increased development in floodplains. While a few communities have worked with the Federal Emergency Management Agency (FEMA) to include future conditions flood hazards as an informational layer on their Flood Insurance Rate Maps, and voluntary programs like the Community Rating System encourage communities to plan for future conditions, most of the flood hazard maps that are used nationwide to determine minimum building design and other floodplain development standards are a snapshot in time, showing only the current flood risk. Meeting our National Preparedness Goal of a “secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk”¹ can only be achieved if we first identify the threats and hazards we face as we move into the future.

The availability of future conditions flood risk products, tools, and information will help communities make more informed development decisions that mitigate the loss of life and property by lessening the impact of future disasters. This information will also enable current local property owners to become more resilient. Risk information supported by future conditions data can save lives; protect property and the environment; and allow for focused, planned recovery when keeping future conditions flood hazards in mind.

The recommendations outlined in this report are intended to counsel FEMA on the utilization and incorporation of best available climate science and methodology to assess possible future flood risk.

¹ Department of Homeland Security, 2011.



Flooded house following a severe storm.
Location unknown.

BIGGERT-WATERS 2012 MANDATE Section 100215(d)

FUTURE CONDITIONS RISK ASSESSMENT AND MODELING REPORT.—

- (1) IN GENERAL.—The Council shall consult with scientists and technical experts, other Federal agencies, States, and local communities to—
 - (A) develop recommendations on how to—
 - (i) ensure that flood insurance rate maps incorporate the best available climate science to assess flood risks; and
 - (ii) ensure that the Federal Emergency Management Agency uses the best available methodology to consider the impact of—
 - (I) the rise in the sea level; and
 - (II) future development on flood risk; and
 - (B) not later than 1 year after the date of enactment of this Act, prepare written recommendations in a future conditions risk assessment and modeling report and to submit such recommendations to the Administrator.

CREATION AND AUTHORITY OF TMAC

The Technical Mapping Advisory Council (TMAC) is a Federal advisory committee established to review and make recommendations to FEMA on matters related to the national flood mapping program.

The TMAC provides advice and recommendations to the Administrator of FEMA to improve the preparation of Flood Insurance Rate Maps and flood hazard information. Among its specified statutory responsibilities, the TMAC examines performance metrics, standards and guidelines, map maintenance activities, delegation of mapping activities to State and local mapping partners, interagency coordination and leveraging, and other requirements mandated by the authorizing Biggert-Waters Flood Insurance Reform Act of 2012 legislation.

CONGRESSIONAL MANDATE FOR FUTURE CONDITIONS RISK ASSESSMENT AND MODELING

Per the Biggert-Waters Flood Insurance Reform Act of 2012, the TMAC must also develop recommendations for incorporating the best available climate science in flood insurance studies and maps and using the best available methodology when considering the impacts of sea level rise and future development on flood risk. This is the focus of this report.

IMPORTANCE FOR THE NATION

The identification and broad availability of future conditions hazard and risk information is of utmost importance to our Nation's citizens and economy as development and population growth occur in areas that are at risk now, or will be in the future. Several recent directives, pieces of legislation, reports, and initiatives also support this assertion. These are further described in Section 7 of this report.

Planning, zoning, land use, and other development decisions made by communities today will impact the buildings and infrastructure that will be in existence for decades to come. The recommendations provided here support the assertion that in order to become a more resilient Nation, elected officials, community planners, engineers, architects, emergency management officials, and decision-makers will need the tools necessary to plan, prepare for, and mitigate against future risks from natural and manmade hazards.

TMAC RECOMMENDATIONS AND SUB-RECOMMENDATIONS

The seven primary recommendations from the TMAC as well as sub-recommendations that support these primary recommendations are outlined on the following pages. Sub-recommendations are shown throughout the report in blue boxes with white text.

The sub-recommendations are numbered according to the section of the Future Conditions report in which they appear, and reflect the numerical order in which they appear in that section. For example, Sub-Recommendation 3-1 is the first sub-recommendation in Section 3, Sub-Recommendation 3-2 is the second, and so on. The sub-recommendations estimate the amount of time required to achieve the recommended action. "Short-term" means up to 2 years to accomplish and "long-term" means greater than 2 years to achieve. The TMAC believes that future conditions flood hazard products, tools, and information can be developed and provided to communities via policy change alone, and that regulatory or legislative changes are not necessary at this time.



Water rescue team in Moorhead, MN, 2009.

The TMAC believes that future conditions flood hazard products, tools, and information can be developed and provided to communities via policy change alone, and that regulatory or legislative changes are not necessary at this time.

Though many of the recommendations and sub-recommendations outlined in this report are specific to FEMA, many of them should be undertaken with mapping partners and other relevant stakeholders, including the private sector.

RECOMMENDATION 1

Provide future conditions flood risk products, tools, and information for coastal, Great Lakes, and riverine areas. The projected future conditions should use standardized timeframes and methodologies wherever possible to encourage consistency and should be adapted as actionable science evolves.



Coastal Coalition Meeting in Ventnor City, NJ, 2013.

RECOMMENDATION 1 : SUB-RECOMMENDATIONS

Sub-Recommendation 3-2	FEMA should use future risk assessments to take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates. Timing: SHORT TERM
Sub-Recommendation 3-4	FEMA should define a future population metric that uses a standard future population database along with various budget scenarios for keeping the data current to predict the percent of the population covered at various points in the future. Timing: SHORT TERM
Sub-Recommendation 3-5	FEMA should take into account future development (excluding proposed flood control structures for the base condition/scenario) for future conditions mapping. An additional scenario can be generated that does include future flood control structures. Timing: SHORT TERM
Sub-Recommendation 3-6	FEMA should use population growth as an indicator of areas with increased potential flood risk. Timing: SHORT TERM
Sub-Recommendation 4-4	FEMA should develop guidance for how local zoning and land use planning can be used to identify where and how land use will change in the future, and incorporate that into local hazard and risk modeling. Timing: SHORT TERM
Sub-Recommendation 4-11	FEMA should develop a policy and standards on how to consider and determine erosion zones that are outside of the Special Flood Hazard Area (SFHA), as they ultimately affect flooding and environmental conditions within the SFHA. Timing: SHORT TERM

RECOMMENDATION 1 : SUB-RECOMMENDATIONS

Sub-Recommendation 5-2 FEMA should use a scenario approach for future conditions flood hazards calculation and mapping that will allow users to evaluate the robustness of proposed solutions to a range of plausible future conditions, including uncertain land use and climate change impacts.
Timing: LONG TERM



Flood damage in Sea Bright, NJ, 2012.

RECOMMENDATION 1 DISCUSSION

THE IDENTIFICATION AND BROAD availability of future conditions hazard and risk information is of utmost importance to our Nation's citizens and economy as development and population growth occur in areas that are at risk now, or will be in the future. Therefore, the TMAC recommends that FEMA provide future conditions flood hazard products, tools, and information for coastal, Great Lakes, and riverine areas. In this report, the term "riverine" encompasses flood risk from inland flooding sources, such as rivers, streams, and lakes; shallow flooding, such as sheet flow and ponding; and special hazards, such as areas subject to ice jams, alluvial fans, and other special flood hazards.

The TMAC recommends that all future conditions flood risk information be non-regulatory (advisory at the Federal level of National Flood Insurance Program [NFIP] administration). However, communities should be allowed—and encouraged—to adopt the future conditions flood hazard products, tools, and information for local regulatory purposes and decision-making on the local level.

In order to encourage national consistency and allow for accurate comparisons, the flood risk products, tools, and information provided should use standardized timeframes and methodologies wherever possible. These timeframes and methodologies should be adapted as the actionable science in this area evolves.

FEMA should use a scenario approach to future conditions flood hazard products, tools, and information. While future development should be taken into account for future conditions flood risk products, tools, and information (perhaps using population growth as an indicator of future urbanization), the TMAC believes that the base future scenario should not include proposed flood control structures. If proposed flood control structures are taken into account, their impacts should be incorporated into a second scenario. By using a scenario approach, users can evaluate the robustness of proposed solutions to a range of plausible future conditions, including uncertain land use and climate change impacts.

FEMA should develop companion future conditions flood risk product guidance, including information about how local zoning and land use planning can be used to identify where and how land use will change in the future, and how that information can be incorporated into local hazard and risk modeling. FEMA should also develop a policy and supporting standards on how to consider and determine erosion zones that are outside of the SFHA as they ultimately affect flooding and environmental conditions within the 1-percent-annual-chance flood hazard area.

When measuring coverage for future conditions flood risk products, tools, and information, FEMA should define a future population metric that uses a standard future population database along with various budget scenarios for keeping the data current to predict the percent of the population covered by future conditions flood risk products, tools, and information at various points in the future.

RECOMMENDATION 2

Identify and quantify accuracy and uncertainty of data and analyses used to produce future conditions flood risk products, tools, and information.



Flooded roadway and bridge in Marshall County, KS, 2015.

RECOMMENDATION 2 : SUB-RECOMMENDATIONS

Sub-Recommendation 3-2 FEMA should use future risk assessments to take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates.
Timing: SHORT TERM

Sub-Recommendation 3-7 FEMA should publish multiple future conditions flood elevation layers that incorporate uncertainty so as to provide a basis for building designs that lower flood risk.
Timing: SHORT TERM

RECOMMENDATION 2 DISCUSSION

GIVEN UNCERTAINTY ABOUT predicted rainfall and temperatures, historical averages, and recent trends are generally used to identify flood hazards and make flood risk management decisions. This is problematic because past averages and trends may not always be accurate indicators of the future, especially if there are large changes or disruptions in our natural or manmade systems. Also, the observations and data for the past are incomplete and can be inaccurate. While the flood mapping community is accustomed to relying on observations of past floods to estimate the extent and depth of future floods, there has always been uncertainty associated with these estimates, whether that uncertainty has been acknowledged or not.

In the case of future conditions (e.g., changes in precipitation patterns, land alteration by nature or man, changes in stream flow, sea level rise, long-term coastal erosion, riverine erosion), projected trends and variabilities will be based on some combination of data and modeling, both of which magnify uncertainty. Uncertainties will be even greater for future conditions than those associated with modeling and mapping existing conditions, particularly as projections are made over a longer timeframe.

To date, the accuracies, degree of precision, and uncertainties associated with respect to currently-issued flood studies and mapping products have not been quantified or published. This information is needed both for improved risk identification and risk communication, and can serve as a baseline for characterizing future conditions. Therefore, as part of the future conditions flood hazard products, tools, and information recommended by the TMAC, FEMA should publish multiple future conditions flood elevation layers that incorporate identification of uncertainty so as to provide a basis for building designs that lower flood risk. In addition, risk assessments provided by FEMA should take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates.

RECOMMENDATION 3

Provide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise. Major elements are:

- Provide guidance and standards for the development of future conditions coastal flood risk products.
- Incorporate local relative sea/lake level rise scenarios and long-term coastal erosion into coastal flood hazard analyses.
- Consider the range of potential future natural and man-made coastal changes, such as inundation and coastal erosion.



Sand berm construction in Long Beach, NY, 2015.

RECOMMENDATION 3 : SUB-RECOMMENDATIONS

- | | |
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| Sub-Recommendation
4-1 | FEMA should use a scenario approach when considering shoreline location for the estimation of future conditions flood hazards. At least two scenarios should be evaluated, one in which the shoreline is held at its present location, and another in which the shoreline is eroded according to the best available shoreline erosion data.

Timing: SHORT TERM |
| Sub-Recommendation
4-6 | FEMA should develop guidance for incorporating future conditions into coastal inundation and wave analyses.

Timing: SHORT TERM |
| Sub-Recommendation
4-8 | FEMA should develop consistent methods and models for long-term coastal erosion hazard mapping.

Timing: SHORT TERM |
| Sub-Recommendation
5-4 | FEMA should use Parris et. al, 2012, ² or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.

Timing: SHORT TERM |
| Sub-Recommendation
5-5 | FEMA should work with other Federal agencies (e.g., National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, U.S. Geological Survey), the U.S. Global Change Research Program, and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parris et al, 2012 ³ scenarios, for the coastal regions of the United States out to the year 2100 that can be used for future coastal flood hazard estimation.

Timing: SHORT TERM |

² Parris, et. al., 2012.

³ Ibid.

RECOMMENDATION 3 : SUB-RECOMMENDATIONS

Sub-Recommendation 5-7	<p>FEMA should prepare map layers displaying the location and extent of areas subject to long-term erosion and make the information publicly available. Elements include:</p> <ul style="list-style-type: none">• Establishing the minimum standards for long-term erosion mapping that will be used by FEMA that must be met by partners/communities if it is to be incorporated into the FEMA products• Working with Federal, State, and local stakeholders to develop these minimum standards via pilot studies• Securing funding that can support sustained long-term erosion monitoring and mapping by allowing for periodic updates <p>Timing: LONG TERM</p>
Sub-Recommendation 5-9	<p>FEMA should support additional research to characterize how a changing climate will result in changes in Great Lakes and ocean wave conditions, especially along the Pacific Coast. The relative importance of waves on this coast makes this an important consideration.</p> <p>Timing: LONG TERM</p>
Sub-Recommendation 5-10	<p>For the Great Lakes, the addition or subtraction of future lake level elevations associated with a changing climate is not recommended at this time due to current uncertainty in projections of future lake levels.</p> <p>Timing: SHORT TERM</p>
Sub-Recommendation 5-11	<p>FEMA should build upon the existing current conditions flood hazard analyses prepared by FEMA for the NFIP to determine future coastal flood hazards.</p> <p>Timing: SHORT TERM</p>



Fast-moving floodwaters in Texas, undated.

RECOMMENDATION 3 : SUB-RECOMMENDATIONS

Sub-Recommendation 5-12

FEMA should incorporate Local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process in one of the following ways:

- Direct Analysis – Incorporate sea level rise directly into process modeling (i.e., surge, wave setup, wave runup, overtopping, and erosion) for regions where additional sea level is determined to impact the Base Flood Elevation non-linearly (for example, where a 1-foot sea level rise equals a two-foot or more increase in the base flood).
- Linear Superposition – Add sea level to the final calculated total water level and redefine the Base Flood Elevation for regions where additional sea level is determined to impact the base flood linearly (for example, 1 foot of sea level rise equals a 1-foot increase in the base flood).

Wave effects should be calculated based on the higher Stillwater, including sea level rise.

Timing: SHORT TERM

Sub-Recommendation 5-13

Maps displaying the location and extent of areas subject to long-term coastal erosion and future sea level rise scenarios should be advisory (non-regulatory) for Federal purposes. Individuals and jurisdictions can use the information for decision-making and regulatory purposes if they deem appropriate.

Timing: SHORT TERM



Washed-out landing in Tipton County, TN, 2011.



North Carolina coastline, undated.

RECOMMENDATION 3 DISCUSSION

NON-REGULATORY FUTURE CONDITIONS
flood hazard products, tools, and information for coastal and Great Lakes areas should include the effects of long-term erosion and sea level rise (lake level rise, if appropriate, for the Great Lakes).

It is important to understand existing hazards in order to begin to understand how those hazards may change in the future. Therefore, the TMAC recommends that the analyses for future coastal flood hazards be built from existing current conditions flood hazard analyses, such as those prepared by FEMA for the National Flood Insurance Program. This consistency will facilitate comparisons between current and future projections of extreme water levels and will also enable compatibility with existing programs and uses.

Defining future coastal flood hazards will require an assessment of how sea level change will influence the frequency and magnitude of future extreme water level events. Future storm tides and waves may reach higher elevations than during past storms and may do so with more frequency in most areas of the country, increasing the area impacted by future coastal flood hazards. Because local relative sea level is variable along the coast, some areas are actually experiencing relative sea level fall, while other localized areas exhibit a more dramatic relative sea level rise trend than generally observed globally. Therefore, regionalization of existing global sea level projections is needed for

mapping future conditions. Ideally, these regional scenarios would be vetted by regional and local stakeholders and used for consistent future flood hazard assessment. These decisions should be documented as part of the final product.

Because of the uncertainty about future changes in climate, it is necessary to examine a range of scenarios that reflect complete, coherent, and internally consistent descriptions of plausible future states. This allows an examination of cases for exposure to extreme events and performance for the project alternatives. The TMAC recommends that FEMA work with other Federal agencies (e.g., National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, U.S. Geological Survey), the U.S. Global Change Research Program, and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parris et al, 2012⁴ out to the year 2100 that can be used for future coastal flood hazard estimation. In addition, Parris et. al, 2012, or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects, should be used to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.

When incorporating these scenarios into the existing FEMA coastal flood insurance study process, FEMA should use a direct analysis approach that incorporates sea level rise directly into process modeling (e.g., surge, wave setup,

⁴ Ibid.

wave runup, overtopping, and erosion) for regions where additional sea level increase is determined to impact the Base Flood Elevation non-linearly (e.g., a 1-foot sea level rise equaling a 2-foot or more increase in the base flood). For regions where additional sea level is determined to impact the Base Flood Elevation linearly (where a 1-foot rise in sea level causes a 1-foot increase in the base flood), a linear superposition approach should be used; that is, adding the sea level change to the final calculated total water level and redefining the elevation of the base flood in that manner. In either case, wave effects should be calculated based on the higher stillwater elevation, including sea level rise.

For the Great Lakes, the addition or subtraction of future lake level elevations associated with a changing climate is not recommended at this time due to current uncertainty in projections of future lake levels.



Turbulent water on a beach. Location unknown.

When considering shoreline location for the estimation of future conditions flood hazards, the TMAC recommends that at least two scenarios be evaluated—one in which the shoreline is held at its present location, and another in which the shoreline is eroded according to the best available shoreline erosion data.

FEMA should develop consistent methods and models for long-term coastal erosion hazard mapping. The TMAC also recommends that FEMA work with Federal, State, tribal, and local stakeholders via pilot studies to establish the minimum standards for long-term erosion mapping if the information is to be incorporated into the regulatory FEMA products. FEMA should secure funding that can support sustained long-term erosion monitoring and mapping by allowing for periodic updates.

In support of future conditions coastal flood hazard products, tools, and information, FEMA should develop guidance for incorporating future conditions into coastal inundation and wave analyses, and support additional research to characterize how a changing climate will result in changes in Great Lakes and ocean wave conditions, especially along the Pacific Coast. The relative importance of waves on the Pacific Coast makes this an important consideration.

RECOMMENDATION 4

Provide future conditions flood risk products and information for riverine areas that include the impacts of: future development, land use change, erosion, and climate change, as actionable science becomes available.

Major elements are:

- Provide guidance and standards for the development of future conditions riverine flood risk products.
- Future land use change impacts on hydrology and hydraulics can and should be modeled with land use plans and projections, using current science and build upon existing model study methods where data are available and possible.
- Future land use should assume built-out floodplain fringe and take into account the decrease of storage and increase in discharge.
- No actionable science exists at the current time to address climate change impacts to watershed hydrology and hydraulics. If undertaken, interim efforts to incorporate climate change impacts in flood risk products and information should be based on existing methods, informed by historical trends, and incorporate uncertainty based upon sensitivity analyses.
- Where sufficient data and knowledge exist, incorporate future riverine erosion (channel migration) into flood risk products and information.



Recovery efforts in Sea Bright, NJ, 2013.

RECOMMENDATION 4 : SUB-RECOMMENDATIONS

Sub-Recommendation 4-7 FEMA should evaluate previously-issued guidance for future conditions land use and hydrology to incorporate best practices and lessons learned from communities that have implemented the guidance since 2001.
Timing: SHORT TERM

Sub-Recommendation 4-9 FEMA should determine long-term riverine erosion hazard areas for areas subject to high erosion and provided to the public in a digital layer.
Timing: SHORT TERM

Sub-Recommendation 4-10 FEMA should utilize a national standard for riverine erosion zone delineations that reflects geographic variability.
Timing: SHORT TERM

Sub-Recommendation 5-6 FEMA should take the impacts of future development and land use change on future conditions hydrology into account when computing future conditions for riverine areas.
Timing: SHORT TERM

RECOMMENDATION 4 : SUB-RECOMMENDATIONS

- | | |
|-----------------------------------|---|
| Sub-Recommendation
5-8 | FEMA should implement riverine erosion hazard mapping (channel migration zones), leveraging existing data, models, and approaches that reflect site-specific processes and conditions.
Timing: LONG TERM |
| Sub-Recommendation
5-15 | FEMA should use observed riverine trends to help estimate what future conditions might look like. In watersheds where floods of interest may decrease in magnitude and frequency, then use existing riverine study results as the basis for flood hazard mapping. In watersheds where floods exhibit increase in magnitude or frequency, then use best available science to determine future hydrology and flood hazards.
Timing: SHORT TERM |
| Sub-Recommendation
5-16 | FEMA should work with other Federal agencies via the Advisory Committee on Water Information's Subcommittee on Hydrology to produce a new method to estimate future riverine flood flow frequencies. This method should contain ways to consistently estimate future climate-impacted riverine floods and address the appropriate range of flood frequencies needed by the NFIP.
Timing: LONG TERM |
| Sub-Recommendation
5-17 | FEMA should produce, and should encourage communities to adopt, future conditions products to reduce flood risk.
Timing: SHORT TERM |



Flood dame in Nags Head, NC, 1999.

At the current time, available and actionable science does not support the development of a single, nationwide method for determining future riverine flood risk boundaries based on projected future changes to the watershed due to geomorphological or climate changes.

RECOMMENDATION 4 DISCUSSION

NON-REGULATORY FUTURE CONDITIONS flood risk products, tools, and information for riverine areas should include the impacts of future development, land use change, erosion, and climate change. This includes rivers that are influenced by coastal effects; Great Lakes tributaries; inland flooding sources, such as rivers, streams, and lakes; shallow flooding, such as sheet flow and ponding; and special hazards, such as areas subject to ice jams, alluvial fans, and other non-coastal special flood hazards. FEMA should encourage the adoption of future conditions products by communities to reduce flood risk. Changes in river morphology can impact future conditions flood hazard identification. Expansion of the floodplain, meandering, erosion and sedimentation, shifting riverbank stability, altered sediment supply, and underlying geologic influence can all have a significant impact on riverine flood levels and lateral migration. Therefore, FEMA should implement riverine erosion hazard mapping (channel migration zones), leveraging existing data, models, and approaches that reflect site-specific processes and conditions. For consistency, channel migration zones should conform to a national standard that allows for them to reflect regional variability.

The TMAC is aware that, at the current time, available and actionable science does not support the development of a single, nationwide method for determining future riverine flood risk boundaries based on projected future changes

to the watershed due to geomorphological or climate changes. Therefore, as outlined in Recommendations 6 and 7, FEMA should build on the current science, support research and innovation, and inform the process with best practices and lessons learned from demonstration projects.

Initially, FEMA should use observed riverine trends to help estimate what future conditions might look like: In watersheds where floods of interest may decrease in magnitude and frequency, then use existing riverine study results as the basis for flood hazard mapping; in watersheds where floods exhibit increase in magnitude or frequency, then use best available science to determine future hydrology and flood hazards.

In order to further the needed research in this area of science, FEMA should work with other Federal agencies via the Advisory Committee on Water Information's Subcommittee on Hydrology to produce a new method to estimate future riverine flood flow frequencies. This method should contain ways to consistently estimate future climate-impacted riverine floods and address the appropriate range of flood frequencies needed by the NFIP.

Before implementing new future flood risk products, tools, and information for riverine areas, FEMA should evaluate previously-issued guidance for future conditions land use and hydrology to incorporate best practices and lessons learned from communities that have implemented that guidance since 2001.

RECOMMENDATION 5

Generate future conditions data and information such that it may frame and communicate flood risk messages to more accurately reflect the future hazard in ways that are meaningful to and understandable by stakeholders. This should enable users to make better-informed decisions about reducing future flood-related losses.



Coastal Flood Recovery Project Meeting, Pensacola, FL, 2004.

RECOMMENDATION 5 : SUB-RECOMMENDATION

Sub-Recommendation 3-3 FEMA should frame future risk messages for future conditions data and information such that individuals will pay attention to the future flood risk. Messages may be tailored to different stakeholders as a function of their needs and concerns.
Timing: LONG TERM

RECOMMENDATION 5 DISCUSSION

ANY FUTURE CONDITIONS flood hazard products, tools, or information that FEMA generates are inherently risk communication products, because they will seek to communicate the risk associated with future conditions to stakeholders. Risk communication is a critical aspect of risk management. All concerned stakeholder groups, including the public, require accurate, easy-to understand information on the risks that communities face.

To illustrate this point, consider a flood with a 100-year return period. If property owners in a flood-prone area are told that there is a 1 in 100 chance of their home flooding in the coming year, they are likely to assume it will not occur and will treat the event as below their threshold level of concern. Had they been told that there is a greater than 1 in 5 chance of their home flooding over the next 25 years (the same probability with an extended time horizon to match a typical 30-year mortgage), they may have been more likely to pay attention and considered undertaking protective measures. Such framing of information on or with future conditions flood hazard products, tools, and information can help assure that individuals who are in harm's way recognize the hazards they face and their associated risks.

When designing products, tools, and information that are meant to communicate future flood hazards, FEMA should seek to recognize the systematic biases and simplified decision rules that individuals utilize in making choices under uncertainty. This recognition will allow FEMA to design better and more effective ways to illustrate and communicate future conditions flood hazard information.

Risk communication is a critical aspect of risk management with all stakeholder groups requiring accurate, easy-to understand information.

Informing residents that there is a greater than 1 in 5 chance of at least one flood occurring in their area over the next 25 years is more likely to get their attention than communicating this as a 1 in 100 chance in the coming year (the same probability).



Hurricane damage, Mississippi, 2005.

RECOMMENDATION 6

Perform demonstration projects to develop future conditions data for representative coastal and riverine areas across the Nation to evaluate the costs and benefits of different methodologies or identify/address methodological gaps that affect the creation of future conditions data.

RECOMMENDATION 6 : SUB-RECOMMENDATIONS

Sub-Recommendation 3-1	FEMA should perform a study to quantify the accuracies, degree of precision, and uncertainties associated with respect to flood studies and mapping products for existing and future conditions. This should include the costs and benefits associated with any recommendation leading to additional requirements for creating flood-related products. Timing: SHORT TERM
Sub-Recommendation 5-3	FEMA should conduct future conditions mapping pilots to continue to refine a process and methods for mapping and calculating future flood hazards, and capture and document best practices and lessons learned for each. Timing: SHORT TERM
Sub-Recommendation 5-14	FEMA should support research for future conditions coastal hazard mapping pilots and case studies using the latest published methods to determine the best means to balance the costs and benefits of increasing accuracy and decreasing uncertainty. Timing: SHORT TERM

RECOMMENDATION 6 DISCUSSION

FUTURE ADJUSTMENTS AND refinements will be needed in the estimation of future flood risk and the corresponding uncertainties as the population, land surface, and actionable science evolve.

Approximate or simplified methods to estimate future flood changes may be needed due to limitations in our ability to project land use and land cover changes, as well as other changes impacting future hydrologic conditions, such as climate change.

Therefore, the TMAC recommends that FEMA conduct future conditions mapping pilots or demonstration projects in order to continue to refine a process and methods for calculating and mapping future conditions flood hazards. FEMA should also capture and document best practices and lessons learned for each project as these should inform changes to the process, methodologies, and assumptions.

In addition, the cost of improving the accuracy and reducing uncertainties of the future conditions flood hazard products, tools, and information needs to be compared with the benefits so that future studies can be budgeted

and prioritized appropriately. Therefore, FEMA should support research for future conditions coastal hazard mapping pilots and case studies using the latest published methods to determine the best means to achieve this balance between costs and benefits.



Flood risk education in Wimberley, TX, undated.



Urban Search and Rescue Team in Virginia, 2015.

RECOMMENDATION 7

Data and analysis used for future conditions flood risk information and products should be consistent with standardized data and analysis used to determine existing conditions flood risk, but also should include additional future conditions data, such as climate data, sea level rise information, long-term erosion data; and develop scenarios that consider land use plans, planned restoration projects, and planned civil works projects, as appropriate, that would impact future flood risk.



Elevated homes in Stratford, CT, 2012.

RECOMMENDATION 7 : SUB-RECOMMENDATIONS

Sub-Recommendation 4-2 FEMA should support expanded research and innovation for water data collection, for example using Doppler radar.

Timing: SHORT TERM

Sub-Recommendation 4-3 FEMA should use a scenario approach to evaluate the impacts of future flood control projects on future conditions flood hazards.

Timing: SHORT TERM

Sub-Recommendation 4-5 FEMA should support research on future conditions land use effects on future conditions hydrology and hydraulics.

Timing: SHORT TERM

Sub-Recommendation 4-12 FEMA should develop guidance for evaluating locally-developed data from States and communities to determine if it is an improvement over similarly-available national datasets and could be used for future conditions flood hazard analyses.

Timing: SHORT TERM

Sub-Recommendation 4-13 FEMA should develop better flood risk assessment tools to evaluate future risk, both population-driven and climate-driven. Improve integration of hazard and loss estimation models (such as Hazus) with land use planning software designed to analyze and visualize development alternatives, scenarios, and potential impacts to increase use in local land use planning.

Timing: LONG TERM

Sub-Recommendation 5-1 Future flood hazard calculation and mapping methods and standards should be updated periodically as we learn more through observations and modeling of land surface and climate change, and as actionable science evolves.

Timing: SHORT TERM

RECOMMENDATION 7 DISCUSSION

THE TMAC RECOMMENDS that FEMA build on the current flood hazard identification process and methods as a starting point for providing future conditions flood hazard products, tools, and information. Calculating and mapping future conditions can be accomplished by using the existing FEMA modeling framework, but requires additional information and data about future natural and manmade changes. Using future conditions data requires a different approach that must account for a potential future that is not based on the past. In other words, the rules of stationarity (i.e., the assumption that data and processes do not change over time), upon which existing conditions mapping is based, will no longer be valid. Non-stationarity (i.e., the assumption that data and processes will change over time) must be taken into account. Incorporating non-stationarity into the existing modeling framework requires different approaches that deal with future uncertainty (e.g., future manmade actions and changing natural systems, such as climate change and sea level rise).

In addition, FEMA should support and utilize research and technology that will assist in our understanding of future conditions flood hazards, and develop a process and associated guidance for evaluating locally-developed data from States,

tribes, and communities to determine if it is an improvement over similarly-available national datasets and could be, therefore, be used for future conditions flood hazard analyses.

FEMA should develop better flood risk assessment tools to evaluate future risk, both population-driven and climate-driven. Improve integration of hazard and loss estimation models (such as Hazus) with land use planning software designed to analyze and visualize development alternatives, scenarios, and potential impacts to increase use in local land use planning.

As noted in Recommendation 1, FEMA should use a scenario approach to future conditions flood hazard products, tools, and information. A scenario approach allows users to evaluate land use plans, planned restoration projects, and planned civil works projects (e.g., transportation, navigation, infrastructure, flood control), as appropriate, that could impact future flood risk.

Finally, future conditions flood hazard calculation and mapping methods and standards should also be updated periodically as we learn more through observations and modeling of land surface and climate change, as actionable science evolves, and through the pilot projects outlined in Recommendation 6.



Damage caused by storm surge, Jersey City, NJ, 2012.

CONSIDERATIONS FOR FUTURE STUDY

The scope of the report is to identify how future conditions should be incorporated into the floodplain analysis from a technical basis. The following are some of the issues that need to be considered if future conditions data (or components) are added nationally to the program. These are further explored in Section 6.

Issue	Description
1. Risk-based information	People will be more accurately informed if they are provided with information on the insurance premium that reflects their flood-related risk.
2. Base regulatory conditions	Consider whether and how future conditions information could be used for regulatory purposes.
3. Properties impacted by coastal shoreline change and riverine erosion	Develop a more complete understanding of the impact of future conditions if future conditions become regulatory products at the Federal level.
4. Rate of Future Change Implications	Consider rates of future conditions changes and determine appropriate planning time horizons.
5. Maintenance of Future Conditions Maps	Consider the cost of adding and maintaining future conditions maps.
6. Future Conditions Implication to Mitigation Grants	Consider how future conditions should be linked to mitigation grants in order to reduce future losses.
7. Future Conditions Roll-Out	Consider how future conditions data will be released to stakeholders.
8. Public's Perception of Safety	Can future conditions data be used to improve the public's understanding of flood risk?
9. Flood Control Structures	Consider how flood control structures should be incorporated into future conditions hazard data and information.
10. Implications of the Federal Flood Risk Management Standard	Changes in future conditions mapping should be consistent with the options for meeting the Federal Flood Risk Management Standard.
11. Types of Future Condition Changes	Should land development changes be separated from climate changes in future conditions data and information?
12. Floodplain Management and Community Rating System Modifications to Support Future Conditions	How might floodplain management regulations and the Community Rating System be modified to support future conditions?

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1 Introduction

The Technical Mapping Advisory Council (TMAC or Council) is a Federal advisory committee established to review and make recommendations to the Federal Emergency Management Agency (FEMA) on matters related to the national flood mapping program. Section 1 provides the TMAC's statutory authorization and requirements, a description of the TMAC, and the 2015 members.

1.1 Purpose

The purpose of this report is to provide FEMA recommendations for incorporating the best available climate science and using the best available methodologies when considering the impacts of sea level rise and future development on flood risk.

1.2 Congressional Charter

Pursuant to the *Biggert-Waters Flood Insurance Reform Act of 2012*, as amended (BW-12) (42 U.S.C. §§ 4001–4130), the charter filed with Congress on July 29, 2013, formally established the TMAC. The TMAC was established in accordance with and operates under the provisions of the *Federal Advisory Committee Act of 1972*, as amended (FACA) (5 U.S.C. App 2).

The TMAC Charter outlines the principles and functions of the Council, including the objectives and scope of TMAC activities, description of duties, member composition, frequency of meetings, and other pertinent items relating to the Council's establishment and operation (see Appendix A).

1.3 TMAC Responsibilities

The TMAC provides advice and recommendations to the Administrator of FEMA to improve the preparation of Flood Insurance Rate Maps (FIRM) and flood hazard information. Among its specified statutory responsibilities, the TMAC examines performance metrics, standards and guidelines, map maintenance activities, delegation of mapping activities to State and local mapping partners, interagency coordination and leveraging, and other requirements mandated by the authorizing BW-12 legislation.

The TMAC Bylaws establish and describe rules of conduct, regulations, and procedures regarding Council membership and operation (see Appendix B).

1.4 TMAC Duties

The TMAC's duties as mandated by BW-12 are as follows:

- (1) Recommend to the Administrator how to improve in a cost-effective manner the:
 - (A) accuracy, general quality, ease of use, and distribution and dissemination of flood insurance rate maps and risk data; and
 - (B) performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States;

- (2) Recommend to the Administrator mapping standards and guidelines for:
 - (A) flood insurance rate maps; and
 - (B) data accuracy, data quality, data currency, and data eligibility;
- (3) Recommend to the Administrator how to maintain, on an ongoing basis, FIRMs and flood risk identification;
- (4) Recommend procedures for delegating mapping activities to State and local mapping partners;
- (5) Recommend to the Administrator and other Federal agencies participating in the Council:
 - (A) methods for improving interagency and intergovernmental coordination on flood mapping and flood risk determination; and
 - (B) a funding strategy to leverage and coordinate budgets and expenditures across Federal agencies; and
- (6) Submit an annual report to the Administrator that contains:
 - (A) a description of the activities of the Council;
 - (B) an evaluation of the status and performance of flood insurance rate maps and mapping activities to revise and update flood insurance rate maps, as required under section 4101b of this title; and
 - (C) a summary of recommendations made by the Council to the Administrator (42 U.S.C. § 4101a(c))

BIGGERT-WATERS 2012 MANDATE SECTION 100215(d)

The Council shall consult with scientists and technical experts, other Federal agencies, States, and local communities to—

- (A) Develop recommendations on how to—
 - (i) Ensure that flood insurance rate maps incorporate the best available climate science to assess flood risks; and
 - (ii) Ensure that the Federal Emergency Management Agency uses the best available methodology to consider the impact of—
 - (I) The rise in the sea level; and
 - (II) Future development on flood risk; and
- (B) Not later than 1 year after the date of enactment of this Act, prepare written recommendations in a future conditions risk assessment and modeling report and to submit such recommendations to the Administrator.

The TMAC is also required by BW-12 to provide recommendations to FEMA on incorporating the best available climate science in flood insurance studies and maps, and using the best available methodology when considering the impacts of sea level rise (SLR) and future development on flood risk (the legislative language is located in the text box to the left). This is the focus of this report.

1.5 TMAC Creation and Composition

Since the National Flood Insurance Program's (NFIP's) inception in 1968 under the *National Flood Insurance Act of 1968*, as amended (42 U.S.C. §§ 4001–4129), Congress has enacted additional legislation to encourage community participation in the national flood mapping program, strengthen the flood insurance purchase requirement, and address other priorities. BW-12 sought to make the program more financially sound,

directing FEMA to raise flood insurance rates to reflect true flood risk and implement other changes. The TMAC was originally established under the *National Flood Insurance Reform Act of 1994*, as amended (42 U.S.C. §§ 4001 et seq.), for a term of 5 years. In 2012, BW-12 directed FEMA to re-establish the TMAC.

Current TMAC members were appointed based on their demonstrated knowledge and competence regarding surveying, cartography, remote sensing, Geographic Information Systems (GIS), or the technical aspects of preparing and using FIRMs. In addition, the legislation requires that the TMAC's membership have to the maximum extent practicable a balance of Federal, State, local, tribal, and private members, and include geographic diversity, including representation from areas with coastline on the Gulf of Mexico and other States containing areas identified by the Administrator as at high risk for flooding or as areas having special flood hazards.

Per FACA requirements, FEMA solicited TMAC nominations through various professional organizations and a public submission process that was published in the *Federal Register*. To establish the TMAC as a Federal advisory committee, the FEMA Administrator selected the most qualified candidates in each membership category, ensuring that, together, the nominees provided a balance of geographically diverse professional opinions from a mix of State, local, and private- sector organizations. Following a rigorous vetting process, FEMA announced the membership and establishment of the Council in July 2014.

TMAC members serve 1- or 2-year terms, at the discretion of the Administrator, to allow refresh and ensure that the required expertise is represented. The FEMA Administrator or designee may reappoint serving members for additional 1- or 2-year periods. When new members must be appointed, the same process that was used to appoint members in 2014 will be followed. When the TMAC terminates, all TMAC appointments will also terminate.

The 2015 TMAC members, subcommittee members, and Designated Federal Officers are listed below. See Section 1.8 for information on the TMAC subcommittees.

2015 TMAC Members

Mr. John Dorman, CFM, Chair

Assistant State Emergency Management Director for Risk Management, North Carolina Emergency Management

BW-12 TMAC Membership Requirement

State Cooperating Technical Partner Representative

TMAC Member Role

Chair; Annual Report Subcommittee Member

Mr. Scott Edelman, P.E., Vice-Chair

Senior Vice President, North America AECOM Water Resources

BW-12 TMAC Membership Requirement

Mapping Member (recommended by Management Association for Private Photogrammetric Surveyors)

TMAC Member Role

Vice-Chair; Future Conditions Subcommittee Chair

Mr. Doug Bellomo, P.E., CFM

Senior Technical Advisor, U.S. Army Corps of Engineers

BW-12 TMAC Membership Requirement

Federal Emergency Management Agency Designee

TMAC Member Role

Member through May 2015; Annual Report

Subcommittee Member

Ms. Juliana Blackwell

Director, National Geodetic Survey, National Oceanic and Atmospheric Administration

BW-12 TMAC Membership Requirement

National Oceanic and Atmospheric Administration / Commerce for Oceans and Atmosphere Designee

TMAC Member Role

Annual Report Subcommittee Member; Future

Conditions Subcommittee Member

Ms. Nancy Blyler

Lead, Geospatial Community of Practice, U.S. Army Corps of Engineers

BW-12 TMAC Membership Requirement

U.S. Army Corps of Engineers Designee

TMAC Member Role

Annual Report Subcommittee Member; Future

Conditions Subcommittee Member

Mr. Richard Butgereit, GISP

GIS Administrator, Florida Division of Emergency Management

BW-12 TMAC Membership Requirement

State Geographic Information System Representative

TMAC Member Role

Annual Report Subcommittee Member

Mr. Mark DeMulder

Director, U.S. Geological Survey National Geospatial Program (Ret.)

BW-12 TMAC Membership Requirement

U.S. Geological Survey Representative

TMAC Member Role

Annual Report Subcommittee Member

Ms. Leslie Durham, P.E.

Floodplain Management Branch Chief, Office of Water Resources, Alabama Department of Economic and Community Affairs

BW-12 TMAC Membership Requirement

State Cooperating Technical Partner Representative

TMAC Member Role

Annual Report Subcommittee Chair

Mr. Steve Ferryman, CFM

Mitigation and Recovery Branch Chief, Ohio Emergency Management Agency

BW-12 TMAC Membership Requirement

State Mitigation Officer

TMAC Member Role

Future Conditions Subcommittee Member

Mr. Gale Wm. Fraser, II, P.E.

General Manager and Chief Engineer, Clark County (Nevada) Regional Flood Control District

BW-12 TMAC Membership Requirement

Regional Flood and Stormwater Member (recommended by National Association of Flood and Stormwater Management Agencies)

TMAC Member Role

Annual Report Subcommittee Member

Ms. Carrie Grassi

Deputy Director for Planning, New York City Mayor's Office of Recovery and Resiliency

BW-12 TMAC Membership Requirement

Local Cooperating Technical Partner Representative

TMAC Member Role

Future Conditions Subcommittee Member

Mr. Christopher P. Jones, P.E.

Registered Professional Engineer

BW-12 TMAC Membership Requirement

Engineering Member (recommended by the American Society of Civil Engineers)

TMAC Member Role

Annual Report Subcommittee Member; Future

Conditions Subcommittee Member

2015 TMAC Members (cont.)

Dr. Howard Kunreuther

James G. Dinan Professor of Decision Sciences and Public Policy, Wharton School, University of Pennsylvania

BW-12 TMAC Membership Requirement

Risk Management Member (recommended by the Society for Risk Analysis)

TMAC Member Role

Future Conditions Subcommittee Member

Ms. Wendy Lathrop, PLS, CFM

President and Owner, Cadastral Consulting, LLC

BW-12 TMAC Membership Requirement

Surveying Member (recommended by the National Society of Professional Surveyors)

TMAC Member Role

Annual Report Subcommittee Member

Mr. David Mallory, P.E., CFM

Program Manager, Floodplain Management Program, Urban Drainage and Flood Control District, Denver, Colorado

BW-12 TMAC Membership Requirement

Local Cooperating Technical Partner Representative

TMAC Member Role

Future Conditions Subcommittee Member

Mr. Robert Mason

Chief, Office of Surface Water, Department of Interior, U.S. Geological Survey

BW-12 TMAC Membership Requirement

Department of the Interior Designee

TMAC Member Role

Annual Report Subcommittee Member

Ms. Sally Ann McConkey, P.E., CFM, D. WRE

Illinois State Water Survey Prairie Research Institute, University of Illinois

BW-12 TMAC Membership Requirement

State Floodplain Management Member (recommended by Association of State Floodplain Managers)

TMAC Member Role

Annual Report Subcommittee Member

Mr. Luis Rodriguez, P.E.

Branch Chief, Engineering Management Branch, Federal Insurance and Mitigation Administration, FEMA

BW-12 TMAC Membership Requirement

Federal Emergency Management Agency Designee

TMAC Member Role

TMAC Member (beginning May 2015); Annual Report Subcommittee Member

Mr. Javier E. Ruiz

Acting Director, National Geospatial Center of Excellence, Natural Resources Conservation Service

BW-12 TMAC Membership Requirement

U.S. Department of Agriculture Designee

TMAC Member Role

Future Conditions Subcommittee Member

Ms. Christine Shirley, CFM

National Flood Insurance Program Coordinator, Oregon Department of Land Conservation and Development

BW-12 TMAC Membership Requirement

National Flood Insurance Coordination Office Representative

TMAC Member Role

Future Conditions Subcommittee Member

Ms. Cheryl Small

President, Small Consulting LLC

BW-12 TMAC Membership Requirement

Flood Hazard Determination Firm Member

(Recommended by National Flood Hazard Determination Association)

TMAC Member Role

Annual Report Subcommittee Member

Additional 2015 TMAC Subcommittee Members

Ms. Laura Algeo, P.E., CFM

Program Specialist, FEMA

TMAC Member Role

Annual Report Subcommittee Member

Mr. Kenneth W. Ashe, P.E., PMP, CFM

Senior Associate Engineer, Amec Foster Wheeler Environment & Infrastructure, Inc.

TMAC Member Role

Annual Report Subcommittee Member

Mr. Dwayne Bourgeois, P.E.

Executive Director, North Lafourche Conservation, Levee and Drainage District

TMAC Member Role

Annual Report Subcommittee Member

Dr. Maria Honeycutt, CFM

Coastal Hazards Specialist, National Oceanic and Atmospheric Administration

TMAC Member Role

Annual Report Subcommittee Member

Mr. Douglas Marcy

Coastal Hazards Specialist, National Oceanic and Atmospheric Administration

TMAC Member Role

Future Conditions Subcommittee Member

Additional 2015 TMAC Subcommittee Members (cont.)

Mr. Andy Neal

Actuary, FEMA

TMAC Member Role

Future Conditions Subcommittee Member

Mr. Patrick Sacbibit, P.E.

Program Specialist, Federal Emergency Management Agency

TMAC Member Role

Annual Report Subcommittee Member

Mr. Jonathan Westcott, P.E.

Coastal Hazards Specialist, Federal Emergency Management Agency

TMAC Member Role

Future Conditions Subcommittee Member

Dr. Kathleen D. White, P.E.

Lead, Climate Preparedness and Resilience, Community of Practice, U.S. Army Corps of Engineers, Institute for Water Resources

TMAC Member Role

Future Conditions Subcommittee Member

TMAC Designated Federal Officers

Mr. Mark Crowell

Physical Scientist, FEMA

TMAC Member Role

TMAC Designated Federal Officer

Future Conditions Subcommittee Member

Ms. Kathleen Boyer

Program Specialist, FEMA

TMAC Member Role

TMAC Alternate Designated Federal Officer

Mr. Michael Godesky, P.E.

Physical Scientist, FEMA

TMAC Member Role

TMAC Alternate Designated Federal Officer

1.6 TMAC Mission and Guiding Principles

The TMAC's mission is to provide counsel to FEMA on strategies and actions that will efficiently and effectively advance the identification, assessment, and management of flood hazards and risk.

The TMAC believes the following guiding principles should underpin the future of the national flood mapping program:

- Credible products
- Efficient implementation
- Stakeholder acceptance
- Effective leveraging
- Financial stability

1.7 TMAC Program Vision and Goals

The TMAC believes the following statement reflects an appropriate end-state vision for the national flood mapping program:

A Nation more resilient to flood hazards through the effective identification and communication of flood hazards and risk.

Toward this end-state vision, the TMAC believes the following goals and subsequent recommendations should be established and monitored:

- Goal 1 Accurate, comprehensive data, models, displays, and risk assessments associated with present and future flood hazards
- Goal 2 Time- and cost-efficient generation and process management of flood hazard risk data, models, assessments, and displays
- Goal 3 Effective utilization of efficient technologies for the acquisition, storage, generation, display, and communication of data, models, displays, and risk
- Goal 4 Integrated flood risk management framework of hazard identification, risk assessment, mitigation, and monitoring
- Goal 5 Strong confidence, understanding, awareness, and acceptance of flood hazard and risk data, models, displays, assessments, and process by the public and program stakeholders
- Goal 6 Robust added-value coordination, leveraging and partnering with local, State, Federal, and private sector organizations
- Goal 7 Permanent, substantial funding that supports all program resource requirements

1.8 Activities of the TMAC

As a Federal advisory committee, the TMAC open business meetings are announced to the public in a notice published in the *Federal Register* (<https://www.federalregister.gov/>). The notices included meeting details, the agenda, general information, and direction to the public website (www.fema.gov/tmac) where interested parties can obtain certified public meeting summaries. These materials are made available for the public comment period 15 days prior to each TMAC meeting.

To facilitate public participation, members of the public were invited to provide written comments on the issues to be considered by the TMAC prior to the meetings. In addition, the public was given an opportunity to provide oral comments during designated public comment periods at each meeting.

The TMAC conducted seven in-person public meetings and two virtual public meetings between September 2014 and October 2015 that were guided by the TMAC's mission (see Section 1.5) and vision (see Section 1.6) and were in accordance with the requirements mandated under BW-12 and the *Homeowner Flood Insurance Affordability Act of 2014* (HFIAA) (Public Law 113–89, 128 Stat. 1021–22).

The business objectives that were achieved in the TMAC meetings from September 2014 through October 2015 were as follows:

- Nominate, deliberate, and vote on the TMAC Chair
- Develop the TMAC vision and mission statement
- Form the subcommittees
- Research topics in the form of subject matter expert (SME) briefings
- Produce two reports required by BW-12 and HFIAA:
 - *Future Conditions Flood Risk Assessment and Modeling Report* containing recommendations for future conditions risk assessment and modeling
 - *2015 Annual Report* containing recommendations to improve the effectiveness of the national flood mapping program and products

The TMAC also established three subcommittees: the Future Conditions Subcommittee; Flood Hazard and Risk Generation Subcommittee; and Operations, Coordination, and Leveraging Subcommittee. In March 2015, the Flood Hazard and Risk Generation Subcommittee and the Operations, Coordination, and Leveraging Subcommittee were combined into the Annual Report Subcommittee. The subcommittees presented their work at TMAC meetings.

The purpose of the subcommittees was as follows:

- Future Conditions Subcommittee – Consult with scientists, technical experts, other Federal agencies, States, and local communities to develop recommendations on how to ensure that FIRMs incorporate the best available climate science to assess flood risks and that FEMA uses the best available methodology to consider the impacts of the rise in sea level and future development on flood risk.
- Flood Hazard and Risk Generation Subcommittee – Recommend the following to the Administrator:
 - How to improve in a cost-effective manner the accuracy, general quality, ease of use, and distribution and dissemination of FIRMs and risk data
 - Improve in a cost-effective manner the performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States
 - Map standards and guidelines for FIRMs
 - Map standards and guidelines for data accuracy, data quality, and data eligibility
- Operations, Coordination, and Leveraging Subcommittee:

- Recommend to the Administrator how to maintain FIRMs and flood risk identification on an ongoing basis
- Recommend to the Administrator and other Federal agencies a funding strategy to leverage and coordinate budgets and expenditures across Federal agencies
- Recommend to the Administrator and other Federal agencies how to delegate mapping activities to State and local mapping partners
- Recommend to the Administrator and other Federal agencies participating on the Council methods for improving interagency and intergovernmental coordination on flood mapping and flood risk assessment

A summary of the TMAC meetings and meeting activities is shown in Appendix D.

1.9 Presentations/Research/Subject Matter Experts

As part of the TMAC and subcommittee agendas, SMEs were invited to TMAC and subcommittee meetings to present information that was critical to achieving the TMAC's objectives and producing the required reports. Although some presentations were organized by subcommittees, they were all open to all TMAC members. The presentations are listed in Appendix E.

2 Background

Section 2 provides background information on the NFIP, Flood Insurance Studies (FIS) and maps, flood zones, and current policies and practices regarding future conditions flood risk and mapping. This section also provides a brief history of SLR and how long-term erosion is accounted for in the program.

1.1 National Flood Insurance Program

FEMA administers the NFIP through the Federal Insurance and Mitigation Administration (FIMA). Created with the passage of the *National Flood Insurance Act of 1968*, the NFIP is an insurance, mapping, and floodplain management program that makes Federally-backed flood insurance available to home and business owners and renters in the more than 22,000 communities that participate in the program.

The NFIP comprises three central interconnected activities:

- **Flood insurance** – Making flood insurance available to help property owners recover following a flood
- **Floodplain management** – Minimizing the economic impact of flood events using a combination of mitigation efforts and community-adopted floodplain ordinances
- **Floodplain identification and mapping** – Identifying and mapping community areas that are subject to flooding

These activities are supported by the production of FISs and FIRMs based on engineering evaluations of the flood hazards in each community.

2.1 Flood Insurance Studies and Maps

FISs are prepared to determine the elevation and spatial extent of the 1-percent-annual-chance flood, which defines the water surface elevations that have a 1-percent chance of being equaled or exceeded during any given year, as well as other frequency events. The 1-percent-annual-chance water surface elevations are termed Base Flood Elevations (BFE) and are referenced to the National Geodetic Vertical Datum of 1929 (NGVD29), the North American Vertical Datum of 1988 (NAVD88), or a local datum where NGVD29 and NAVD88 are not available.¹

Areas subject to 1-percent-annual chance flooding are termed Special Flood Hazard Areas (SFHAs). If a structure is located in an SFHA, owners carrying Federally-backed mortgages and owners receiving FEMA grant funding are required to purchase flood insurance if the community participates in the NFIP. The boundaries and lateral extent of the SFHAs and other flood zones are established when the BFEs are overlain on topographic data. This information is then used to produce FIRMs, which depict the horizontal extent of SFHAs (and other flood hazard boundaries) and associated BFEs.

In 1997, FEMA developed a plan to modernize the mapping inventory from paper maps to a digital product. As part of a map modernization effort, FEMA has been producing updated FIRMs using digital methods. These georeferenced, modernized and, generally, more accurate FIRMs are published as cartographic map products and as digital geospatial data in the National Flood Hazard Layer.²

¹ FEMA's current policy is to ensure that all new updated maps are referenced to NAVD88 where it is available.

² Crowell, et al., 2013.

2.1.1.1 Flood Zones

FIRMs depict various flood hazard areas, or flood zones, that are determined in a variety of ways. It is important to understand that flood risk and, therefore, the flood zones depicted on a FIRM, can change over time due to manmade and natural changes in floodplains that impact the flood hazard. The flood zones are described below.

2.1.1.2 High Flood Risk Areas

In communities that participate in the NFIP, mandatory flood insurance requirements apply to all flood zones in high flood risk areas. These flood zones are known as SFHAs. Riverine SFHAs are defined in Table 2-1, and coastal SFHAs are defined in Table 2-2.

Table 2-1: Flood Zones in High Flood Risk Riverine Areas (Riverine SFHAs)

Zone(s)	Description
A	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
AE, A1-30	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. BFEs are shown. Mandatory flood insurance requirements and floodplain management standards apply. In general, AE is used on newer FIRMs, whereas Zones A1-30 were used on older Flood Insurance Rate Maps (approximately 1989 and older).
AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. BFEs derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. Some Zone AO areas have been designated in areas with high flood velocities, such as alluvial fans and washes. Communities are encouraged to adopt more restrictive requirements for these areas.
AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection. Mandatory flood insurance purchase requirements and floodplain management standards apply.
A99	Areas subject to inundation by the 1-percent-annual-chance flood event but that will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system such as dikes, dams, and levees to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No BFEs or depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Table 2-2: Flood Zones in High Flood Risk Coastal Areas (Coastal SFHAs)

Zone(s)	Description
V	Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone(s)	Description
VE, V1-30	Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. In general, Zone VE is used on newer FIRMs, whereas Zones V1–30 were used on older FIRMs (approximately 1989 and older).
A	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate coastal flood methods. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
AE, A1-30	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using detail coastal flood models. BFEs are shown. Mandatory flood insurance requirements and floodplain management standards apply.
AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on the landward side of a dune or barrier subject to wave overtopping). Average depths in coastal A zones are between 1 and 3 feet. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Most riverine SFHAs are categorized as Zone AE, Zones A1–30, or Zone A and are determined using hydrologic and hydraulic models or analysis procedures designed for riverine flood analyses. Storm surge or tide gauge analyses and wave studies are used to determine Zone As in coastal areas. Collectively, these zones are referred to as Zone As.³

COASTAL A ZONE

The term “Coastal A Zone” has been used to refer to both (1) Zone As determined using coastal flood models and (2) the area between the landward extent of Zone VE and the Limit of Moderate Wave Action (LiMWA), commonly referred to as CAZ.

Coastal A Zone (CAZ) is not a regulatory flood zone, but a specific term tied to the LiMWA and referenced by FEMA building science and building codes and standards. Building codes and standards apply Zone V design and construction requirements in the CAZ. CAZ also is recognized by the CRS program.

Coastal SFHAs categorized as Zone VE, Zones V1–30, or Zone V indicate flood hazard areas that are subject to high velocity wave action.

Coastal high flood risk areas are more hazardous than riverine high flood risk areas because wave effects can cause structural damage to buildings that would otherwise remain intact following inundation only.

³ In this report, the term “Zone As” refers to any zone that begins with the letter A (A, A1–30, AE, AH, AO, AR, A99).

Consequently, NFIP floodplain management and construction requirements are more stringent (see Figure 2-1) and flood insurance premium rates are much higher in Zone Vs.⁴ Building codes and standards extend Zone V design and construction requirements to Coastal A Zones subject to wave heights between 1.5 and 3 feet (see Figure 2-2).

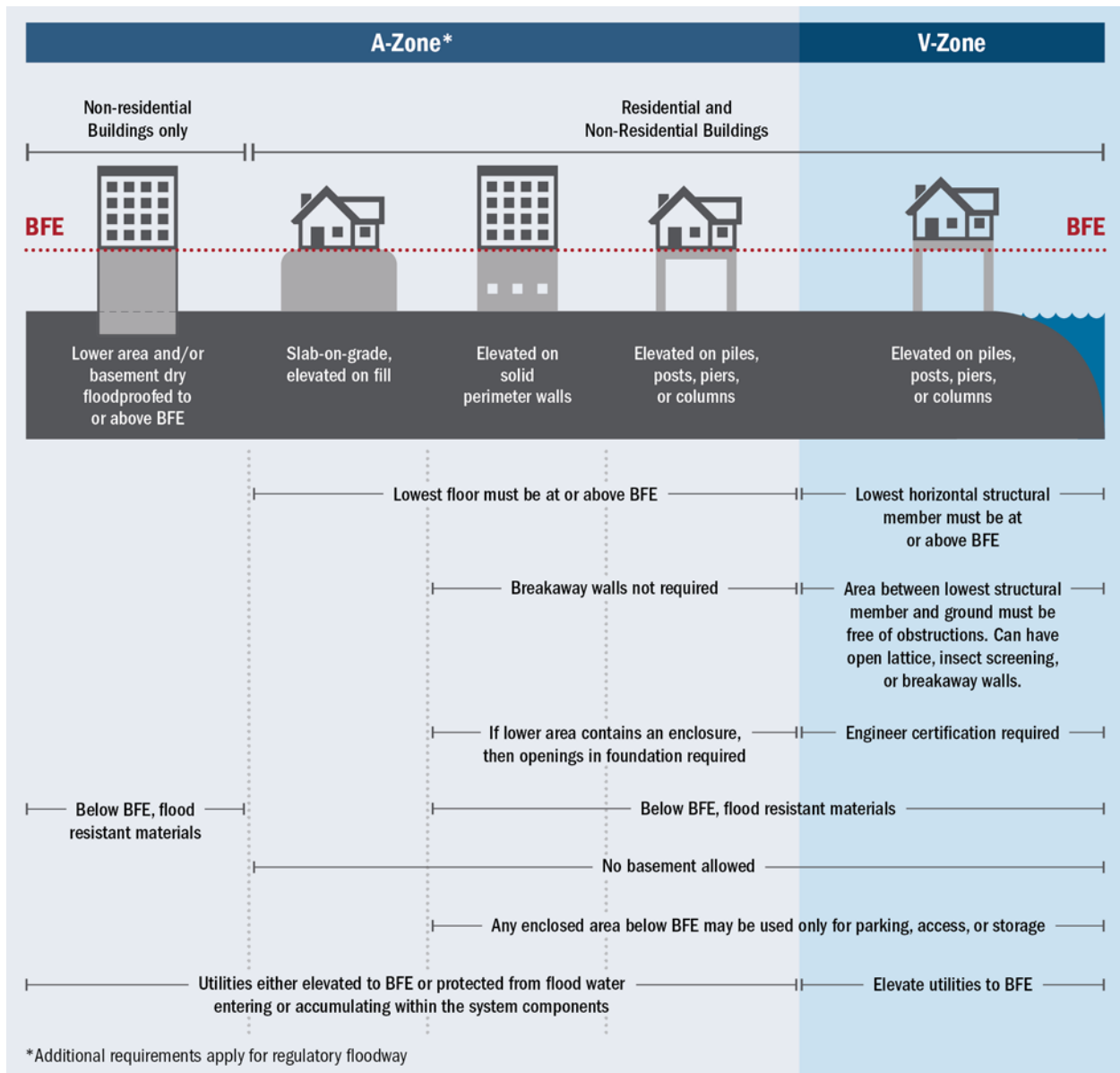


Figure 2-1: Summary of current minimum NFIP building requirements⁵

⁴ In this report, the term "Zone Vs" refers to any zone that begins with the letter V (V, V1-30, VE).

⁵ Crowell, et al., 2013

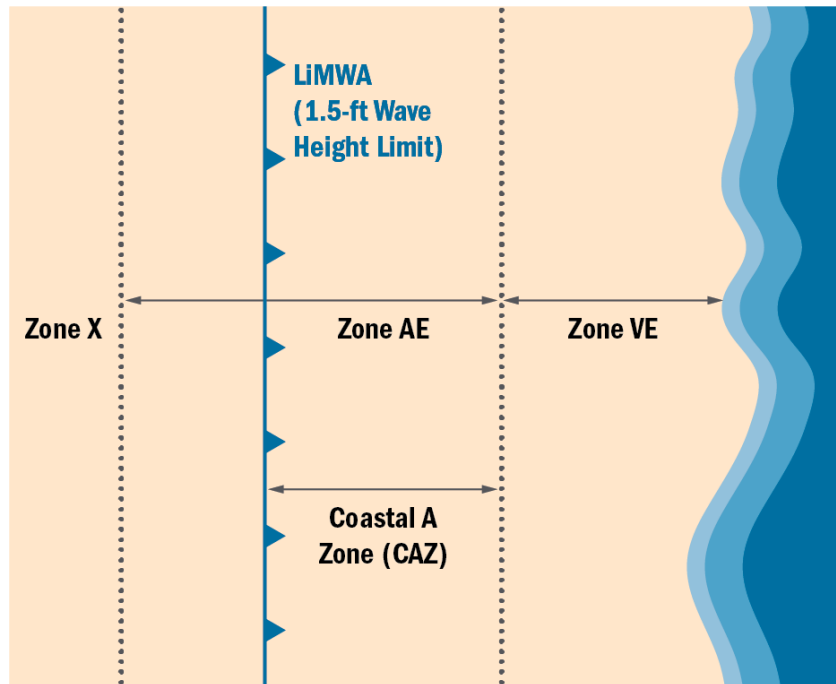


Figure 2-2: Coastal A Zone relationship to flood zones⁶

2.1.1.3 Moderate-to-Low Flood Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in moderate-to-low flood risk areas. Moderate-to-low flood risk areas are not considered to be within the SFHA because the area has less than a 1-percent-annual-chance flood hazard or the 1-percent-annual-chance flood depth is less than 1 foot. While purchasing flood insurance in these areas is encouraged, there is no Federally-mandated requirement to do so. The flood zones in the moderate-to-low flood risk area are defined in Table 2-3.

Table 2-3: Flood Zones in Moderate-to-Low Flood Risk Areas

Zone(s)	Description
B and X (shaded)	Areas subject to inundation by the 0.2-percent-annual-chance flood event; areas subject to inundation by the 1-percent-annual-chance flood event with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by accredited levees. Flood insurance is not Federally mandated, but lenders can require the purchase of flood insurance in these areas. No minimum Federal floodplain management standards apply.
C and X (unshaded)	Areas determined to be outside the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains. Flood insurance is not Federally mandated, but lenders can require the purchase of flood insurance in these areas. No minimum Federal floodplain management standards apply.

⁶ Crowell et al., 2013.

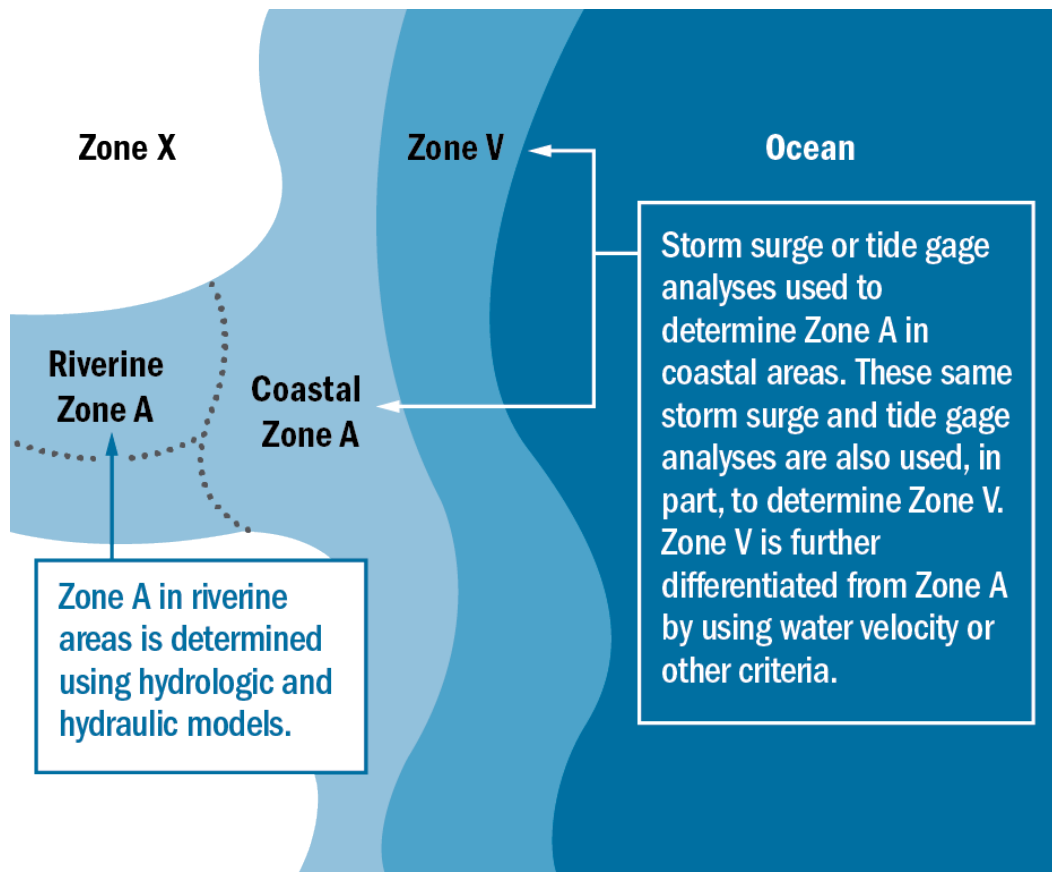


Figure 2-3: Relationship between riverine Zone A, coastal Zone A, Zone V, and Zone X7

2.1.1.4 Undetermined Flood Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in undermined flood risk areas. While purchasing flood insurance in these areas is encouraged, there is no Federally mandated requirement to do so. The flood zone used for areas of undetermined flood risk is defined in Table 2-4.

Table 2-4: Flood Zone for Undetermined Flood Risk Areas

Zone	Description
D	Areas where there are possible but undetermined flood hazards. This zone designation is used for areas where no analysis of flood hazards have been conducted, in sparsely populated areas, and some areas protected by non-accredited levees. Flood insurance is not Federally mandated, but lenders can require the purchase of flood insurance in these areas. No minimum Federal floodplain management standards apply.

2.2 Future Conditions: Current Policy

The NFIP generally does not consider future conditions hydrology or hydraulics for the identification of SFHAs, where the minimum development standards of the program apply. Current mapping practice is to

7 Adapted from Crowell, et al., 2013.

apply historical climate information to existing topography and development conditions. Minor adjustments can be made to the application of historical data, but current FIRMs do not predict or project future flood hazards based on future climate and sea level.

At present, the most direct consideration of future conditions in the NFIP involves: (1) the Community Rating System (CRS), a voluntary floodplain management incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements; (2) insurance premiums, where flood insurance premium rate setting considers future conditions-based actuarial loading; and (3) mapping future conditions for informational purposes, where communities may use future conditions hydrology, resulting from land use development, for (with respect to the NFIP) non-regulatory mapping purposes.

2.2.1 Community Rating System

The CRS was implemented as a voluntary program for recognizing and encouraging community floodplain management activities exceeding the minimum NFIP standards. Communities can accrue points to improve its CRS rating and receive increasingly higher insurance discounts for property owners. In particular, points can be accrued for certain future conditions activities undertaken by local communities. For example, credit points can be provided for communities that demonstrate that:

- They have programs that minimize increases in future flooding
- They use regulatory flood elevations in the Zone V, VE, V1-30, and coastal Zone A areas that reflect future conditions, including SLR
- The community's regulatory map is based on future conditions hydrology, including SLR;
- The community's stormwater program regulates runoff from future development
- They have flood hazard assessment and problem analyses that address areas likely to flood, and flood problems that are likely to get worse in the future, including: (1) changes in floodplain development and demographics, (2) development in the watershed, and (3) climate change or SLR

2.2.2 Insurance Premiums

Fundamental insurance principals dictate that actuarially-based insurance policies should be priced to account for all of the expected costs associated with the transfer of risk. Most NFIP policies, as with most homeowner's policies, have a one-year policy term; thus, the premium is based on the current risk within that term and is not be based on expected increases or decreases in risk beyond the policy term.⁸

Nonetheless, NFIP insurance premiums include an explicit load for long-term erosion, while other climate conditions, including SLR, and future development are addressed minimally as one of many uncertainties in a general contingency load.

⁸ Because NFIP policies are only for a one-year term, an understanding of current conditions risk would be necessary for setting current rates. However, estimates of future conditions risk could also be necessary if analyses of current risk do not adequately capture the effect of future changes in risk. For example, if mean sea level relative to ground elevation is increasing, risk analyses based on the current sea level may become out of date soon after the analyses are complete. Incorporating estimates of future conditions risk into premiums could be required to maintain estimates of current risk between analyses. Furthermore, estimates of future premiums based on estimates of future conditions risk could be one of the most useful tools to communicate the magnitude of expected increases or decreases in risk.

It should be noted that flood insurance premium rates can be lower for structures elevated above minimum NFIP requirements if an elevation certificate is provided. The higher a structure is elevated above the BFE, the more insurance premium rates decrease. This provides an incentive for mitigation above minimum standards, which can help a structure's resiliency when future conditions result in increased risk. The opposite is true as well. If a new structure is built below the BFE, then the insurance premium rates will be higher to reflect the increased risk of flooding.

2.2.2.1 General Contingency Load

FEMA currently accounts for SLR, future development, and other future conditions in rate-setting through an actuarial contingency loading.⁹ The contingency load is not rigorously developed, and there is no explicit allocation of the load that is specifically due to future conditions. The contingency load accounts for the cost of bearing risk, including the cost of uncertainty. The portion of the contingency load for the risk of uncertainty can be divided into two components: (1) process risk, which is the inherent uncertainty of actual events modeled by a given loss distribution, and (2) parameter risk, which is the risk for which the model does not adequately model the loss. The modeled rate is based on current hazard parameters that describe the probability of flooding relative to a structure, such as the BFE and other depth exceedance probabilities.

To the extent future conditions change the estimates of the frequency of flooding, the modeled loss distribution may not adequately describe the actual loss distribution, resulting in the need for parameter risk contingency. In addition to parameter risk, the NFIP also faces considerable process risk, in that actual aggregate losses will be very different from the expected mean in any given year. The contingency load is currently 10 percent for most policies in Zone As. The load is 20 percent for policies in Zone Vs, 20 percent for policies in Zone As with a reference level below the BFE, and 25 percent for policies in Zone Vs with a reference level below the BFE.

2.2.2.2 Long-term Erosion Load

The increased risk of flooding brought about by erosion has long been an area of concern for the NFIP. In recognition of this, Section 577 of the *National Flood Insurance Reform Act of 1994* mandated that FEMA oversee a study on the economic impact of erosion on the NFIP. The Heinz Center for Science, Economics, and the Environment was contracted to perform the study and released its report, *Evaluation of Erosion Hazards*, in 2000 (see Section 2.5.9 of this report).

The study results demonstrated that the risk of flooding in Zone Vs susceptible to erosion will dramatically increase over the next 30 to 60 years. As a result of this finding, the NFIP began a multi-year plan to increase rates for all policies in Zone Vs in 2001. The Heinz study also contributed to the development of the erosion load for policies in Zone Vs. The load accounts for the increasing hazard of flooding resulting from ongoing erosion. Consequently, insurance rates have increased faster in Zone Vs than they would have if based strictly

⁹ To better understand the concept of the contingency load, two resources are a World Bank article (World Bank, 2015) about catastrophic risk pricing and a Casualty Actuary Society (Feldblum, 1991) article on risk loads for insurers. The World Bank article delineates the contingency load into the cost of equity capital, the cost of risk transfer, frictional costs, and uncertainty loads. The uncertainty load is defined as "a margin to compensate the insurer for limited information or uncertainty associated with writing a specific insurance line. For those lines covering large, infrequent events, and even more frequent events in countries where the quality of data is poor, the uncertainty load can be a significant component of the premium." The Casualty Actuary Society article delineates the contingency load into process risk and parameter risk, where parameter risk is defined as "uncertainty in estimating the expected loss; this is the major risk for the insurer."

on FEMA's flood risk models. It should be pointed out that FEMA does not have the authority to charge higher premiums in areas of higher erosion; as such, the erosion loading applies equally to all Zone Vs, regardless of whether a particular area has a high or low erosion rate (or even an accretion rate).

2.2.3 Future Land-Use Conditions Hydrology

In 2001, FEMA issued a rule that allows communities to use future conditions hydrology, resulting from land use development, for mapping purposes. From the perspective of FEMA, showing a future conditions boundary is for informational purposes only, and carries with it no additional regulatory requirements for floodplain management, nor would insurance be rated using a future conditions boundary. The 2001 ruling modified shaded Zone X (and Zone B) designations to indicate that they represented "Areas of moderate flood hazards or areas of future conditions flood hazard." Showing the future conditions floodplain as shaded Zone X attempts to avoid confusion regarding the mandatory flood insurance requirement. Section 2.3.5 provides additional information regarding mapping implications of future land use conditions hydrology.

2.3 Future Conditions: Flood Hazard Mapping

The projected impacts of future conditions (long-term) erosion and SLR are not considered by FEMA in mapping and managing coastal SFHAs. For riverine SFHAs, neither storm-event-driven erosion, nor future conditions erosion is considered. However, future land development is considered for informational, non-regulatory mapping purposes as explained below.

2.3.1 Coastal Erosion

With regard to coastal flood mapping, there are two categories of erosion: (1) storm- or event-driven erosion, and (2) long-term erosion.

2.3.1.1 Storm- or event-driven erosion

Storm- or event-driven erosion is the erosion that occurs during a storm event (e.g., dune erosion). This type of erosion is considered in mapping coastal flood hazards along open-coast shorelines backed by dunes; however, such erosion is not considered in flood hazard mapping for coastal bluffs on the open coast, or along any shoreline in bay and estuary areas. Further, storm- or event-driven erosion does not consider the long-term movement of shorelines in response to several factors, such as interruption/fluctuation in sediment supply, tidal inlets, and SLR, among others.

2.3.1.2 Long-term, future conditions erosion

Long-term erosion (more properly, long-term recession) as used in this report is the erosion that occurs over a period of decades, and that can be projected into the future based on historical erosion trends and/or modeling. This type of erosion is not considered in determining SFHAs. It is common for States to establish coastal setback lines or erosion hazard areas based on predicted shoreline locations 30, 60, or 100 years into the future. This method for determining long-term erosion rates and future shoreline locations is known as historical shoreline mapping and erosion rate analysis. As implemented by most States, this method generally assumes stationarity; that is, the predicted rate of shoreline change is assumed to be the same as

the historical rate of shoreline change, and does not consider potential acceleration or deceleration caused by geophysical processes, such as changes in the rate of relative SLR.¹⁰

2.3.2 Riverine Erosion

Riverine erosion is a complex physical process that involves the interaction of numerous factors, including: fluvial hydraulics, geotechnical stability, sediment transport, and watershed characteristics, including hydrology and sediment yield; past and future land use; and vegetation; among others.¹¹ As stated above, FEMA does not consider storm- or event-driven erosion, nor long-term erosion, when mapping riverine flood hazard areas. Nonetheless, there are many communities that have used various methods to calculate riverine erosion hazard areas and incorporate the data and information into their respective floodplain management programs.

2.3.3 Special Note on E Zones

The Code of Federal Regulations (CFR) that govern the NFIP (44 CFR) contains language regarding a Zone E. Specifically, *44 CFR 59.1 Definitions*, associates Zone E with flood-related erosion, not long-term, gradual erosion. For example, an area of special flood-related erosion hazard is defined as "...the land within a community which is most likely to be subject to severe flood-related erosion losses. The area may be designated as Zone E on the Flood Hazard Boundary Map."¹²

While Zone E is clearly associated with "flood-related erosion," the definition goes on to state that, "After the detailed evaluation of the special flood-related erosion hazard area in preparation for publication of the FIRM, Zone E may be further refined." This may imply that, in the future, Zone E may be refined to include long-term, gradual erosion. Note that additional changes would need to be made to 44CFR to clarify and recognize long-term (gradual) erosion as a peril covered under the NFIP. As an example, *44 CFR 59.1* defines erosion as, "...the process of gradual wearing away of land masses. This peril is not per se covered under the Program." The current map inventory does not contain any areas with a Zone E designation. The designation was authorized, but never implemented.

2.3.4 Sea Level Rise

As with long-term erosion, FEMA does not consider SLR in a prospective manner (future conditions) in flood hazard mapping. However, as with the case of coastal and riverine erosion, SLR is considered in a retrospective manner. For example, after a period of years, when an area is to be restudied and remapped, the past cumulative effects of SLR and erosion will be reflected in revised and relocated positions of flood zones and revised BFEs.

2.3.5 Future Land Use Development

Historically, flood hazard information presented on NFIP flood maps has been based on the existing conditions of the floodplain and watershed, with no consideration given to future development and its impact on hydrology. As such, FEMA's guidelines for study contractors had specified that flood hazard

¹⁰ Long-term SLR is an "enabler" of long-term coastal erosion; thus, both are linked geophysically.

¹¹ FEMA, 1999.

¹² FHBM.

determinations should be based on conditions that are planned to exist in the community within 12 months following completion of the draft FIS. In 2001, FEMA issued a rule that allows communities to use future conditions hydrology, resulting from land use development, for mapping purposes. Specifically, Section 64.3 of 44 *CFR* states that “FIRM[s] also may indicate, at the request of the community, zones to identify areas of future-conditions flood hazards.” The Zone B and shaded Zone X designation was also modified to indicate that they represented “areas of moderate flood hazards or areas of future-conditions flood hazard.”

Definitions were added to Section 59.1 of 44 *CFR* to provide clarification in what is meant by future conditions. Specifically, the term “area of future-conditions flood hazard” was defined as “the land area that would be inundated by the 1-percent-annual-chance (100-year) flood based on future conditions hydrology.” Moreover, the term “future-conditions hydrology” is defined as “the flood discharges associated with projected land-use conditions based on a community’s zoning maps and/or comprehensive land-use plans and without consideration of projected future construction of flood detention structures or projected future hydraulic modifications within a stream or other waterway, such as bridge and culvert construction, fill, and excavation.” Note that the definition referred to manmade, and not natural changes to future conditions hydrology.

FEMA’s Modernizing FEMA’s Flood Hazard Mapping Program: Recommendations for Using Future-Conditions Hydrology for the National Flood Insurance Program¹³ report provides a detailed summary of FEMA’s evaluation of future conditions hydrology. As a result of the evaluation, FEMA concluded, in part, the following:¹⁴

- The local community should determine the future-conditions land-use and hydrology.
- If the community requests that FEMA do so, the future-conditions 1-percent-annual-chance (100-year) floodplain should be shown on the printed FIRM and be designated as shaded Zone X with no BFEs shown. The future boundaries are also prepared and are delivered in a digital format for the community to use in their GIS and Web-based systems.
- BFEs should be shown on the FIRM only for the existing-conditions 1-percent-annual-chance (100-year) floodplain. The future conditions BFEs should be included in the FIS report (on the Flood Profiles and in the Floodway Data Table), thus providing necessary information to the community to meet its local floodplain management needs. The existing conditions 0.2-percent-annual-chance (500-year) flood elevations should also be shown on the Flood Profiles in the FIS report to help Federal agencies meet the requirements of Executive Order 11988 and to provide Federal agencies with information to evaluate the potential effects of any actions they may take in a floodplain.
- From a floodplain management standpoint, FEMA should continue to require regulation of floodplain development based on the existing conditions data, while local floodplain managers can regulate development based on the future conditions data.

2.4 Federal Flood Risk Management Standard

In 2013, the Hurricane Sandy Rebuilding Task Force adopted a higher flood standard for the Sandy-affected region to ensure that Federally-funded buildings, roads, and other projects were rebuilt stronger to withstand future storms. The strengthened standard is similar to flood risk standards in place in the States of New York and New Jersey. The Sandy Task Force also recommended that the Federal Government create a national

¹³ FEMA, 2001.

¹⁴ A full list of conclusions can be found at: <http://www.fema.gov/media-library/assets/documents/7287?id=2219>.

flood risk standard for Federally-funded projects beyond the Sandy-affected region. *The President's Climate Action Plan* directed Federal agencies to update their flood risk reduction standard to ensure that Federally-funded projects across the country last as long as they are intended. Federal agencies collaborated on this update in 2014. The new Federal Flood Risk Management Standard (FFRMS), issued in January of 2015, gives agencies the flexibility to select one of three approaches for establishing the flood elevation and associated hazard area they use in siting, design, and construction.

Compliance with FFRMS is mandatory when FEMA grants are involved (e.g., Hazard Mitigation Assistance grants, Public Assistance grants, any other FEMA grants funding construction activities in or affecting a floodplain). The FFRMS requires one of the following three approaches to be used to determine the level of resilience needed:

- The Climate-Informed Science Approach – Use data and methods informed by best-available, actionable climate science;
- The Freeboard Value Approach – Use 2 feet above the 1-percent-annual-chance (also referred to as the base flood) elevation for standard projects and 3 feet above the 1-percent-annual-chance elevation for critical buildings, like hospitals and evacuation centers; or
- The 0.2-percent-annual-chance flood Approach – Use the 0.2-percent-annual-chance floodplain and elevation.

The FFRMS is focused on all Federal actions and does not impact operation of the NFIP, but may have positive effect on insurance rates for structures covered by NFIP policies via the CRS. While elevation of the lowest floor per the freeboard approach or the 0.2-percent-annual-chance elevation approach may be used by many projects to satisfy FFRMS, other options may be available. The climate-informed science approach outlined in the standard and the agency implementation guidelines¹⁵ recommend future conditions mapping approaches consistent with the TMAC report's recommendations.

2.5 Sea Level Rise and Long-Term Erosion: A Brief History

FIMA and its predecessor directorates have a long history of investigating and planning for certain aspects of climate change and its impact on the NFIP. The main focus has been on long-term coastal erosion (and occasionally riverine erosion), and to a lesser extent, long-term SLR. Within the context of the NFIP, both SLR and long-term erosion have been politically controversial, and the NFIP has examined both to varying degrees as a result of congressional mandates. It wasn't until passage of BW-12 that FEMA was authorized to incorporate SLR and long-term coastal erosion into flood mapping.

Following is a summary of legislation, reports, and other significant events concerning FEMA and future conditions erosion and SLR.

2.5.1 National Flood Insurance Act (1968)

¹⁵ FEMA, 2015.

The *National Flood Insurance Act of 1968 (NFIA)*, which was responsible for the creation of the NFIP, did not contain language regarding the peril of erosion. Losses were covered by flood insurance only if the direct cause was a flood event, with the term “flood” being defined as:

“A general and temporary condition of partial or complete inundation of normally dry land areas from:

- The overflow of inland or tidal waters;
- The unusual and rapid accumulation of runoff of surface waters from any source;” or
- “Mudslides.”

Note that this definition was revised during modifications to the NFIP in 1973 (see Section 2.5.2). In practice, however, event-driven erosion-related claims were (and still are) paid when a flood, as defined above, was determined to be the cause of the loss.

2.5.2 Flood Disaster Protection Act (1973)

The *Flood Disaster Protection Act of 1973* added a new dimension to insurance coverage under the NFIP by including losses caused by extraordinary erosion, absent the existence of other, typical flooding conditions at the time of the loss. The Act amended the NFIA by expanding the definition of flood to include “the collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels...”

Importantly, long-term, gradual, erosion was not considered in the 1973 Act.

2.5.3 National Conference on Coastal Erosion, Cape May, NJ (1977)

Following the *Flood Disaster Protection Act of 1973*, a National Conference on Coastal Erosion convened in Cape May, New Jersey, in 1977. A primary goal of the conference was to determine how to deal with long-term erosion within the context of the NFIP. Unfortunately, the outcome was inconclusive and did not provide a clear direction for the future.¹⁶

2.5.4 Upton/Jones Amendment (1988-1995)

In 1987, as a result of high water levels in the Great Lakes, the U.S. Congress became concerned about buildings threatened by erosion caused by abnormally high lake levels. Numerous structures were being undermined and collapsing into the lakes. Similar problems were occurring in North Carolina, where every year more beach cottages were sustaining structural damage or being lost completely as a result of coastal erosion.

To reduce these losses, Congressman Fred Upton (R-Michigan) and Walter Jones (D-North Carolina) proposed the Upton/Jones Amendment to the *National Flood Insurance Reform Act*. The Upton/Jones Amendment, which was enacted into law in 1988, provided demolition and relocation benefits to insureds whose structures were located within a “zone of imminent collapse,” an area defined as five times the long-term erosion rate at a site plus ten horizontal feet.

¹⁶ Buckley, 1999.

Insureds whose structures were found to be located in a zone of imminent collapse could receive benefits of up to 40-percent of the value of the structure, with the requirement that the structure be relocated landward of a 30- or 60-year setback line. Insureds opting for demolition benefits could receive up to 110 percent of the value of the structure for demolition expenses.

The zones of imminent collapse for site-specific areas (both coastal and riverine) were determined on a case-by-case basis either by FEMA or a certified State agency. Zones of imminent collapse and setback lines were not mapped by FEMA. The Upton/Jones Amendment marked the first time that long-term erosion was considered under the NFIP, albeit briefly. The Upton/Jones program was an underutilized program,¹⁷ and was terminated in 1995 by the *National Flood Insurance Reform Act of 1994*.

2.5.5 National Research Council Report: Managing Coastal Erosion (1990)¹⁸

In an effort to evaluate and determine how FEMA should treat long-term erosion through the NFIP, FEMA commissioned the National Research Council (NRC) in the late 1980s to examine public policy and scientific issues related to the potential consideration of long-term erosion in the flood insurance program. In 1990, the NRC issued the *Managing Coastal Erosion* report, which recommended including mapping, land-use management, and insurance requirements under the NFIP.

The NRC report stimulated congressional interest and, beginning in 1990, several bills were introduced to amend the NFIP. Still, questions continued regarding the scientific methods and the economic impacts of erosion on the NFIP and possible impacts on coastal real estate valuations. Without clear qualitative answers, Congress settled on a mandate for FEMA to conduct an economic impact study of erosion under a provision in the *National Flood Insurance Reform Act of 1994* (see Section 2.5.7).

2.5.6 FEMA Sea Level Rise Report: Projected Impacts of Relative Sea Level Rise on the National Flood Insurance Program (1991)¹⁹

FEMA completed a congressionally-mandated report in 1991 on the impact of SLR on NFIP.²⁰ The report, titled *Projected Impacts of Relative Sea Level Rise on the National Flood Insurance Program*, concluded that the NFIP would not be significantly affected by a 1-foot rise in sea levels by the year 2100 because “the aspects of flood insurance ratemaking [contingency loading—see Section 2.2.2.1] already account for the possibility of increasing risk, and the tendency of new construction to be built more than 1 foot above [the] BFE.”

The study also concluded that, “given the high projection of a 3-foot rise, the incremental increase of the first foot would not be expected until the year 2050.” Given this 60-year timeframe for the first foot of SLR, the study concluded that there would be “ample opportunity for the NFIP to consider alternative approaches to the loss control and insurance mechanisms of the NFIP and to implement those changes that are both effective and based on sound scientific evidence.”

Nonetheless, the study noted that because of uncertainties in projected SLR and the ability of the insurance rating system to easily respond to a 1-foot rise, the possibility exists for significant SLR impacts in the long term and, therefore, FEMA should: (1) continue to monitor progress in the scientific community about SLR

¹⁷ Crowell, Leikin, and Buckley, 1999.

¹⁸ National Research Council, 1990.

¹⁹ FEMA, 1991.

²⁰ Ibid.

and consider future studies that provide more detailed information on potential impacts of SLR on the NFIP, (2) consider the formulation and implementation of measures that would reduce the impact of relative SLR along the Louisiana coast, and (3) strengthen efforts to monitor development trends and incentives of FEMA's CRS that encourage measures that mitigate the impacts of SLR.

2.5.7 National Flood Insurance Reform Act (1994)

Between 1990 and 1994, a number of legislative proposals were introduced that would have established long-term erosion mapping, management, and insurance provisions under the NFIP. Many of these proposals were based on recommendations from the 1990 NRC report. The proposals were controversial and vigorously debated in Congress; in the end, none of these proposed bills were enacted.

However, a compromise was included in the *National Flood Insurance Act of 1994*. Section 577 of the Act, entitled "Evaluation of Erosion Hazards," required FEMA to study the socio-economic and insurance implications of long-term coastal erosion mapping through the NFIP (and conduct a riverine erosion mapping feasibility study, discussed below in Section 2.6.8), rather than mandate immediate change to the NFIP. The Act also specified that FEMA submit a report to Congress, but that the report should be conducted by a "private independent entity." Additionally, the Act stated that "the [FEMA] Director may map a statistically valid and representative number of communities with erosion hazard areas throughout the U.S., including coastal, Great Lakes, and, if technologically feasible, riverine areas."

Ultimately, two reports were prepared, including: (1) FEMA's *Riverine Erosion Hazards Mapping Feasibility Study* report, which focuses on riverine issues; and (2) *Evaluation of Erosion Hazards*, which focuses on coastal issues. These reports are described in the following sections.

2.5.8 FEMA's Riverine Erosion Hazards Mapping Feasibility Study Report (1999)²¹

In 1995, FEMA initiated a *Riverine Erosion Hazards Mapping Feasibility Study*. The study was advised by a project working group of experts in the field of riverine erosion. In 1999, the *Riverine Erosion Hazard Areas Mapping Feasibility Study* report was released. The study developed cost estimates for mapping riverine erosion hazard areas and concluded that it was technologically feasible to map the hazard areas.

2.5.9 Heinz Center Report: Evaluation of Erosion Hazards (2000)²²

Beginning in 1995, FEMA oversaw the first technical phase of the coastal erosion study and contracted with 18 coastal and Great Lakes states (or their designees) to conduct long-term coastal erosion hazard mapping for a total of 26 counties. In 1997, the H. John Heinz III Center for Science, Economics and the Environment, initiated the second, economic/insurance phase of the study, which utilized the erosion hazard mapping conducted during the first phase.

The Heinz Center's *Evaluation of Erosion Hazards* (Heinz Center report), was delivered to Congress in April 2000. The report made two recommendations: (1) Congress should instruct FEMA to map long-term coastal erosion hazard areas, and (2) "Congress should require FEMA to include the cost of expected erosion losses when setting flood insurance rates along the coast." Congress did not act on these recommendations;

²¹ FEMA, 1999.

²² Heinz Center, 2000.

however, FEMA developed and began implementing a long-term erosion contingency loading model based on data from the Heinz Center report.

2.5.10 Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades are Potentially Significant (2007)²³

In 2007, the Government Accountability Office (GAO) published a report, *Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades are Potentially Significant*, recommending that FEMA analyze the potential long-term implications of climate change on the NFIP and report its findings to Congress. In response to this recommendation, FEMA contracted with AECOM to conduct a climate change study (see Section 2.5.12).

2.5.11 Biggert-Waters Flood Insurance Reform Act (2012)

In 2012, Congress passed BW-12, which requires that FEMA make several policy changes to the NFIP. Key provisions of the legislation require the NFIP to raise rates to reflect true flood risk, make the program more financially stable, and change how FIRM updates will impact policyholders. BW-12 also mandated the creation of the current TMAC.

2.5.12 Impact of Climate Change and Population Growth on the NFIP (2013)²⁴

In 2013, AECOM released a report, *Impact of Climate Change and Population Growth on the National Flood Insurance Program*.

The report investigated various aspects of climate change and their impacts on the NFIP. These aspects of climate change include changes in: (1) precipitation patterns, (2) frequency and intensity of coastal storms, and (3) sea levels. The report's findings include:

- By 2100, the 1-percent-annual-chance flood depth and flood hazard areas are expected to increase on average by about 45 percent in riverine areas. In the populated areas of most interest to the NFIP, about 30 percent may be attributed to increased runoff caused by growth of impervious land area caused by population growth/development, while the remaining 70 percent represents the influence of climate change. This means that even if future climate change is minimal, future flooding will increase anyway because of population growth, increase in development, and increased surface impermeability.
- By 2100, coastal SFHAs may increase anywhere from zero percent to 55 percent depending on type and scale of shore protection measures.
- By 2100, the total number of NFIP insurance policies is likely to increase by approximately 80 percent to 100 percent, with 70 percent of this increase attributable to growth of floodplains caused by climate change and 30 percent attributable to population growth.
- Individual premiums per policy are projected to increase by 10 percent to 70 percent in 2010 dollars by 2100 in order to offset the projected increase in flood losses.

²³ US GAO, 2007.

²⁴ AECOM, 2013.

2.5.13 The Homeowner Flood Insurance Affordability Act (2014)

In 2014, the HFIAA was passed into law. This law repeals and modifies certain provisions of BW-12 and makes additional changes to other aspects of the program not covered by that Act. Many provisions of BW-12 remain and are still being implemented. In addition, HFIAA requires the TMAC to review the new national flood mapping program authorized under the 2012 and 2014 flood insurance reform laws.

3 Future Conditions and Changes in the Floodplain

The phrase, “future conditions and changes in the floodplain,” encompasses both natural changes (e.g., SLR, erosion, rainfall patterns), as well as human impacts (e.g., population changes, land use policies, development). There are several challenges in developing a set of recommendations for incorporating future conditions into FISs and maps and using the best available methodology when considering both the impacts of natural processes and human policies on flood risk.

First, uncertainty about future conditions is inherent in any approach to develop flood hazard data. Regarding expected natural changes in floodprone areas, the direction (increasing or decreasing) of future trends may be uncertain for any particular location. Even in cases where there is a definable trend in historical data, the degree of uncertainty increases substantially the farther into the future we project. Yet, ignoring uncertain or as-yet-unquantified trends is hazardous in itself, particularly for mapping products that attempt to quantify future hazards beyond the next century.

There are several other sources of uncertainty, including the impacts of future laws, regulations, and policies—or even changes to the NFIP itself—that may impact the way development is planned and implemented, where and whether future population will increase or decrease, how future development will impact the environment, and a host of other unknowns that are difficult to predict.

All of these uncertainties create challenges in how best to communicate future risk in an understandable and usable way, particularly when communicating even *current* flood risk is a challenge for many practitioners. Mapping future risk also brings up connected issues that need to be explored, such as the use of future conditions in risk assessments, flood insurance rating, land use regulations, building design and construction, and floodplain management regulations. This section explores these issues and the scientific and social considerations involved with mapping flood hazard areas based on future conditions.

3.1 Future Conditions Impacts and Uncertainty

In making decisions, there is always some degree of uncertainty about the future, whether it be an investment strategy for financial markets, determining what weather to expect for a planned vacation, or what types of seeds to purchase now for planting next year’s crops. Given uncertainty about predicted rainfall and temperatures, we tend to use historical averages and recent trends to make decisions, and we assume these simple measures provide us with the information we need.

There are two potential problems with this approach: (1) past averages and trends may not always be accurate indicators of the future, especially if there are large changes or disruptions in our natural or manmade systems; and (2) our observations and data for the past are incomplete and can be inaccurate. Thus, while we are accustomed to relying on observations of past floods to estimate the extent and depth of future floods, there has always been uncertainty associated with our estimates, whether we have acknowledged it or not. When that uncertainty is combined with additional uncertainty related to future land use, topographic changes, hydrology, and hydraulics, the confidence in our estimates diminishes.

This is obvious when considering future climate-related changes impacting flooding. Even in cases where there is a definable trend in historical data, we would expect the degree of uncertainty to increase substantially as we predict flooding decades into the future.

Changes can happen slowly, as in the case where urban areas gradually expand into agricultural or forested land, thereby altering runoff patterns over time; or they can happen rapidly, like the kinds of river channel changes, erosion, and deposition that occurred during Hurricane Irene in Vermont (2011) or in the 2013 fall floods in Colorado (see Figure 3-1).

Uncertainties will be greater for future conditions than those associated with modeling and mapping existing conditions, particularly as projections are made over longer time frames.



Figure 3-1: Channel Changes, Erosion, and Deposition. Left shows channel changes on Vermont Route 107 resulting from Hurricane Irene (Photo: Vermont Agency of Transportation). Right shows changes after flash flooding at the in Colorado (Photo: Cliff Grassmick, AP).

It is helpful to consider how uncertainty can be characterized and the likelihood of uncertain events taking place. Uncertainty guidelines from the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC)²⁵ are useful in this regard.

3.1.1 IPCC AR5 Uncertainty Guidelines

The AR5 rely on two metrics for communicating the degree of certainty in key findings:

- Confidence in the validity of a finding, based on the type, amount, quality, and consistency of evidence (e.g., mechanistic understanding, theory, data, models, expert judgment) and the degree of agreement as detailed in Figure 3-2
- Quantified measures of uncertainty in a finding expressed probabilistically (based on statistical analysis of observations or model results, or expert judgment) as depicted by the Likelihood Scale in Table 3-1

These two metrics defined a common approach and calibrated language that can be used broadly for developing expert judgments and for evaluating and communicating the degree of certainty in findings of the assessment process.

²⁵ IPCC, 2010.

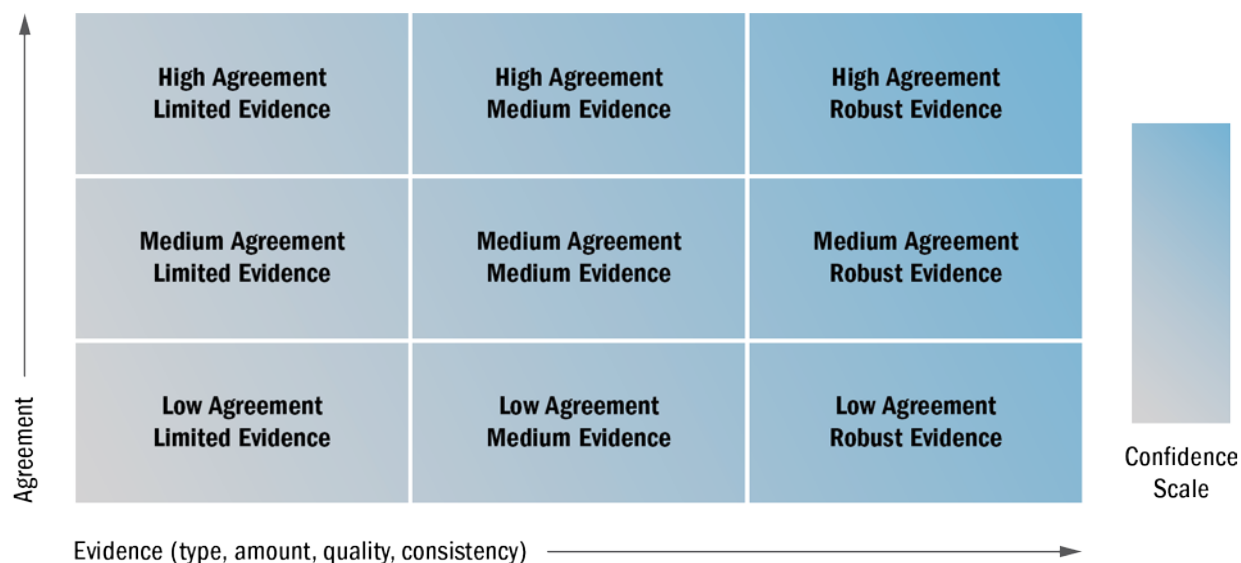


Figure 3-2: Evidence and Agreement Relationship.
Evidence and agreement statements and their relationship to confidence.

Confidence in the validity of a finding is based on the type, amount, quality, and consistency of evidence and the degree of agreement among experts. Confidence is expressed qualitatively as shown in Figure 3-2, with the degree of confidence in an estimate increasing moving from the least amount of confidence in the lower left to the highest amount of confidence in the upper right.

Table 3-1: Likelihood Scale

Term	Likelihood of the Outcome
Very Certain	99-100 percent probability
Very Likely	90-100 percent probability
Likely	66-100 percent probability
About as likely as not	33-66 percent probability
Unlikely	0-33 percent probability
Very Unlikely	0-10 percent probability
Exceptionally Unlikely	0-1 percent probability

3.1.2 Flood Map Accuracy and Uncertainty

Current flood hazard studies and maps are not perfect. They are estimates of complex hydrologic and hydraulic processes, and graphical depictions of the resulting flood hazards. Some of those estimates are based on detailed studies using recent data, well-established calculation procedures, and modern mapping techniques; others are more approximate, relying on less and/or older data, simplified assumptions, and simplified calculations/mapping.

Flood hazard studies and maps can be characterized by two types of uncertainty.

- **Natural Variability (Aleatory Uncertainty)** – Variability in the physical world; uncertainty arising from variations inherent in the behavior of natural phenomena that are viewed as random rather than systematic
- **Knowledge Uncertainty (Epistemic Uncertainty)** – Uncertainty arising from imprecision in analysis methods and data. Arises from a lack of understanding of events and processes, or from a lack of data; such lack of knowledge is reducible with additional measurements, observations, and scientific analysis

To date, the accuracies, degree of precision, and uncertainties associated with respect to flood studies and mapping products have not been quantified or published. This information is needed, both for improved risk identification and risk communications and can serve as a baseline for characterizing future conditions. The cost of improving the accuracy and reducing uncertainties of the flood hazard studies and maps needs to be compared with their expected benefits with respect to prioritizing and undertaking future flood studies for existing and future conditions.

Some sources of uncertainty that exist in flood hazard identification include the precision and accuracy associated with measurements of the physical environment. Topographic and bathymetric data are the most important factors in the accuracy of FEMA's flood maps.²⁶ Climatology data for the physical process being simulated are also a factor. For coastal areas, this relates primarily to wind and pressure fields; for riverine areas, this mostly covers historical rainfall and stage/discharge data. The data that will be used to validate the results (i.e., the measured wave and water level data, the wave information studies, and surveyed high water marks) are also a factor.

Uncertainty also lies in the calculation methods used to identify flood hazards, including the skill of models used in the computation of the physical parameters. All models, both physical and empirical models, include some uncertainty; and this uncertainty is additive. While care is exercised to identify and reduce uncertainty and bias in the results, no strict standards exist with respect to the acceptable amounts of uncertainty in flood hazard identification. FEMA relies on model validation, engineering judgment, and rigorous review to ensure the results are high-quality and reasonable representations of historical flood conditions.

The variability in the physical processes being simulated (both climate-driven and anthropomorphic adaption) is also a source of uncertainty. A long period of climatological record may provide an account of what has happened in the past, but it does not necessarily represent what could happen in the future. Therefore, climatic factors, such as increases in the frequency and severity of coastal storms and SLR are sources of uncertainty. Variability inherent in the storm track is also a factor; slight changes in storm track can result in very different flooding locations and impacts. Also, development and/or construction of flood conveyance, retention, or protection structures can also impact the flood hazard being identified.

²⁶ NRC, 2009.

In the case of future conditions (such as changes in precipitation patterns, land alteration by nature or man, changes in stream flow, SLR, long-term coastal erosion, and riverine erosion), projected trends and variabilities are based on some combination of data and modeling, both of which magnify uncertainty.

Uncertainties will be greater for future conditions than those associated with modeling and mapping existing conditions, particularly as projections are made over a longer time frame.

Sub-Recommendation 3-1. FEMA should perform a study to quantify the accuracies, degree of precision, and uncertainties associated with respect to flood studies and mapping products for existing and future conditions. This should include the costs and benefits associated with any recommendation leading to additional requirements for creating flood related products.

3.1.3 Hazard Identification, Risk Assessment, and Risk Communication

The process of hazard identification requires the determination of the types and characteristics of potential disasters facing a community or region. The risk to the community is characterized by the likelihood of disasters of different magnitudes and intensities and their resulting impacts to individuals, property, and the environment. Assessing the likelihood of a future flood is typically based on analysis of the historical record, as well as knowledge of the physical processes leading to the occurrence of a disaster.

Although historical records are important, they need to be combined with scientific studies to attempt to project future physical phenomena. For example, expected changes in climate bring into question how to interpret historical data in characterizing the intensity and magnitude of future hurricanes and floods²⁷ and may increase the costs and losses associated with severe hurricanes and floods in the years to come.²⁸

The risk assessment process (see Figure 3-3) combines the potential hazards obtained from hazard identification with data on vulnerability (taking into account exposure and mitigation). Risk assessment encompasses studies that estimate the chances of a specific set of events occurring, their potential consequences, and the uncertainties surrounding these estimates.

RISK COMMUNICATION
<ul style="list-style-type: none"> • Risk communication is a critical aspect of risk management with all stakeholder groups requiring easy-to-understand information. • informing residents that there is a greater than 1-in-5 chance of at least one flood occurring in their area over the next 25 years is more likely to get their attention than communicating this as a 1-in-100-chance in the coming year (the same probability).



Figure 3-3: Risk Assessment

²⁷ Milly, et al., 2008.

²⁸ IPCC, 2015.

UNCERTAINTY

- Climate change adds uncertainty to flood loss predictions.
- Risk assessments take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties.

Risk assessment was greatly improved by the confluence of two developments in the last several decades: scientifically-based probabilistic hazard models (i.e., quantifying the rate of occurrence and magnitude of hazard events and their impact)²⁹ and advances in information technology and GIS for mapping risk and measuring the

hazard.³⁰ Computer-based models were developed for assessing probabilistic catastrophic risk and loss potential at different return periods. Maps can indicate the likelihood of specific events, and damage models can determine their impacts. Together, these tools can be used in catastrophe models to determine premiums for insurance protection against floods and other natural hazards.³¹

Risk communication is a critical aspect of risk management. All concerned stakeholder groups including the public require accurate, easy-to-understand information on the risks that residents and communities face. When designing risk communication strategies, there is a need to recognize the systematic biases and simplified decision rules that individuals utilize in making choices under uncertainty. To illustrate this point, consider a flood with a 1-percent-annual-chance (often termed “100-year”) return period. If a property owner in a floodprone area is told that there is a 1-in-100 chance of their home flooding in the coming year, they are likely to assume it will not occur and will treat the event as below their threshold level of concern. Had they been told that there is a greater than 1-in-5 chance of their home flooding over the next 25 years (the same probability with an extended time horizon to match a typical 30-year mortgage), they may have been more likely to pay attention and considered undertaking protective measures.³² Such framing of information on risk maps can be employed to communicate information on the risk so that individuals in harm’s way recognize the hazards they face and their associated risks.

Sub-Recommendation 3-2. Future risk assessments should take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates.

Sub-Recommendation 3-3. FEMA should frame future risk messages for future conditions data and information such that individuals will pay attention to the future flood risk. Messages may be tailored to different stakeholders as a function of their needs and concerns.

²⁹ Cornell, 1968.

³⁰ NRC, 2007.

³¹ Grossi and Kunreuther, 2005.

³² Kunreuther, 2015.

3.2 Population Growth and Development Changes

For centuries, mankind has lived and worked around waterways and the coast. Waterways provide transportation, food, water, and a desirable environment. Many of our population centers are located near major water features of the coast or large rivers. It's far too simplistic to say, "Get out of harm's way," when there are established communities and critical infrastructure (energy, transportation, water and wastewater, etc.) that aren't easy to move and have historical (health, survival, technology, industry) reasons for their geographic location.

As the Nation grows, additional land becomes developed, which in turn increases the runoff from rainfall (see Figure 3-4). In an undeveloped state, water that does not run off is stored in natural depressions until such time it either evaporates or moves to the groundwater table. The impacts of development can be very significant—especially for watersheds under 100 square miles, with discharges more than doubling.³³ This development can lead to the water surface elevations in streams increasing by many feet in elevation. Use of the national urban equations in the U.S. Geological Survey (USGS) Water-Supply Paper 2207, *Flood Characteristics of Urban Watersheds in the U.S.* (WSP 2207),³⁴ shows that a percent impervious area of as little as 20 percent can double flow.

Many communities have stormwater regulations that include the provision that post-development discharges must be equal to or less than the pre-development discharges; however, this typically applies only to the frequent storm events, such as the 10-year frequency. These regulations typically have no or very little impact on infrequent events, such as the 100-year frequency event (1-percent-annual-chance flood event). It should be noted that not all development results in increased water surface elevations. Water surface elevations can be decreased by implementing projects that improve rainfall infiltration and retention, such as re-forestation and wetland restoration.

³³ Sauer, et al., 1983.

³⁴ Ibid.

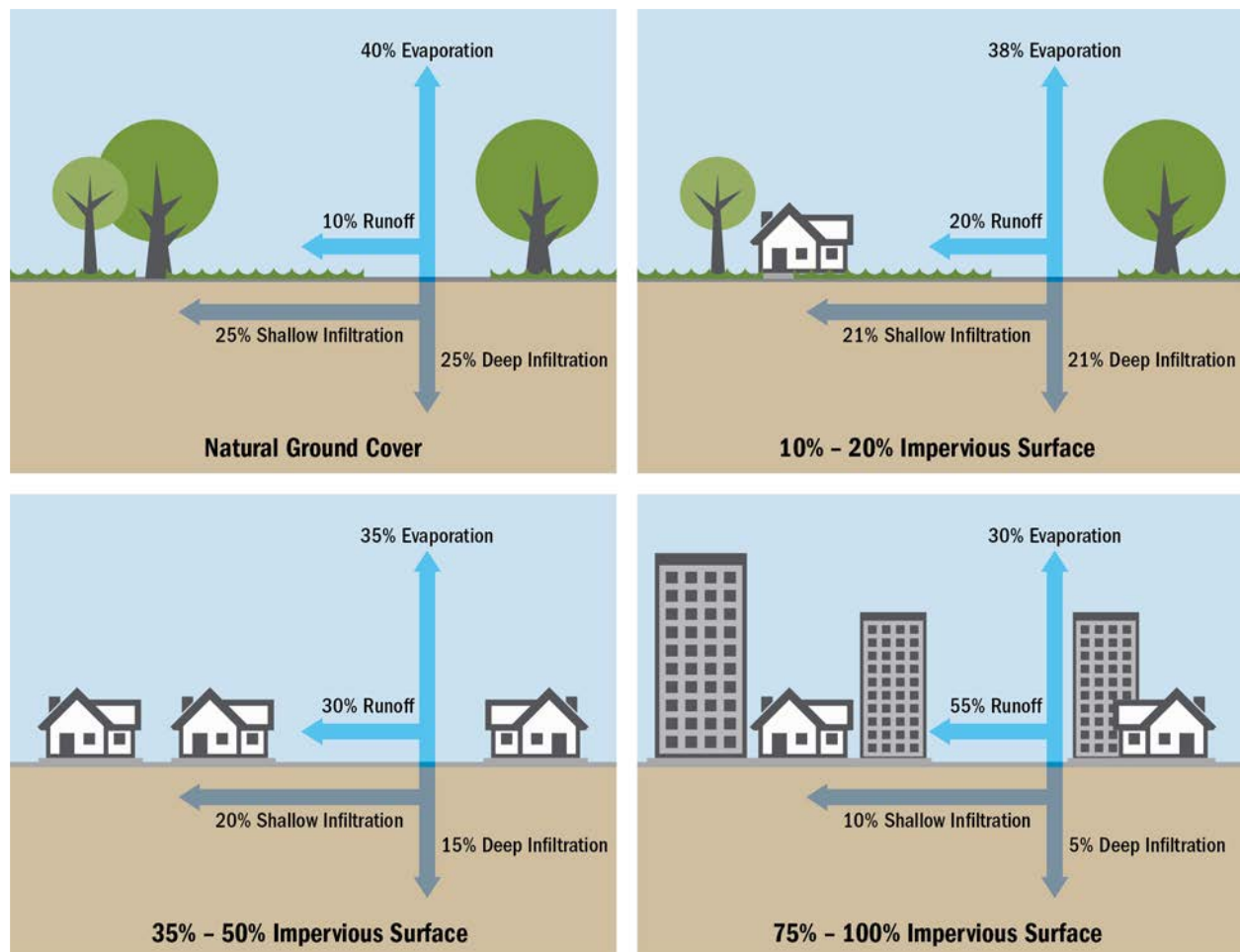


Figure 3-4: Impacts of Development.
Manmade development can increase flood discharge by a factor of five.

Population—particularly population growth—is a significant indicator of development. As the population increases, the infrastructure required to support housing, utilities, and businesses increases as well. Population increase can also increase the density of people in certain geographic areas. Therefore, population growth over time as well as by geographic location should be evaluated when assessing future conditions and changes to the floodplain. For the large majority of areas across the United States, population and development increases have occurred over the time, and this population growth is expected to continue (see Figure 3-5 and Figure 3-6).

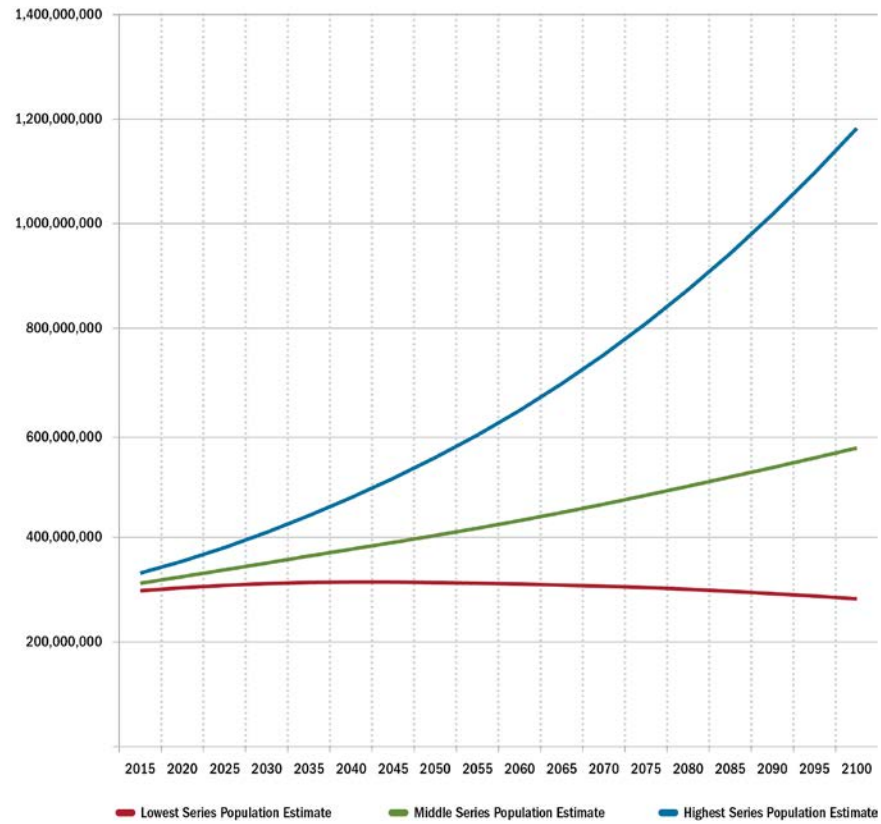


Figure 3-5: Population Growth Estimates.

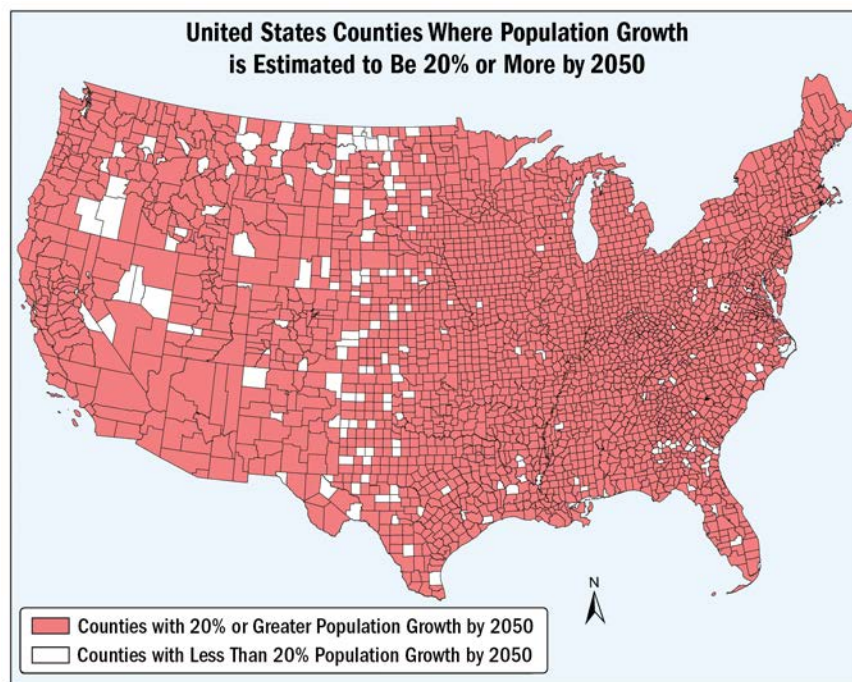


Figure 3-6: Population Growth Estimates by County.

Surges in population have been most significant in coastal region of the county. The trend of people moving towards the coasts is illustrated in Figure 3-7.

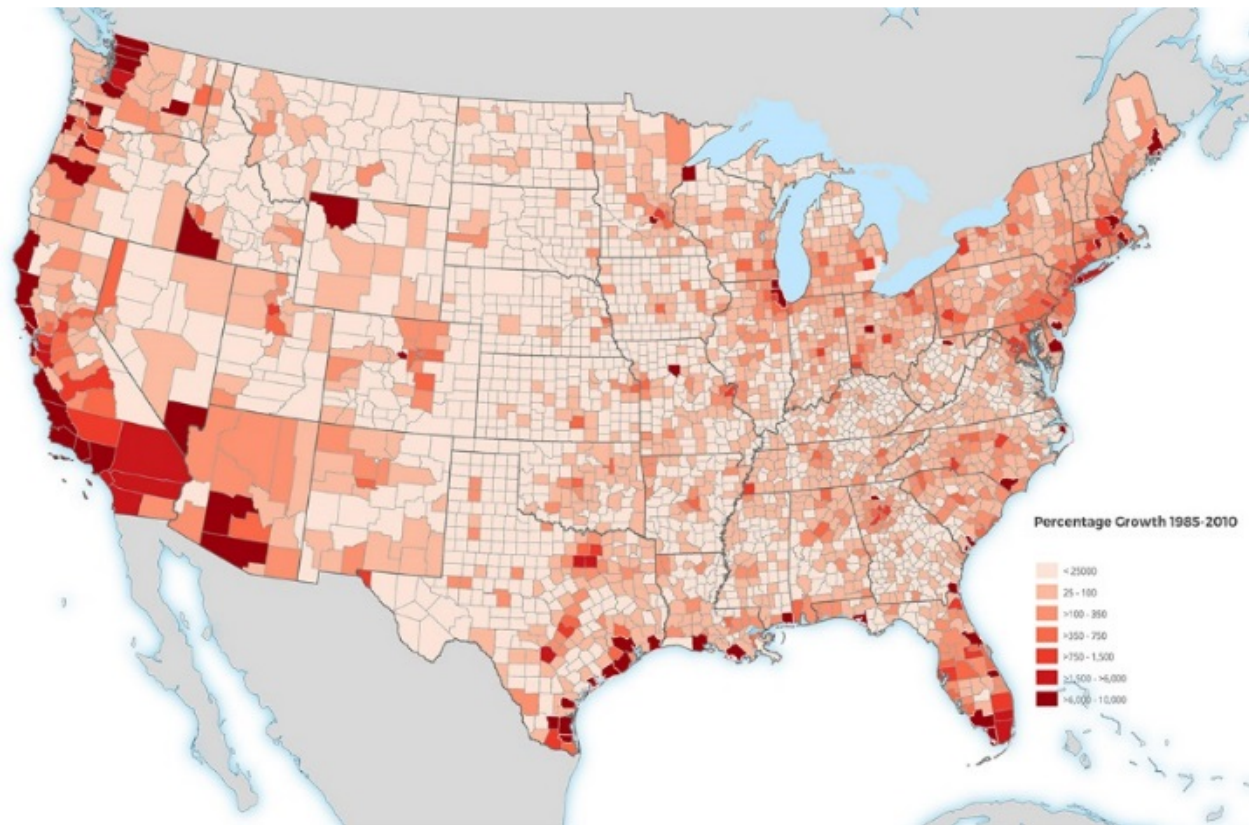


Figure 3-7: Population Changes: 1985-2010.
The mid-Atlantic, the Atlantic, the Gulf Coasts of Texas and Florida, and the California Coast have incurred the most change from 1985 to 2010.

3.2.1 Land Use Changes

A Hydrologic Unit Code by County (HUCCO) is a geographic area that represents counties and hydrologic units that have been combined together. Figure 3-8 illustrates the development increases that have occurred over time. Significant changes on a percent basis are seen in the mid-Atlantic area of the United States. This trend can be seen in more recent land use and land change evaluations as well. Figure 3-9 illustrates the land use change by looking at impervious areas.

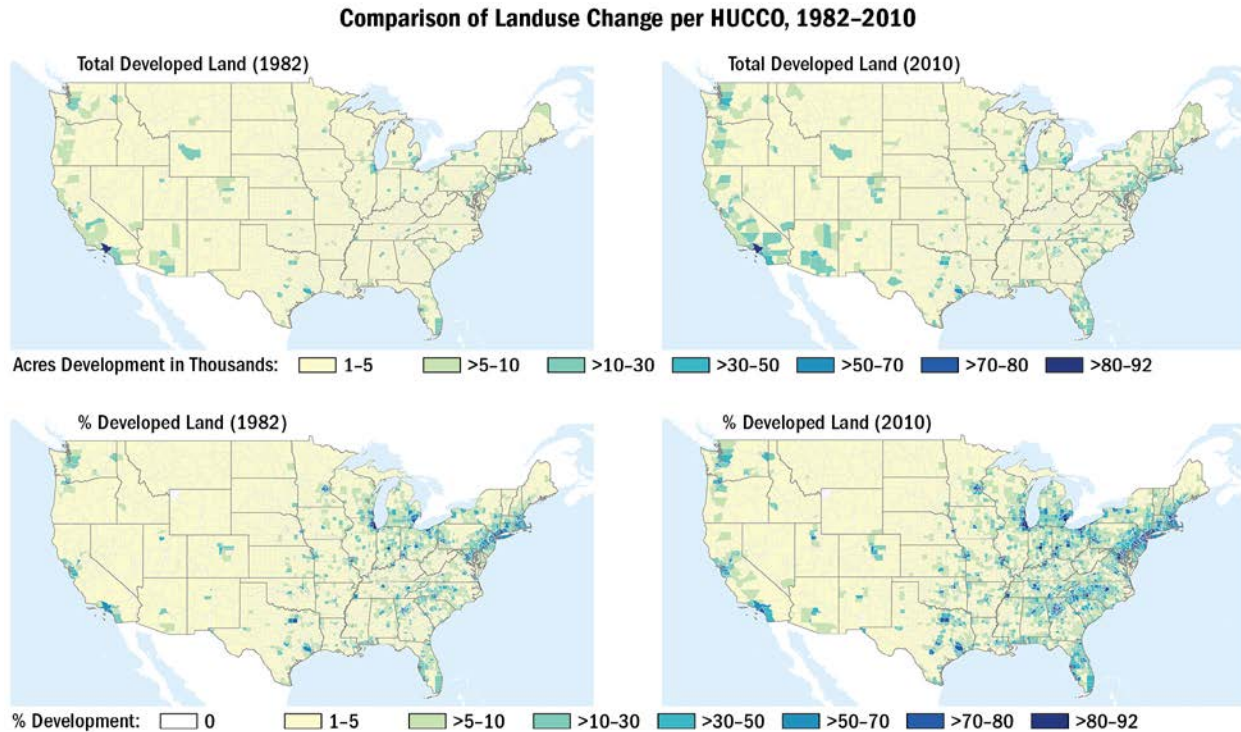


Figure 3-8: Changes in Development between 1982 and 2010.

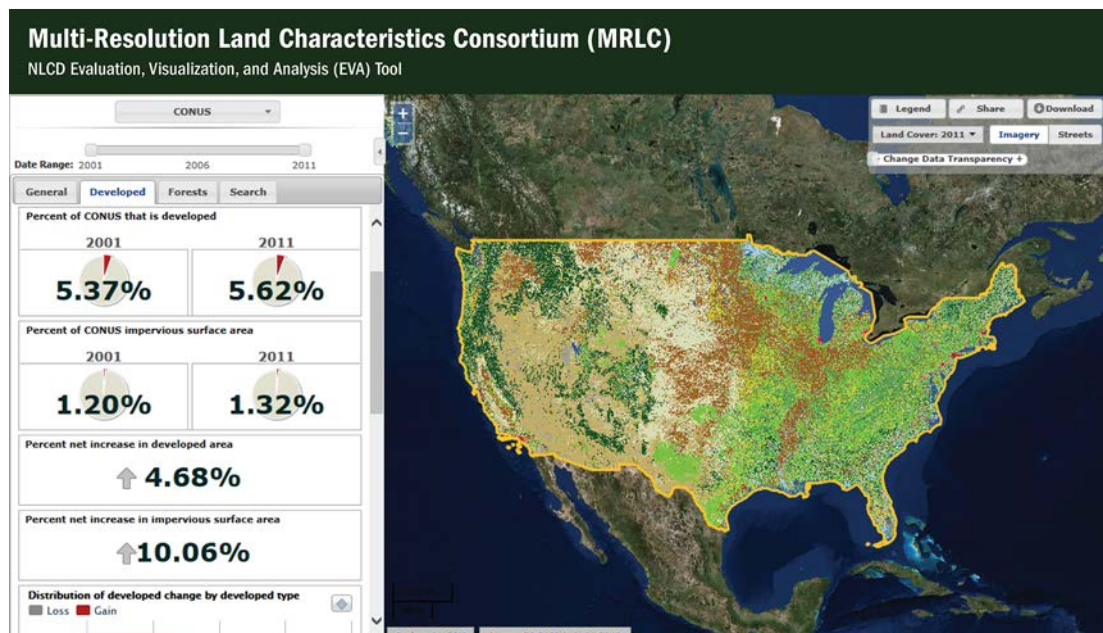


Figure 3-9: Changes in Land Development between 2001 and 2011.

3.2.2 Measuring Population Covered by Modernized Maps

The Map Modernization Program used a metric that reported on the percent of population covered by modernized maps. As of 2015, the program has exceeded the goal of 92 percent of the population being

covered by a modernized map. This computation used the logic that if any part of a stream that had a defined floodplain intersected a census block group, then the entire population of the census block group was considered to be covered by a modernized map. This included maps that were just converted to a digital format with no updated flood modeling. There are currently 220,818 census block groups that cover the Nation, with each block group typically representing between 600 and 3,000 people. This metric worked well for the mass conversion of the inventory from paper to digital format, and allowed tracking of progress since the inception of the program.

However, this population metric has two challenges for moving forward. First, the metric over-predicts the population covered by a modernized map. FEMA generally studies streams that drain a drainage area of greater than one square mile. If a census block group has 10 miles of stream and only 1 mile is studied, the current metric will count 100 percent of the population within the census block group as being covered by a modernized map, as opposed to the 10 percent that may actually be covered. Therefore, the current metric can lead to a significant over-prediction of the population covered by a modernized map. This could lead policy makers to believe that flood hazards have been more widely identified than the reality. If the metric is changed to be more reflective of the streams studied within a census block group, then it may more realistically illustrate that the country has flood hazard areas defined for only somewhere between 16 percent and 22 percent of all streams.

The second challenge is that the metric does not predict the future. In predicting the future, two aspects must be considered. The first aspect is in knowing where the population will grow and where in the country emigration will occur. The second aspect is that the mapped floodplains degrade with time due to changes in land use, and better data and science becoming available. FEMA currently addresses this second aspect with a quality metric that predicts the degradation of the floodplain data over time.

Sub-Recommendation 3-4. FEMA should define a future population metric that uses a standard future population database, along with various budget scenarios, for keeping the data current to predict the percent of the population covered at various points in the future.

3.2.3 Population Impacts for Riverine Areas

At the request of the GAO (see Section 2.5.10), FEMA funded a study in November 2008 on the effects of climate change and population growth on the NFIP (see Section 2.5.12). Through the study, FEMA hoped to understand the potential impact of climate change on the financial strength of the NFIP and recommend options to increase the NFIP's viability. FEMA contracted with AECOM, in partnership with Michael Baker Jr., Inc. and Deloitte Consulting, LLP, to conduct an independent study and present the findings and recommendations to FEMA.

The primary conclusions of the study are:³⁵

"For the riverine environment, the typical 1-percent-annual-chance floodplain area nationally is projected to grow by about 45 percent, with very large regional variations. The 45 percent growth rate is a median estimate implying there is a 50 percent chance of this occurring."

³⁵ AECOM, 2013.

Floodplain areas in the Northwest and around the Great Lakes region may increase more, while areas through the central portions of the country and along the Gulf of Mexico are expected to increase somewhat less. No significant decreases in floodplain depth or area are anticipated for any region of the Nation at the median estimates; median flood flows may increase even in areas that are expected to become drier on average. Within typical developed areas of primary interest for the NFIP, approximately 30 percent of these increases in flood discharge, SFHA, and base floodplain depth may be attributed to normal population growth, while approximately 70 percent of the changes may be attributed to the influence of climate change. The implication is that on a national basis approximately 30 percent of the 45 percent (or 13.5 percent) growth in the 1-percent-annual-chance floodplain is due solely to population growth and would occur even if there is no climate change. Conversely, approximately 70 percent of the 45 percent (or 31.5 percent) growth in the 1-percent-annual-chance floodplain is due solely to climate change and would occur even if there is no population growth. The split is highly variable from place to place, and so should not be taken as a definitive value; the relative importance of population growth will be much less in undeveloped areas, but will be greater than the national average in densely populated centers.”

3.2.3.1 Population Demographics

In 2010, the total U.S. population was 309 million, which was almost a 10 percent increase from the population in 2000.³⁶

- The five most populous states were: (1) California; (2) Texas; (3) New York; (4) Florida; and (5) Illinois.
- The five most populous cities were: (1) New York City; (2) Los Angeles; (3) Chicago; (4) Houston; and (5) Philadelphia.

According to the Census Bureau, there were on average 87.4 people per square mile in the U.S. in 2010. In general, the population density is highest along the Atlantic and Pacific coasts.

- The areas of the U.S. with the greatest population densities in 2010 were: (1) District of Columbia; (2) New Jersey; (3) Puerto Rico; (4) Rhode Island; and (5) Massachusetts. It should be noted that each of these States/territories include coastal areas.
- The Census Bureau predicts that the U.S. population will reach 400 million by the year 2051. See Figure 3-10 for estimated population growth by county.

³⁶ U.S. Department of Commerce, 2010.

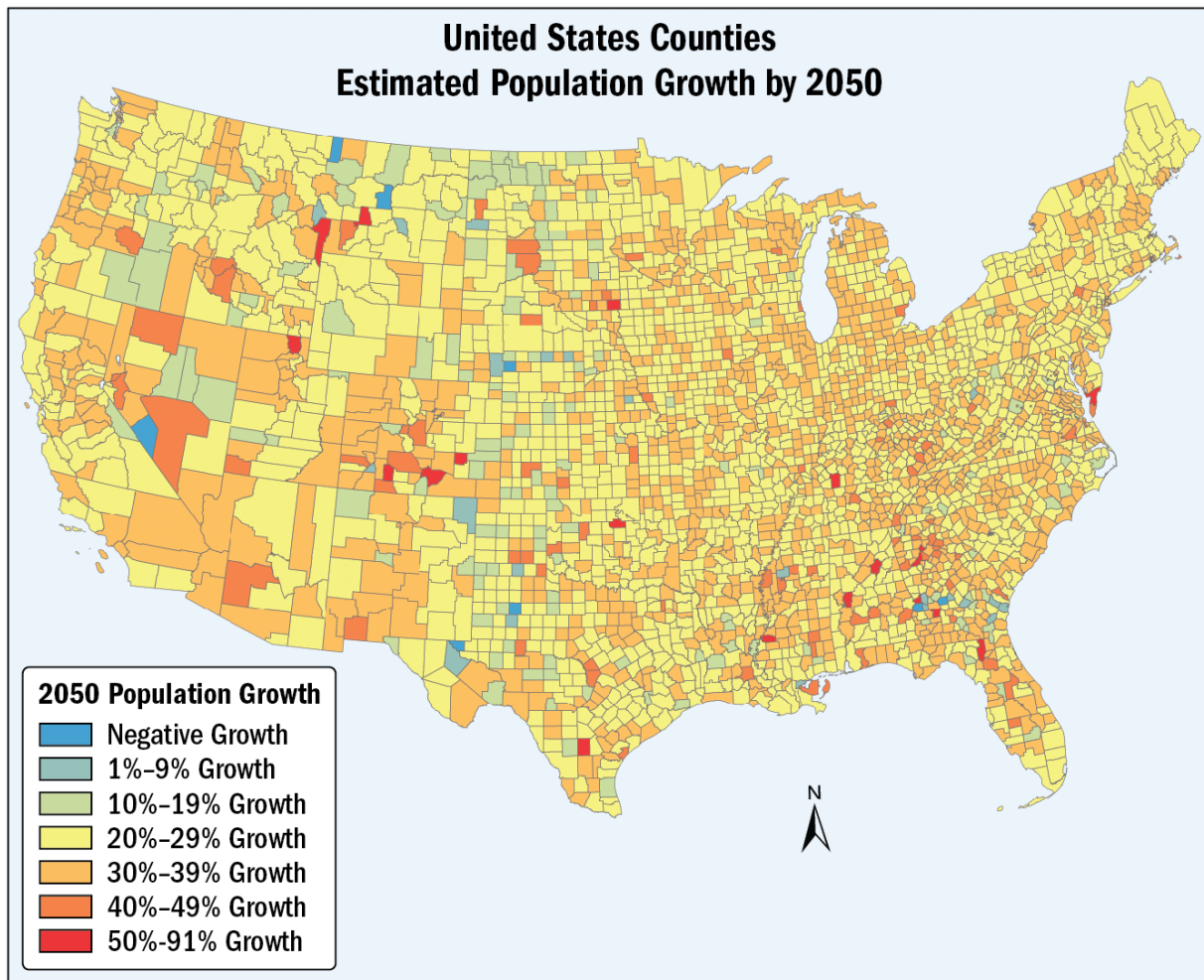


Figure 3-10: Estimated U.S. Population Growth by 2050.

3.2.3.2 Effects of Watershed Hardening

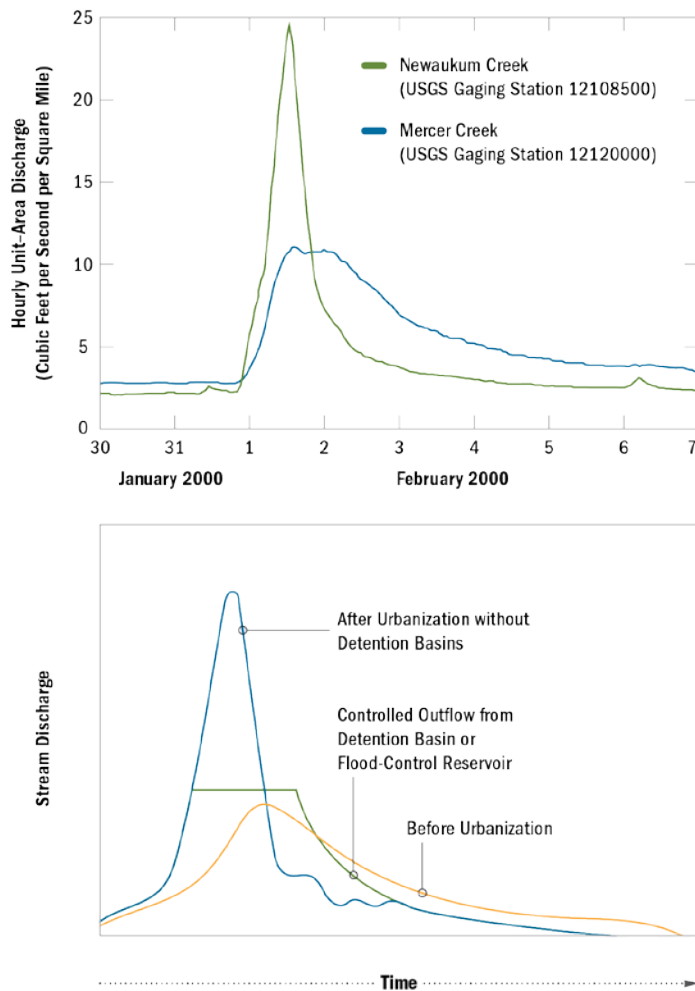


Figure 3-11: Impacts of Urbanization.
Urbanization can lead to increased peak flow and total runoff volume, as well as decreased time to peak.
Increased peak flows can be mitigated by stormwater detention, but increase in volume remains an issue.

As shown in , manmade development has a significant impact on discharges. Watershed hardening occurs when a watershed experiences development. When a watershed is hardened, water tends to runoff with greater volume and it runs off the surface much greater speed than in the natural state. The impacts on floodplains can be dramatic with increases in water surface elevations of a foot or more common. The increase in peak flow in response to urbanization can vary from 1.5 to 5 times. In general, the increase in peak flow resulting from urbanization will be larger for the lower magnitude, higher frequency events.

Levees and dams impact our floodplains in both positive and negative ways. On the positive side, a levee will keep the water contained to a channel and a dam will reduce flooding downstream. But there are negative impacts as well. A dam will increase flooding upstream and both levees and dams are designed for a certain flood level that, if exceeded, may result in the structure failing, potentially causing serious damage.

Another example may be a levee that currently meets protection guidelines but, due to land development, climate change, and subsidence, would not allow the levee to meet flood protection criteria in the future.

Stormwater management facilities provide effective control for frequent floods of up to the 25-year event (see Figure 3-12). However, when less frequent events occur, such as the 1-percent-annual-chance (100-year) event, the stormwater feature is generally filled and has no flood-reducing impact on downstream areas. Therefore, stormwater facilities generally do not need to be considered in future conditions modeling.



Figure 3-12: Stormwater Facilities.

Most stormwater facilities are designed for less than the 25-year event and have nearly no impact on the 100-year event. This creates significant problems for those downstream.

3.2.3.3 Life of Structure

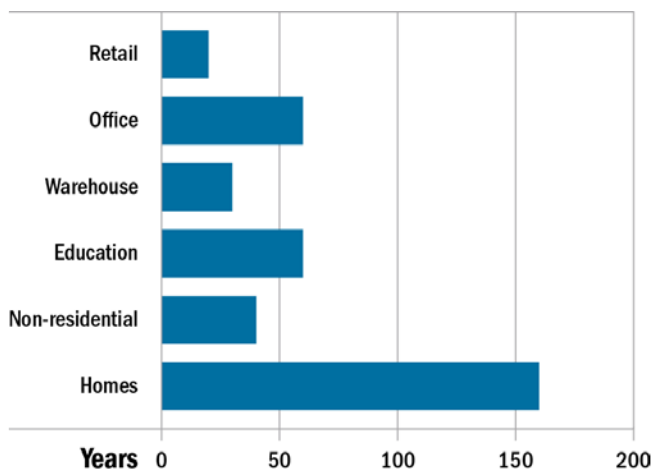


Figure 3-13: Life of Structure.

Residential structures built today will be tomorrow's problems unless life of structure is taken into account.

The design criteria and flood elevations that are established today will have impacts that can range from a couple of decades to future generations. Dr. Arthur C. Nelson, FAICP, has studied the probable life of facilities built today, and determined that a typical residential house built today will have a useful life of over 150 years.³⁷ One estimate of damage from Superstorm Sandy counted over 650,000 houses that were damaged or destroyed. How the Nation rebuilds after a disaster and how development occurs in the future will impact the health, safety, and welfare of future generations.

When examining future conditions, the future state may be different for different types of

structures (see Figure 3-13³⁸). If a structure has a service life of 20 years, the design event may be different than a structure that has a service life of over 100 years. For example, a typical shopping center will have a major upgrade once every 20 years while, for a home, it may be over 150 years before a renovation

³⁷ Nelson, "Human Factors in 2050."

³⁸ Nelson, "Human Factors in 2050."

significant enough to trigger the NFIP floodplain management standards (50 percent of market value). If the science improves our future predictions for the near-term future, a correction can more easily be made for some types of structures than others.

If people are not better informed of their future flood risk, and if structures are built or rebuilt to the current 1-percent-annual-chance flood elevation, we could see similar or worse damages in the decades to come, placing a heavy financial burden on future generations.

3.2.3.4 Impact of Future Conditions on Mitigating Flood Damage

Mapping future conditions could have a positive impact on reducing flood damage in the future if this information is adopted by local communities and used to regulate current and future development. As discussed in Section 3.2.3.3, homes built today may be in use, without major changes, for the next 100 years. If these homes are built with their low floors to or above the water surface elevation of the future conditions 1-percent-annual-chance flood, these structures and their occupants will be better protected, property values will be less likely to degrade over time, and public investment in post-flood damage assistance programs will be reduced.

Future conditions mapping could also be used to help the public understand and local officials plan for the flood risk they and future generations are likely to face. This information could help guide planning and zoning decisions at the local level; help the public better understand the changing dynamics of flood risk; and help encourage mitigation actions, such as the purchase of flood insurance and safer construction practices. Knowing future conditions flood levels will help the public understand how a slight investment in elevating a few more feet during the construction of a home can pay dividends when you consider the resulting reduction in annual flood insurance premiums. In addition, the CRS program currently allows communities to accrue points to improve its CRS rating for implementing future conditions requirements, which will have a positive effect on mitigating flood damage and reducing flood insurance premiums for residents and business owners in that community.

3.2.4 Population Impacts for Coastal Areas

FEMA defines coastal high hazard areas (Zone V, VE, and V1-30) as those areas of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Special floodplain management requirements apply in these areas, including the requirement that all buildings be elevated on piles or columns. Other coastal hazard areas include the Coastal A Zone and Shaded Zone X (see Figure 3-14).

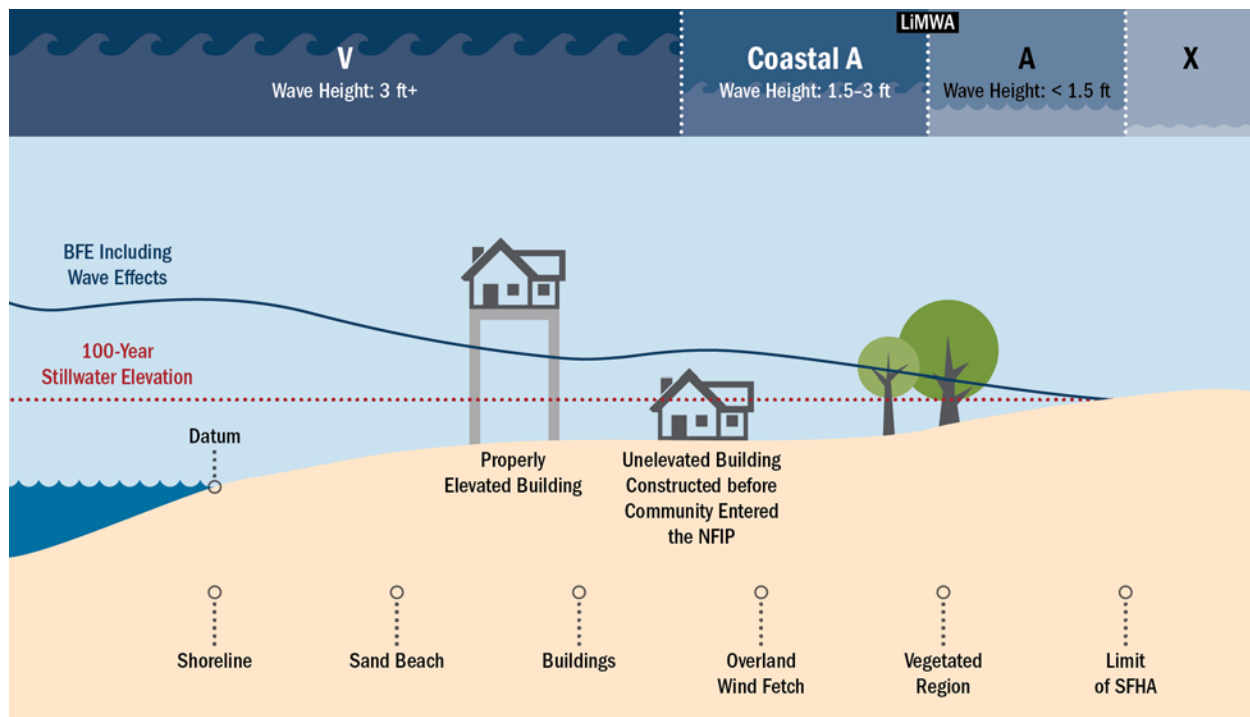


Figure 3-14: Coastal Flood Zones.

3.2.4.1 Coastal Population Demographics

There are 31 States with population in the coastal floodplain (see Table 3-2). In 2010, approximately 11 million people, or 3 percent of the U.S. population, resided in the coastal floodplain. The average population density in the coastal floodplain (excluding Alaska), was 292 people per square mile. This is about three times higher than the average density in the United States. For the population residing in the coastal floodplain (excluding U.S. territories):

- 12 percent are below the poverty level
- 23 percent are under 5 years old or are 65 years old and older

The population density is growing along the coast. In 2010, population density in coastal counties (i.e., counties with a coastal shoreline, but excluding Alaska) was 446 people per square mile (the U.S. average is 87.4 people per square mile). The same year, approximately 123.3 million people, or 39 percent of the U.S. population, resided in a coastal county, which is defined as any county that abuts the ocean or Great Lakes coastline, and or contains a V-zone or coastal A-zones. This number was a 39 percent increase in population of coastal counties from 1970 (the U.S. average during this same time was a 52 percent increase). The expected population change from 2010 to 2020 in coastal counties is 8 percent. This means an additional 10 million people are expected to live in counties with a coastal shoreline in 2020.

Table 3-2: Coastal Population.

Coastal State	2010 Population in Coastal A Zones	2010 Population in Coastal V Zones	2010 Population in Coastal Shaded X Zones	2010 Population in all Coastal A, V, and Shaded X Zones	Total Coastal State 2010 Population
Alabama	40,209	14,202	8,966	63,377	4,779,736
Alaska	26,986	2,258	2,843	32,086	710,231
California	241,304	24,821	144,136	410,261	37,253,956
Connecticut	101,845	21,469	17,391	140,705	3,574,097
Delaware	53,691	1,440	10,892	66,022	897,934
D.C.	7,471	0	2,062	9,533	601,723
Florida	4,205,413	249,907	582,144	5,037,464	18,801,310
Georgia	132,448	46,843	42,926	222,217	9,687,653
Hawaii	59,666	10,460	3,116	73,242	1,360,301
Illinois	10,260	0	5	10,265	12,830,632
Indiana	779	0	19	798	6,483,802
Louisiana	1,033,646	99,711	379,740	1,513,097	4,533,372
Maine	26,714	5,501	1,958	34,173	1,328,361
Maryland	155,694	6,677	40,063	202,434	5,773,552
Massachusetts	145,618	39,428	38,792	223,837	6,547,629
Michigan	85,981	0	27,323	113,304	9,883,640
Minnesota	4,165	0	150	4,315	5,303,925
Mississippi	90,242	27,001	49,998	167,241	2,967,297
New Hampshire	11,921	385	707	13,013	1,316,470
New Jersey	581,659	32,493	130,999	745,150	8,791,894
New York	648,475	32,935	287,676	969,086	19,378,102
North Carolina	166,914	17,960	34,948	219,822	9,535,483
Ohio	23,447	0	3,393	26,841	11,536,504
Oregon	14,981	2,355	1,754	19,090	3,831,074
Pennsylvania	25,060	0	9,176	34,236	12,702,379
Puerto Rico	119,900	16,124	39,250	175,274	3,725,789
Rhode Island	33,417	19,291	17,041	69,748	1,052,567
South Carolina	275,876	69,238	32,391	377,504	4,625,364
Texas	175,212	65,407	177,080	417,700	25,145,561
Virginia	329,021	16,080	87,439	432,540	8,001,024
Washington	55,377	5,011	5,879	66,268	6,724,540
Wisconsin	18,935	0	671	19,606	5,686,986
TOTALS:	8,902,328	826,997	2,180,926	11,910,250	255,372,888
2010 Total U.S. Population (All States, including non-coastal)					312,471,327

3.2.4.2 Effects of Shoreline Hardening

Coastal flood hazards arise from waves and storm surge that originate in the ocean and then interact with the ocean bottom and the land. Therefore, when the ocean bottom or land is modified, it impacts the flood hazard. Future conditions modeling needs to incorporate expected changes to the shoreline.

The shoreline, including the ocean bottom and land, is constantly in motion. The natural processes that change the shoreline include the following example scenarios:

- Breaking waves that move sand along the coast, eroding sand in one area and depositing it on an adjacent beach
- Tidal cycles that bring sand onto the beach and carry it back into the surf
- Rivers that carry sediment to the coast and build deltas into the open water
- Storms that cause deep erosion in one area and leave thick overwash deposits in another
- Plants that retain sediment in wetlands and impede movement of coastal dunes³⁹

These natural processes are very complex, and when manmade actions alter any of these items, it affects the coastal flood hazard (see Figure 3-15).



Figure 3-15: Seawall. This seawall on New Smyrna Beach, Florida, was mostly hidden by sand prior to the arrival of Hurricane Jeanne in 2004. FEMA Photo/Mark Wolf.

³⁹ USGS, 2008.

Shoreline Hardening

Seawalls or other shoreline hardening constructed to protect property along retreating beaches often exacerbate beach erosion. As shown in Figure 3-16, as the coast naturally erodes, undisturbed beaches can keep their natural width. When seawalls or other hardening is constructed, it confines the wave energy. This concentrates the sediment transport processes into an increasingly narrow area; thereby increasing erosion. Eventually, the beach disappears, leaving the seawall. For example, a massive seawall built to protect a highway and beach houses along the northern New Jersey coast has resulted in the complete disappearance of the beach itself.

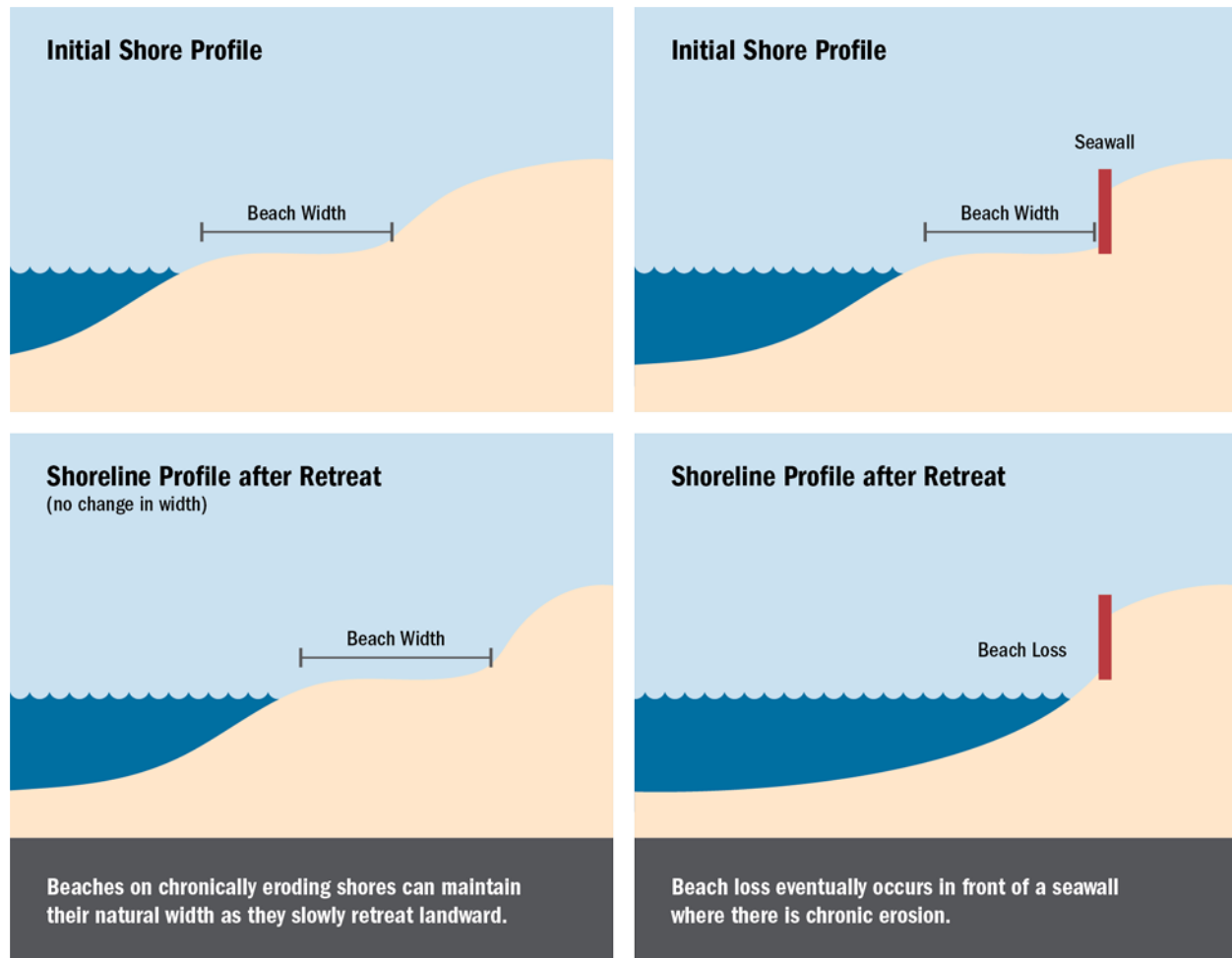


Figure 3-16: Shoreline Hardening. Shoreline hardening can result in beach loss.

Groins or Jetties

To prevent beach loss, groins or jetties are often constructed into the water. These solid structures impede the natural cross-beach transfer of sand that is caused by currents along the shoreline. Small groins may have little effect on sand movement along the entire beach. Larger groins or jetties can cause a significant retention of sand on the updrift side of the groin, which expands the beach in this area. However, the groin will also impede the ability of the sand to move downdrift of the groin, which increases downdrift erosion and reduces the beach area. Sand carried out past the jetty may be deposited as shoals offshore in deeper

water. This removes the sand from the coastal system, thereby further increasing downdrift erosion and reducing the beach area.⁴⁰

Sand Removal

Dredging navigation channels and tidal inlets and discharging the materials into deep water also removes sand from the coastal system. For some coastal regions, such as the Pacific Coast, a large part of their sand budget is supplied by rivers.

According to the USGS, dams “built for flood control and water catchment along the rivers leading to these coasts inhibit the transport of large-grained sediment. Lacking new material, the sediment-starved coasts erode and migrate inland. Damming of tributary rivers to the Mississippi River over the past 60 years has also reduced the movement of sediment. Studies by the USGS in recent years demonstrate that the amount of sediment carried by the Mississippi has been cut in half, aggravating the deterioration of Louisiana's wetlands.”⁴¹

All of these manmade actions along our coast can dramatically alter the shoreline. These changes will then affect the flood hazards along the coast.

Sub-Recommendation 3-5. FEMA should take into account future development (excluding proposed flood control structures for the base condition/scenario) for future conditions mapping. An additional scenario can be generated that does include future flood control structures.

Sub-Recommendation 3-6. FEMA should use population growth as an indicator of areas with increased potential flood risk.

3.3 Natural Changes

3.3.1 Overview of Climate Change

The Global Change Research Act of 1990 (Public Law 101-606)⁴² requires a report to Congress and the President every four years on the environmental, economic, health, and safety consequences of climate change. The Third National Climate Assessment (NCA)⁴³ was conducted as part of this requirement. It was released by the United State Global Climate Change Research Program in May 2014. It summarizes the current and future potential impacts of climate change on the United States on a regional and sector basis. A team of more than 300 experts, guided by a 60-member Federal Advisory Committee, produced the report, which was extensively reviewed by the public and subject matter experts, including Federal agencies and the National Academy of Sciences.

Flood-related issues are covered in nearly every chapter of the NCA, and are addressed specifically in the separate chapters for water and coasts in addition to the chapter on “Our Changing Climate.” This section summarizes salient points in the NCA and elsewhere related to flooding and projected climate information

⁴⁰ USGS, 2008.

⁴¹ USGS, 2008.

⁴² Global Change Research Act of 1990, 1990.

⁴³ Georgakakos, 2014.

that may be of interest to decision-makers. For the purpose of this report, we will first address observed changes, and then projected changes.

3.3.2 Observed Climate Change

The Third NCA noted that all of the trends identified in the Second National Assessment⁴⁴ have continued in the intervening 5 years. These include a continuation of the trends in the 10 indicators of a warming world (see 3-17). These 10 indicators are all important to understanding floods and flood risk because they affect aspects of the hydrologic cycle and contribute to changing sea levels and storm patterns.

The NCA was very clear in stating that the climate is changing, will continue to change for the foreseeable future, and may accelerate in the future if global greenhouse gas emissions continue. These changes are evident in many places, and are becoming increasingly disruptive. Observed changes that directly impact flood risks are outlined below.



Figure 3-17: Ten Indicators of a Warming World

3.3.2.1 Observed Precipitation Trends

Generally, it is both the long-term trend and the variability that are important in understanding how precipitation patterns have changed over time. Average annual precipitation is one commonly used measure of how precipitation has changed. But the amount of precipitation that falls in different seasons is also important, as is the amount of precipitation that falls during heavy precipitation events. Chapter 25⁴⁵ of the NCA reports that since 1991, average annual precipitation has increased 9 percent in the Midwest and 8 percent in the Northeast and southern Great Plains, compared to the period 1901-1960. No definitive trends were reported for the Southeast, Southwest, and Caribbean (Chapter 17),⁴⁶ where some locations had increases and some had decreases. No trends were reported for Alaska (Chapter 22).⁴⁷ In the Pacific,

⁴⁴ Karl, et al., 2009.

⁴⁵ Moser, et al., 2014.

⁴⁶ Carter, et al., 2014.

⁴⁷ Chapin, et al., 2014.

western islands are experiencing slight increases in precipitation, while those in the east (e.g., Hawaii) are experiencing decreases (Chapter 23).⁴⁸

Heavy rainfall that contributes to both local and regional flooding has been observed to increase just about everywhere except Hawaii in the past several decades (see Chapter 2).⁴⁹ The greatest increase in very heavy events (the heaviest 1 percent of all events) between 1958 and 2012 (see Figure 3-18) was observed in the Northeast (71 percent) and Midwest (37 percent). No significant changes were observed in the Southwest, Northwest, and Hawaii.

3.3.2.2 Observed Sea Level Trends

There are a number of factors that impact sea level. Important factors include local land movement (e.g., uplift, subsidence); glacial and ice cap conditions; ocean circulation; and ocean properties, such as the temperature of the water, which is closely related to its volume, salinity, and density. Both global sea level and local relative sea level (LRSL) vary by location, depending on local, regional, and global processes (see Figure 3-19).

Records from various sources show that there has been a long-term trend in rising global sea levels, with an increasing rate of change since the 1800's.⁵⁰ The National Oceanic and Atmospheric Administration (NOAA) maintains tide gauges, which measure local relative sea level, and also reports on current trends (see Figure 3-20). For most of the United States, LRSs are increasing. In some areas of the Pacific Northwest and Alaska, SRSs are falling, primarily due to tectonic activity. Increasing LRSs are already resulting in increased nuisance or recurrent flooding for the continental United States.⁵¹

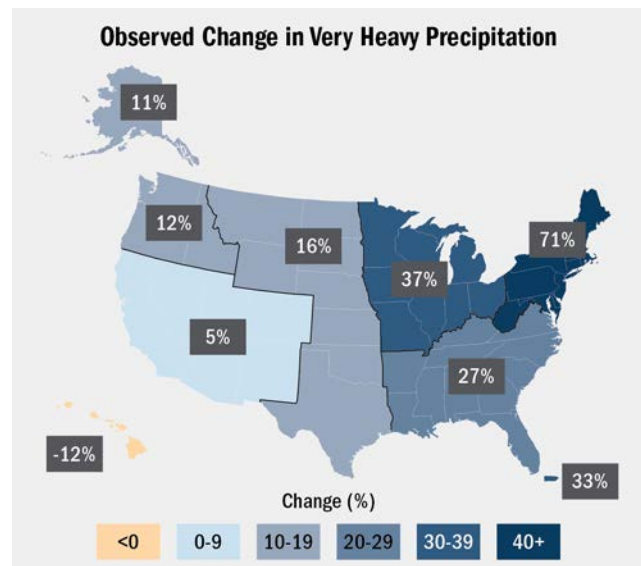


Figure 3-18: Change in Heaviest Precipitation. Percent change from 1958 to 2012 in the amount of precipitation falling in very heavy events (the heaviest 1 percent).

48 Leong, et al., 2014.

49 Walsh, et al., 2014.

50 NRC, 2012.

51 Sweet, et al., 2014.

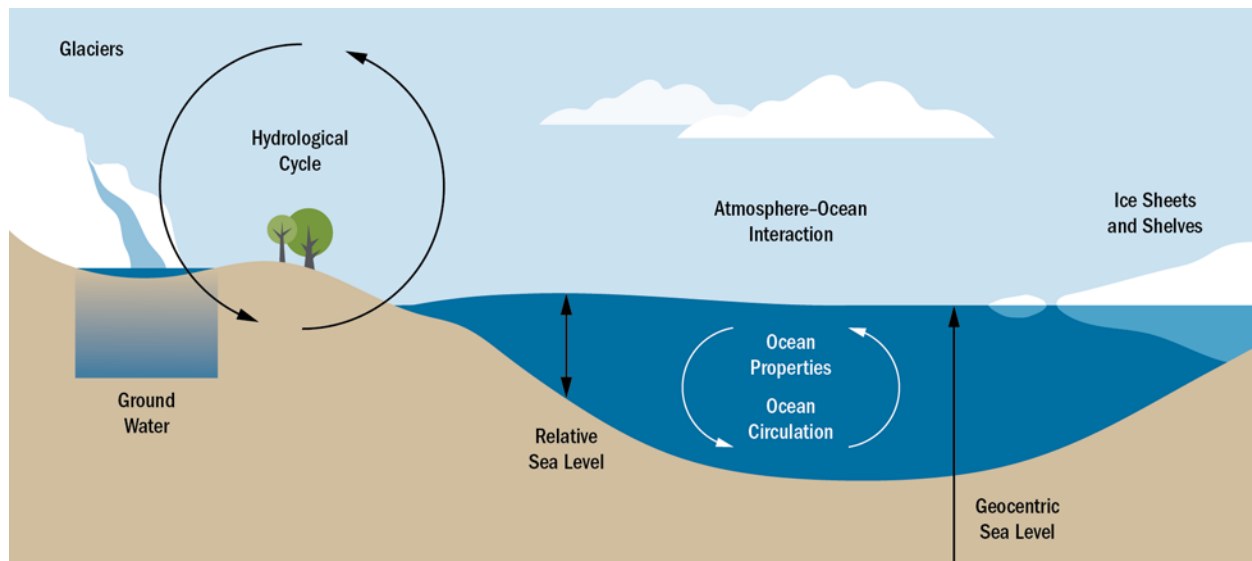
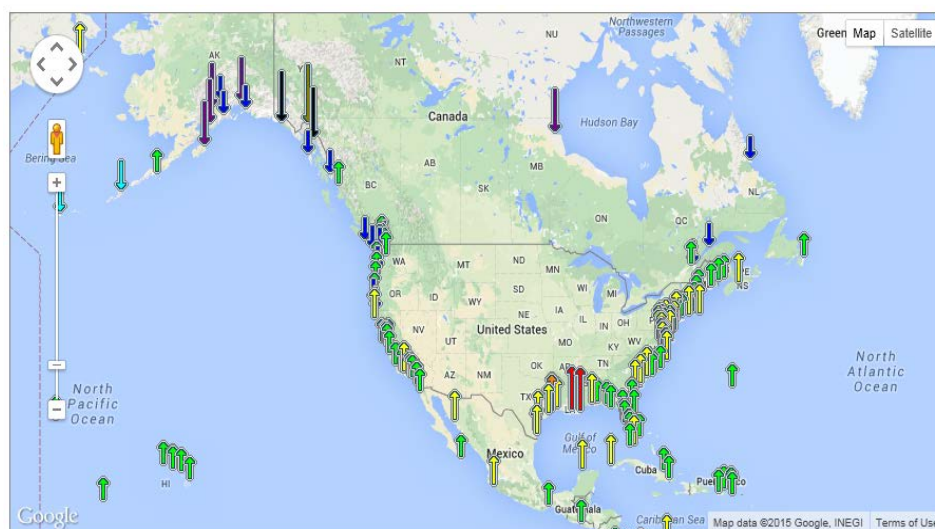


Figure 3-19: Some Components of Global Sea Level Rise.⁵²
Note that both global sea level and relative sea level vary by location.



Sea Level Trends
mm/yr (feet/century)

15 to 21 (5 to 7)	6 to 9 (2 to 3)	-3 to 0 (-1 to 0)	-12 to -9 (-4 to -3)
12 to 15 (4 to 5)	3 to 6 (1 to 2)	-6 to -3 (-2 to -1)	-15 to -12 (-5 to -4)
9 to 12 (3 to 4)	0 to 3 (0 to 1)	-9 to -6 (-3 to -2)	-18 to -15 (-6 to -5)

Figure 3-20: NOAA Regional Sea Level Trends for the United States, April 2015.⁵³

⁵² Church, et al., 2013.

⁵³ NOAA, 2013.

3.3.2.3 Observed Storm Trends

While the NCA reports that Northeast and Northwest coastlines have experienced increasing storm activity since about 1980, when high-quality satellite data became available, it is possible that this apparent increase may also be a factor of improved detection capabilities.⁵⁴ Some reports suggest that it is not possible at this time to identify robust trends in tropical cyclone activity for the Atlantic and western North Pacific for a variety of reasons.⁵⁵

3.3.2.4 Observed Great Lakes Water Level Trends

Great Lakes water levels have been observed since the mid-1800s to fluctuate above and below average.⁵⁶ For example, decreasing water level trends across the Great Lakes in the 1960s were followed by above-average water levels in the 1970s and 1980s, after which period water levels dropped in the 1990s, leveling off (Ontario and Erie) in the 2000s. This natural variability in lake levels has been observed even more recently. For example, in January 2013, monthly-average water levels on Lake Michigan and Lake Huron dropped to their lowest levels in recorded history.⁵⁷ In early 2015, the Great Lakes water levels increased to near record levels in some of the lakes. The Great Lakes Water Level Dashboard⁵⁸ provides visualization and access to the long-term average water level observations for the Great Lakes going back to 1918 (see Figure 3-21).

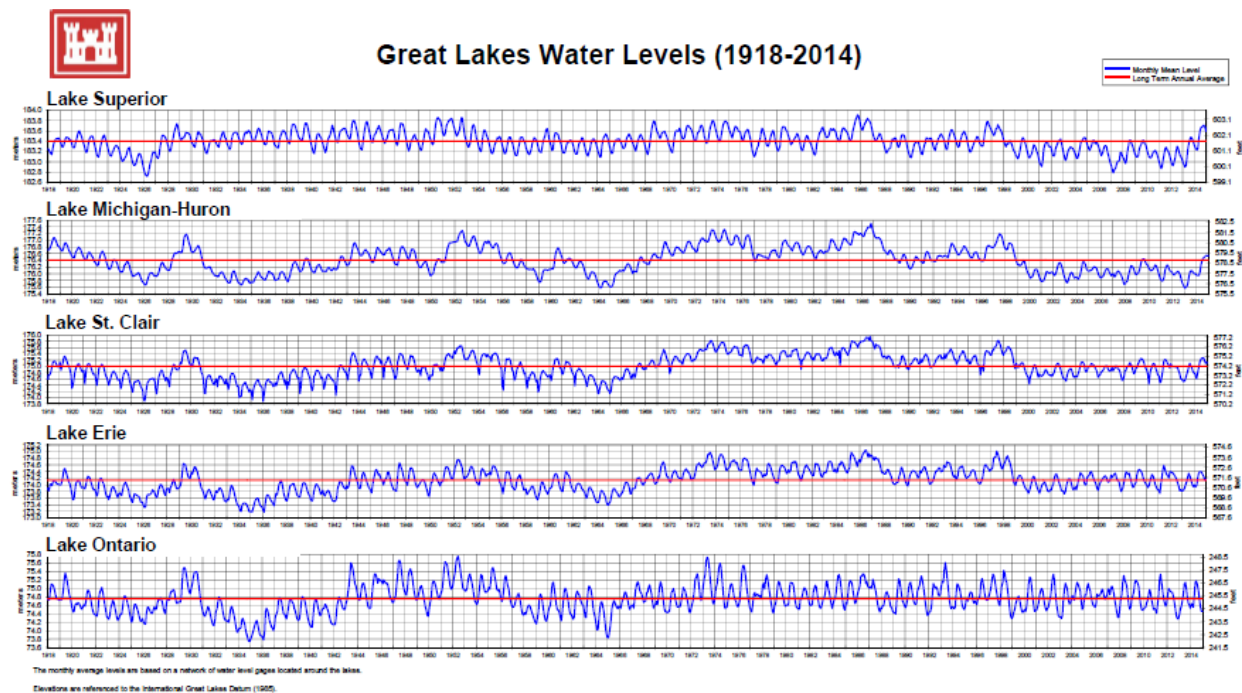


Figure 3-21: Great Lakes Water Levels. Great Lakes Water Levels have historically fluctuated seasonally and interannually. Some lakes are controlled and thus have less fluctuation (ex. Superior and Ontario).⁵⁹

⁵⁴ Landsea, et al., 2010.

⁵⁵ Kunkel, et al., 2013.

⁵⁶ Angel and Kunkel, 2010.

⁵⁷ Clites, et al., 2014.

⁵⁸ Gronewold, et al., 2013.

⁵⁹ USACE, 2015a.

3.3.2.5 Observed Wildfire Trends

Wildfires leave the ground charred, barren, and unable to absorb water, creating conditions conducive for flash flooding and mudflow. Until a watershed impacted by a major wildfire can restore vegetation—which may take up to 5 years after the wildfire—flood risk remains significantly higher when compared with the risk prior to the event.⁶⁰ Areas directly affected by fires and those located below or downstream of burn areas are at greatest risk for flooding. In the U.S. Southwest, increases in heat, drought, and insect outbreaks that are linked to climate change has increased wildfires. Between 1970 and 2003, warmer and drier conditions increased burned areas in the western U.S. mid-elevation conifer forests by 650 percent.⁶¹

3.3.3 Future Climate Change

The NCA states that global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends on the amount of heat-trapped gasses emitted globally and how sensitive the earth's climate is to those emissions.

Choices made now and in the next few decades will determine the amount of additional future warming. Beyond mid-century, lower emission levels will lead to noticeably less future warming. Higher emissions levels will result in more warming and, thus, more severe impacts on human society and the natural world. Figure 3-22⁶² shows different greenhouse gas scenarios projected out to 2100. Lowering emissions now will reduce future temperature increases.

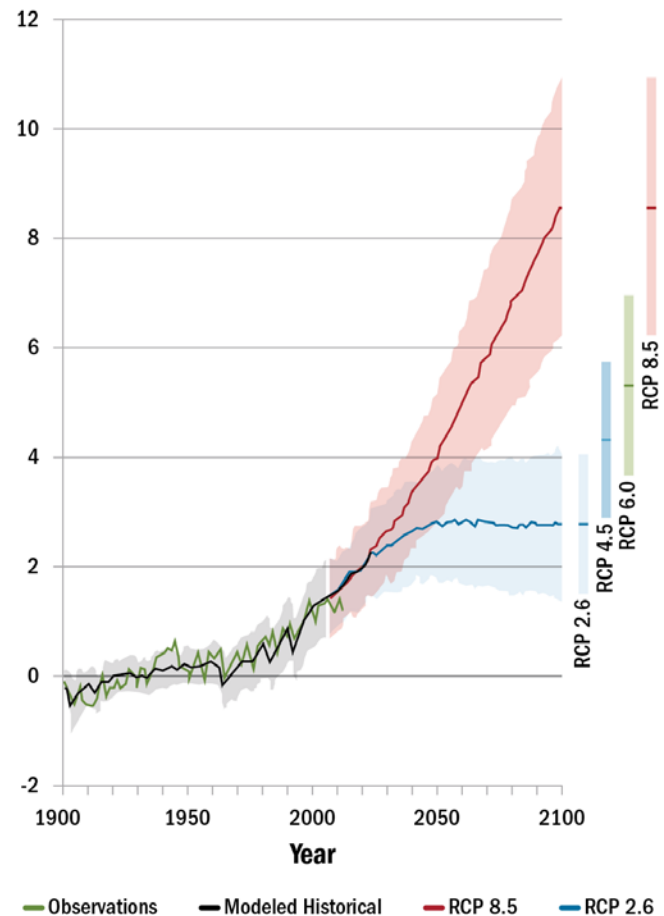


Figure 3-22: Heat-Trapping Gasses and Temperature. Different amounts of heat-trapping gasses released into the atmosphere by human activities produce different projected increases in Earth's temperature. This plot shows temperature observations vs modeled historical trends on the left, and future projected trends based on a lower and higher emissions pathways (also known as Representative Concentration Pathways [RCPs]) on the right.

⁶⁰ FEMA FloodSmart, 2015.

⁶¹ Westerling, et al., 2011.

⁶² NCA, 2014.

3.3.3.1 Projected Precipitation Trends

Warmer air contains more water vapor than cooler air. Global analyses show that the amount of water vapor in the atmosphere has, in fact, increased over both land and oceans. Climate change also alters dynamic characteristics of the atmosphere that, in turn, affect weather patterns and storms. In the mid-latitudes, where most of the continental United States is located, there is an upward trend in extreme precipitation in the vicinity of fronts associated with mid-latitude storms. Locally, natural variations can also be important.

Projections of future changes in precipitation show small increases in the global average, but substantial shifts in where and how precipitation falls. Generally, areas closest to the poles are projected to receive more precipitation, while the dry subtropics expand toward the poles and receive less rain. Increases in tropical precipitation are projected during rainy seasons, especially over the tropical Pacific. Certain regions, including the western United States (especially the Southwest) and the Mediterranean, are presently dry and are expected to become drier.

The widespread trend of increasing heavy downpours is expected to continue, with precipitation becoming less frequent, but more intense. The patterns of the projected changes of precipitation do not contain the spatial details that characterize observed precipitation, especially in mountainous terrain, because the projections are averages from multiple models and because the effective resolution of global climate models is roughly 100 to 200 miles. Figure 3-23 shows globally where precipitation is expected to increase and decrease.

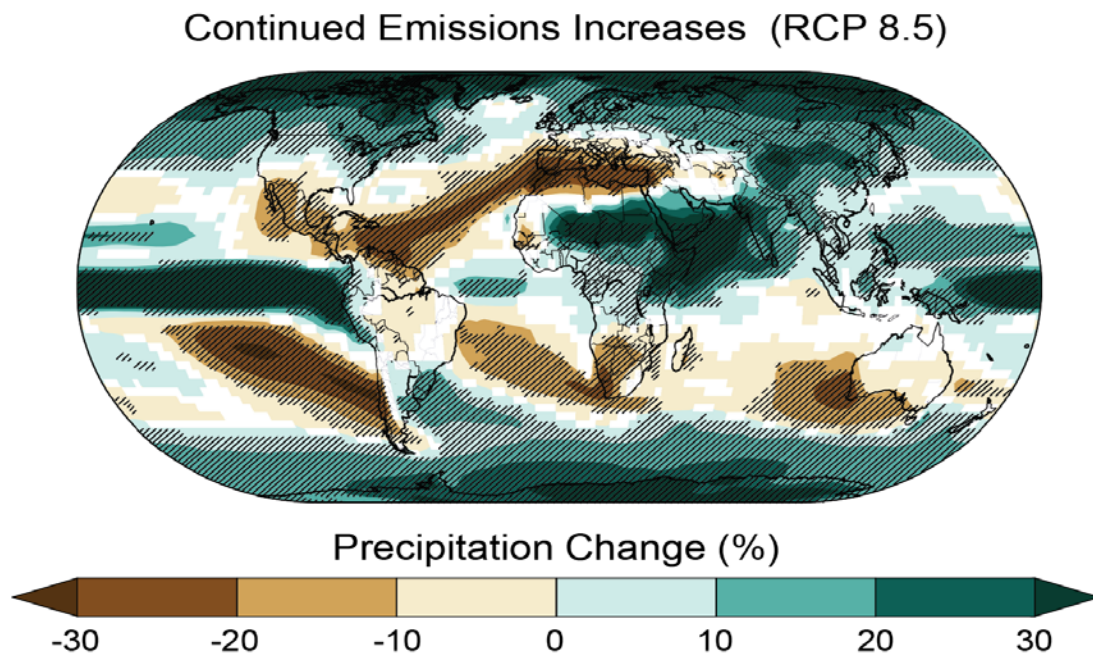


Figure 3-23: Emissions Increases and Precipitation Change.

Projected change in average annual precipitation over the period 2071-2099 (compared to the period 1970-1999) under a high scenario that assumes continued increases in emissions (RCP 8.5). In general,

northern parts of the United States (especially the Northeast and Alaska) are projected to receive more precipitation, while southern parts (especially the Southwest) are projected to receive less.⁶³

3.3.3.2 Projected Storm Trends

Projected storm trends include trends in heavy precipitation and hurricanes.

Heavy Precipitation Events

Flooding may intensify in many U.S. regions, even in areas where precipitation is projected to decline (see Figure 3-24). Floods are caused or amplified by both weather- and human-related factors. Major weather factors include heavy or prolonged precipitation, snowmelt, thunderstorms, storm surges from hurricanes, and ice or debris jams. Human factors include structural failures of dams and levees, altered drainage, and land-cover alterations (e.g., pavement). The risks from future floods are significant, given expanded development in coastal areas and floodplains, unabated urbanization, land-use changes, and human-induced climate change.⁶⁴

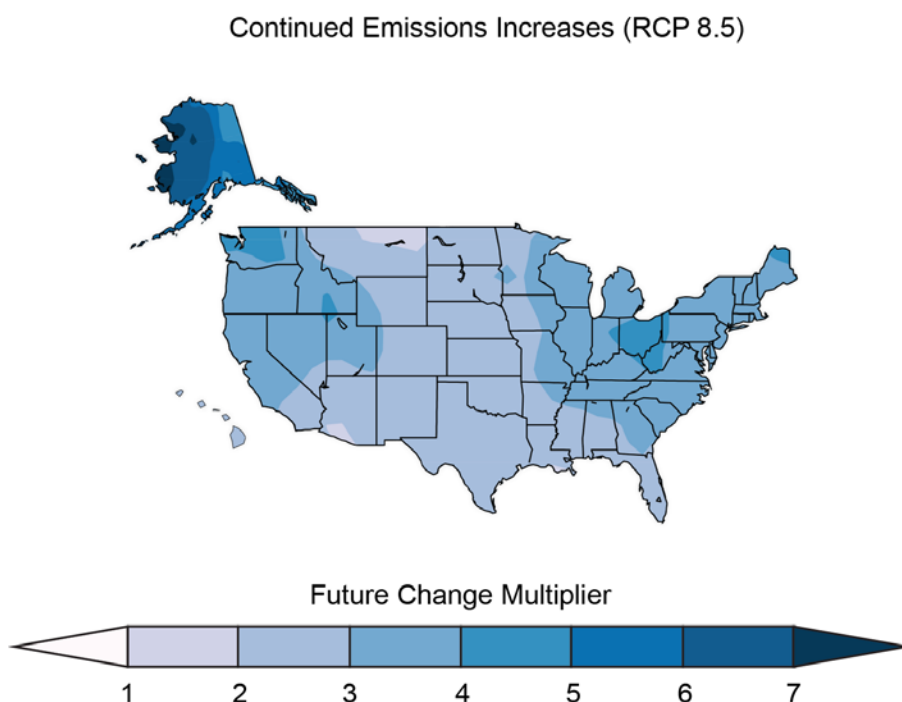


Figure 3-24: Extreme Daily Precipitation events. Map shows the increase in frequency of extreme daily precipitation events (a daily amount that now occurs once in 20 years) by the later part of this century (2081-2100) compared to the later part of last century (1981-2000). Such extreme events are projected to occur more frequently everywhere in the United States For the scenario assuming continued increases in emissions (RCP 8.5), these events would occur more often (noted by the darker blue regions).⁶⁵

Hurricanes

⁶³ NCA, 2014.

⁶⁴ Doocy, et al., 2013.

⁶⁵ Walsh, et al., 2014.

By late this century, models, on average, project a slight decrease in the annual number of tropical cyclones, but an increase in the number of the strongest (Category 4 and 5) hurricanes. Models also project greater rainfall rates in hurricanes in a warmer climate, with increases of about 20 percent averaged near the center of hurricanes. It is important to note, however, that there is still some uncertainty in the climate models when it comes to future tropical cyclone activity.

Severe Storms

Tornadoes and other severe thunderstorm phenomena frequently cause as much annual property damage in the United States as do hurricanes, and often cause more deaths. Recent research has yielded insights into the connections between global warming and the factors that cause tornadoes and severe thunderstorms (e.g., atmospheric instability, increases in wind speed with altitude). Although these relationships are still being explored, a recent study suggests a projected increase in the frequency of conditions favorable for severe thunderstorms.⁶⁶

3.3.3.3 Projected Sea Level Trends

Projecting future rates of sea level rise (SLR) is challenging. Even the most sophisticated climate models, which explicitly represent Earth's physical processes, cannot simulate rapid changes in ice sheet dynamics and, thus, are likely to underestimate future sea level rise. In recent years, "semi-empirical" methods have been developed to project future rates of SLR based on a simple statistical relationship between past rates of globally-averaged temperature change and SLR. These models suggest a range of additional SLR from about 2 feet to as much as 6 feet by 2100, depending on the emissions scenario. It is not clear, however, whether these statistical relationships will hold in the future, or that they fully explain historical behavior. Regardless of the amount of change by 2100, however, SLR is expected to continue well beyond this century as a result of both past and future emissions from human activities.

Scientists are working to narrow the range of SLR projections for this century. Recent projections show that, for even the lowest emissions scenarios, thermal expansion of ocean waters and the melting of small mountain glaciers will result in 11 inches of SLR by 2100, even without any contribution from the ice sheets in Greenland and Antarctica. This projection suggests that about 1 foot of global SLR by 2100 is probably a realistic low end. On the high end, recent work suggests that 4 feet or more is plausible, including significant ice contribution from Greenland and Antarctica. In the context of risk-based analysis, some decision makers may wish to use a wider range of scenarios, from 8 inches to 6.6 feet by 2100⁶⁷ (see Figure 3-25). In particular, the high end of these scenarios may be useful for decision makers with a low tolerance for risk. Although scientists cannot yet assign likelihood to any particular scenario, in general, higher emissions scenarios that lead to more warming would be expected to lead to higher amounts of SLR.

⁶⁶ Diffenbaugh, et al., 2013.

⁶⁷ Parris, et al., 2012.

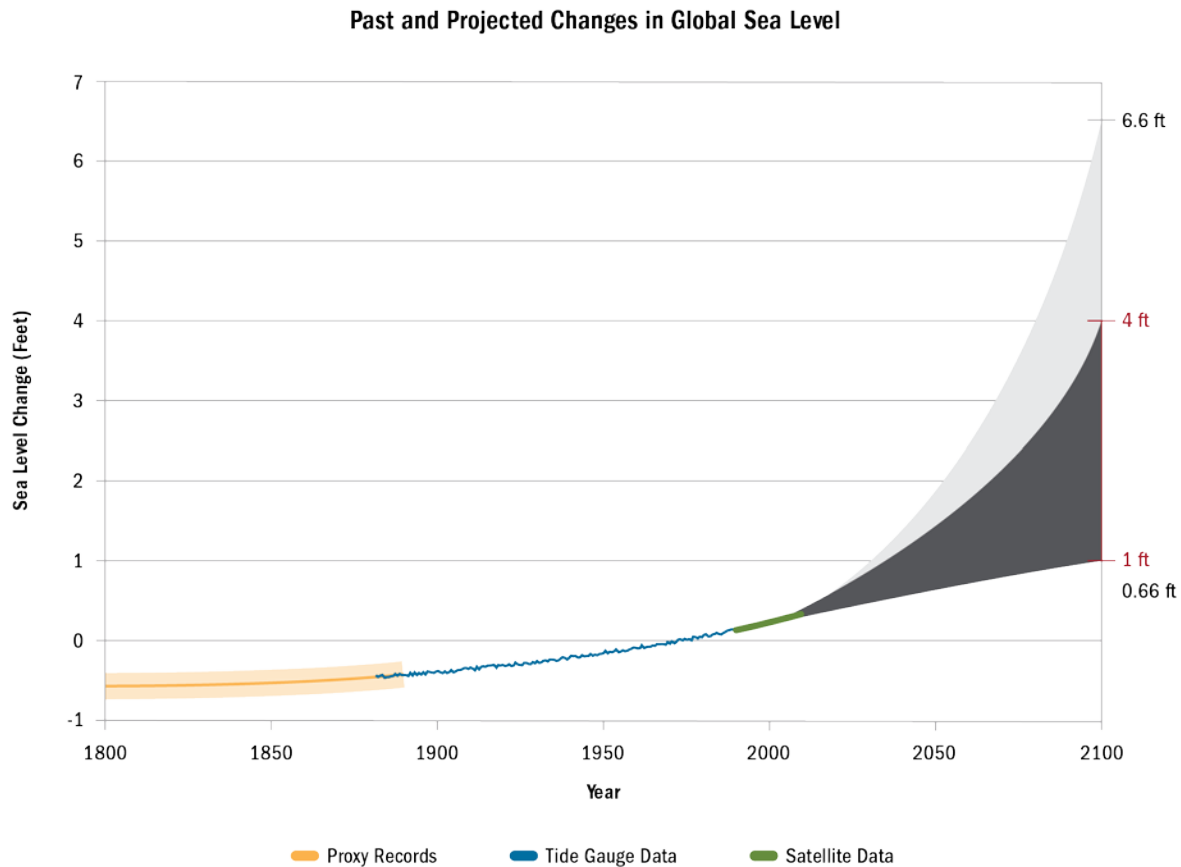


Figure 3-25: Past and Projected Changes in Global Sea Level.
Estimated, observed, and possible future amounts of global sea level rise from 1800 to 2100, relative to the year 2000, based on possible scenarios based on science consensus.⁶⁸

3.3.3.4 Great Lakes Level Trends

Future flood risk in the Great Lakes area will be determined by future fluctuations in lake levels, as well as storm frequency and magnitudes. Great Lakes water levels represent evolving research and are still subject to considerable uncertainty. For example, water level projections for the individual lakes vary by several feet among the available climate models. One area of research is to improve techniques to estimate evapotranspiration because previous estimates from temperature data may have overestimated evaporation losses.^{69, 70, 71}

⁶⁸ Adapted from Parris et al., 2012, with input from NASA Jet Propulsion Laboratory.

⁶⁹ Pryor, et al., 2012.

⁷⁰ MacKay and Seglenieks, 2012.

⁷¹ Angel and Kunkel, 2010.

3.3.3.5 Projected Wildfire Trends

Numerous fire models project more wildfires as climate change continues. For example, models project a doubling of burned area in the Southern Rockies and up to a 74 percent increase in burned areas in California, with northern California potentially experiencing a doubling under a high emission scenario toward 2100.⁷²

3.4 Design Elevations for Future Conditions

The Nation is projected to grow from a population of 310 million to a population of 450 million by the year 2050. This will result in a large number of new structures and significant infrastructure being built. If responsible design decisions are made, the Nation will be better prepared for future disasters. Conversely, if this new development is not planned and implemented in a responsible manner, the consequences of these poor decisions will last for many generations.

Due to the relative young age of the United States, there is limited historic data on flood elevations, which presents a challenge when predicting future flood elevations. Many of the predictions for the 1-percent-annual-chance flood (100-year flood) are based on a period of historical record that is significantly less than 100 years. In the United States, there are very few gages with greater than 100 years of record. By contrast, the Nile River has perhaps nearly 3,000 years of record. Predicting a 1-percent-annual-chance storm for the Nile River would have a narrower band of uncertainty than any flooding source in North America. The uncertainty of flood predictions for existing conditions is generally greater than 40 percent in the United States. Couple this with the unknowns of future development and climate change and the uncertainty of the flood predictions increases.

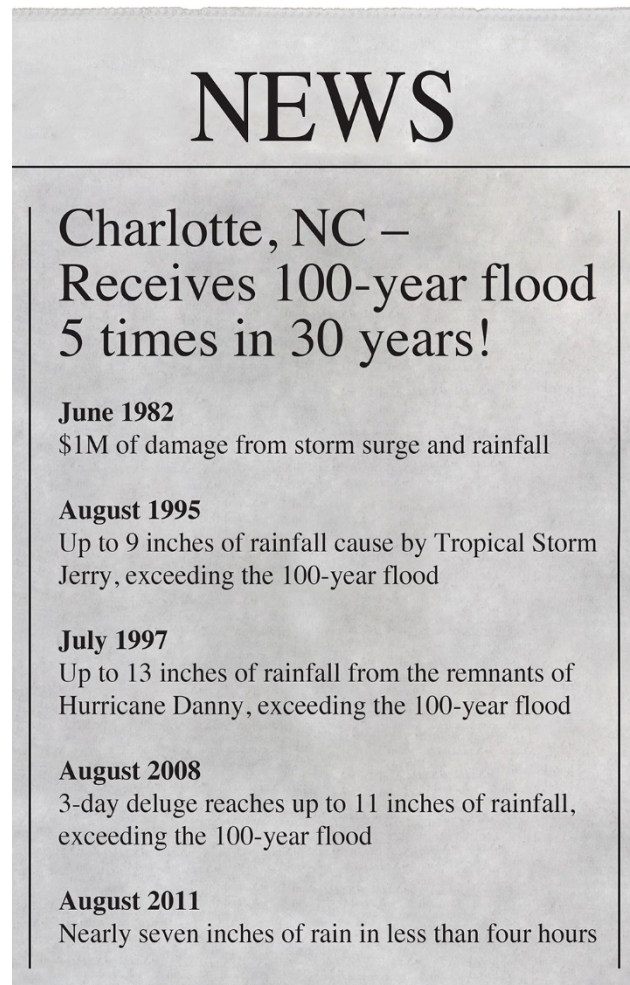


Figure 3-26. Newspaper Headlines

⁷² Westerling, et al., 2006.

EXPECTATIONS OF SAFETY

FEMA's Top Two Goals

- Goal 1: Reduce loss of life and property
- Goal 2: Minimize suffering and disruption caused by disasters

Code of Ethics for Engineers

- 1. Hold paramount the safety, health, and welfare of the public

Planners, engineers, and designers deal with all types of uncertainty by applying a factor of safety to keep the public safe. This is illustrated by FEMA's top two goals of reducing loss of life and property and minimizing the suffering and disruption caused by disasters (see text box). In addition, the code of ethics for engineers is to hold paramount the safety, health, and welfare of the public.

If the United States is to become a resilient and sustainable Nation, then we need to encourage the construction of infrastructure that takes into account

the same level of safety that is expected in all other aspects of engineering with a factor of safety applied to designs.

3.4.1 Ranges and Averages

Riverine and coastal hydrologic and hydraulic analyses and numerical flood modeling are fundamentally based on statistics. These statistical results are often reported as the median storm at a certain recurrence interval.

In addition, the USGS definition of the 1-percent-annual chance flood, upon which FEMA bases its FIRMs, is based on the average number of occurrences over a long period of time: *"the 1-percent flood has a 1 in 100 chance of being equaled or exceeded in any 1 year, and it has an **average** recurrence interval of 100 years, it often is referred to as the '100-year flood.'"*⁷³ However, the past 100 years proves that averages are not the norm, and "average" flooding can be exceeded many times, sometimes even within a single calendar year.

The use of the 1-percent-annual-chance flood as the design flood (with regard to building codes) has led to the existence of structures that are designed to withstand a median 1-percent- or perhaps 0.2-percent storm. However, the reality is that 50 percent of the time, the 1-percent-annual-chance flood will be higher than predicted and structures built to the minimum NFIP requirements will be damaged.

Catastrophic damage from events that exceed the 1-percent-annual-chance flood will also occur and damage buildings and structures that were designed or protected to the NFIP minimum standard.

Defining flood risk based on a median storm confuses the public and policy makers (as well as many architects, engineers, and planners). Since the

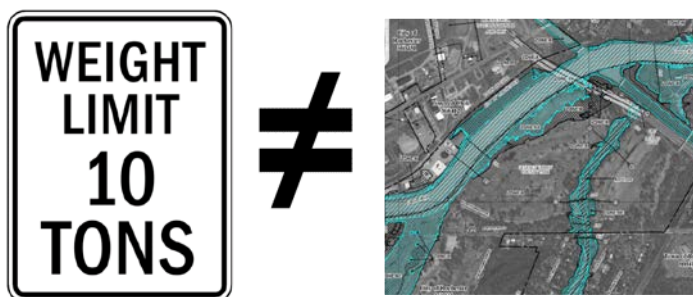


Figure 3-27: Public Expectations of Safety. When an engineer reports a number, the public expects that they will be safe if they follow the engineer's advice. This is not true if the owner wants to be safe from the 1-percent-annual-chance event.

⁷³ USGS, 2010.

message that the FIRMs are intended to convey is confusing, efforts to communicate the risk and take actions to reduce risk are also affected.

The public trusts engineers to keep them safe in many ways, and when engineers provide information about our safety or risk, the public tends to rely on them. For example, if a driver sees a sign on a bridge that states the safe rating of the bridge is 10 tons, the driver expects to be able to drive a 10-ton truck over the bridge once, twice, or a thousand times without the bridge failing. As design professionals, we have conditioned the public to trust without exception the safety limits we set, whether it is the number of people that should be in an elevator, or the maximum weight limit of a bridge.

However, when it comes to flooding, it is more difficult to draw a line between an area that is floodprone and an area that is not. Flood elevations and floodplain boundaries on a FIRM are not based on absolute values, nor do they include an associated factor of safety. Instead, these numbers are the statistical medians developed using averages. While the insurance industry needs the statistical medians to generate flood insurance rate tables, these medians are not building design criteria.

Calculations of flood risk for planning and building/infrastructure design does not include any factor of safety. Factors of safety are applied in every other engineering field to take into account the uncertainty of the science and protect the safety of the public. Many people believe that if they build to an elevation that is reported on the FIRM or outside of an SFHA, they will be safe from flooding. This simply is not the case.

Figure 3-28 and Figure 3-29 show graphs of flood elevations statistical “median,” along with the with 5 percent and 95 percent confidence limits. As shown, the uncertainty of the numbers is large. For example, for the riverine flooding in the Ramapo River near Pompton Lakes, New Jersey, the 1-percent-annual-chance elevation could be 3.8 feet higher or 2.4 feet lower than the average shown. For the coastal flooding at the NOAA Battery, New York, Tidal Station, the 1-percent-annual chance flood elevation could be 1.6 feet higher or 2.3 feet lower than the average, depending upon the data source.

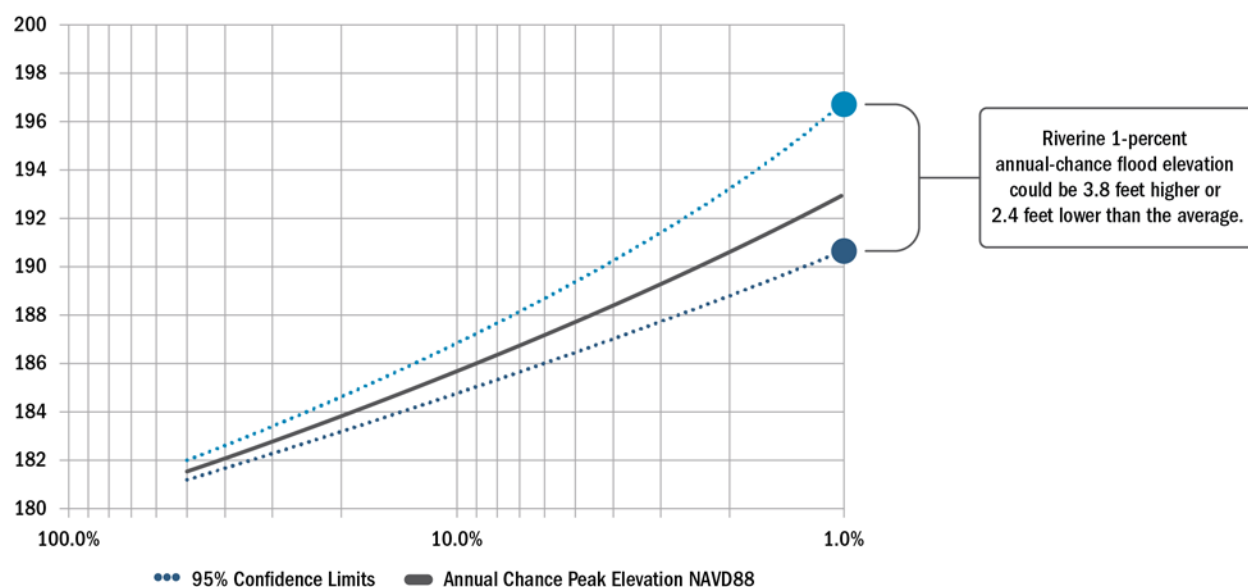


Figure 3-28: Confidence Limits for Ramapo River near Pompton Lakes, New Jersey

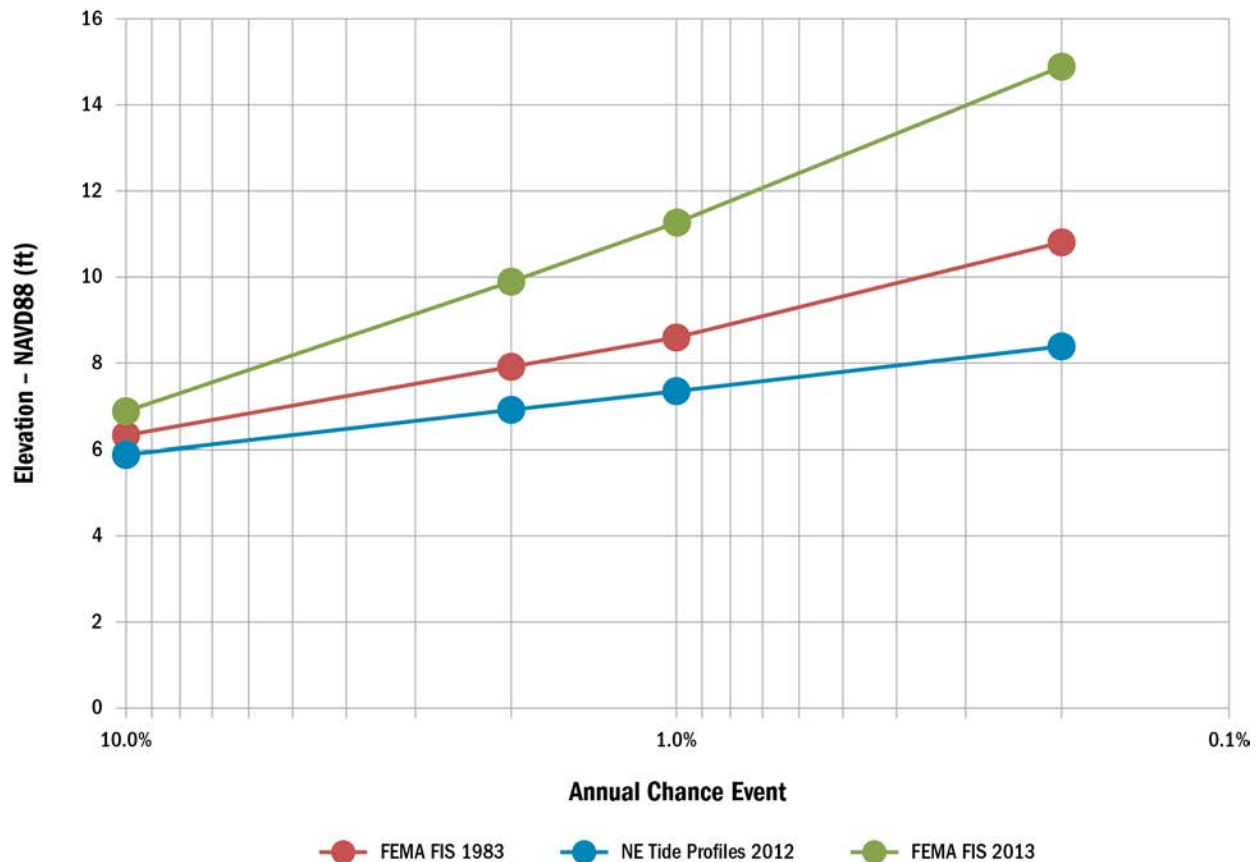


Figure 3-29: NOAA Battery, New York Tidal Station

3.4.2 Design versus Insurance

A design standard is typically an agreed-upon method that will result in a safe condition for the user if that particular situation is encountered. For example, if a structure were to be designed to withstand the 1-percent-annual-chance flood, the design elevation would take into account the uncertainties of the flood prediction in the design. The 1-percent-annual-chance flood elevation shown on the FIRM is more of an average or median elevation with almost no factor of safety. The problem with this approach is that the public and some designers use the BFEs on the FIRM as design elevations when, in reality, they are average or median elevations with no factor of safety.

To illustrate the impact of the flood elevation on design criteria, Figure 3-30 shows that the 1-percent-annual-chance flood elevation of 193.0 feet is equivalent to the 2-percent-annual-chance flood elevation (50-year flood) at the 95 percent confidence limit.

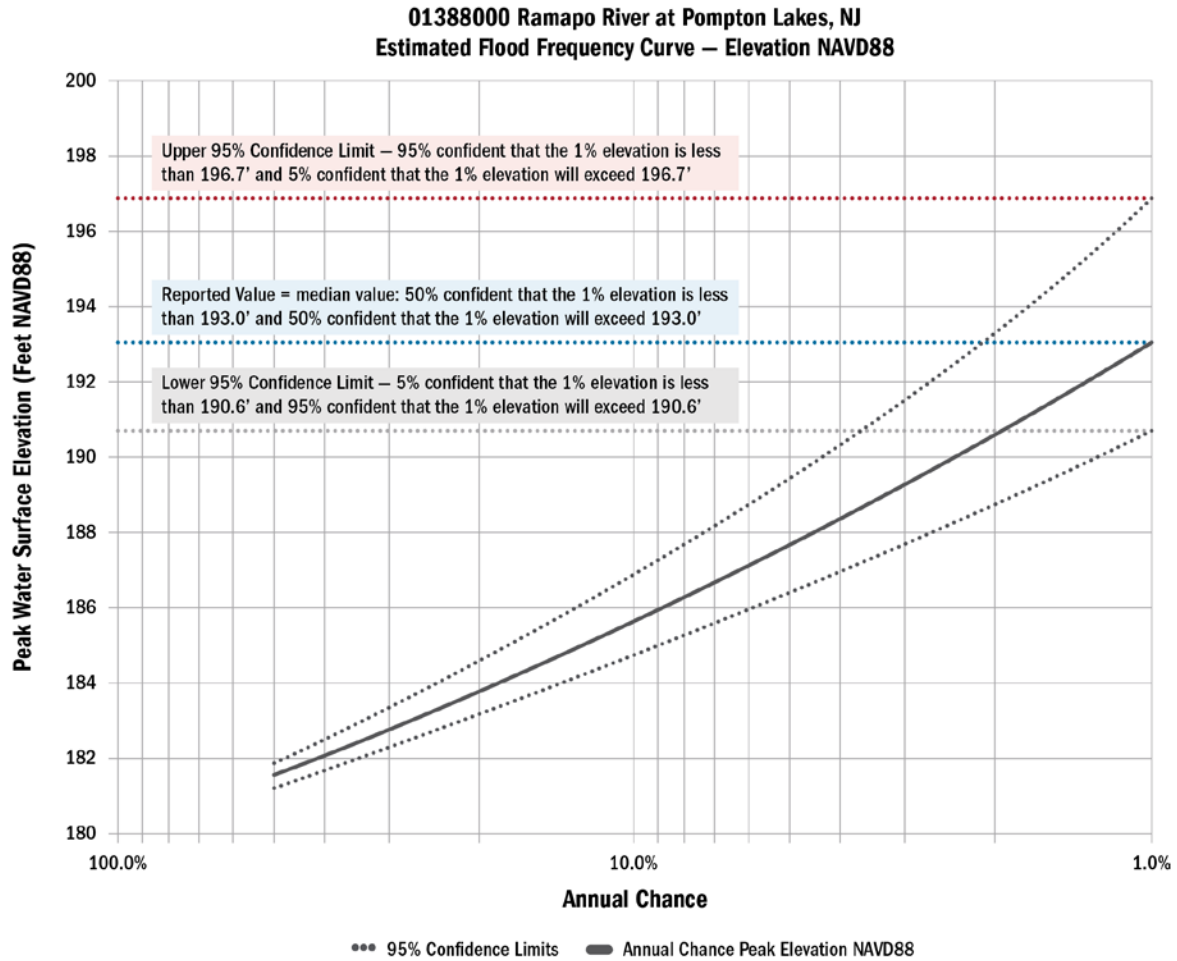


Figure 3-30. Base Flood and Confidence Limits

3.4.3 Additional Design Considerations

The calculations underlying the flood hazard information shown on existing FIRMs have three basic assumptions. These are:

1. All protective flood structures will operate correctly and will never fail.
2. No debris or ice jams will impact flood elevations.
3. Only existing land use can be considered.

The Nation has experienced floods resulting from structures that do fail, such as dams, levees, and floodwalls (see Figure 3-31). These structures are not 100 percent reliable and this residual risk should be taken into account in design considerations for buildings and infrastructure.

Debris has a major impact on flood elevations (see Figure 3-32). Major riverine floods generate large amounts of debris that clogs bridges and culverts and increases flooding. This effect should also be considered in design criteria.

Future land use development also needs to be considered (see Figure 3-33). Many communities have zoning maps that identify future areas of development and its density. Where available, this information

can be used to determine where the watershed may be hardened, which will result in flooding that is potentially more frequent, deeper, and with less warning time.

Many local stormwater regulations limit the post-development discharge condition to the pre-development condition, but only for frequent flood events. These structures have almost no impact on the 1-percent-annual-chance flood event.

Planned flood control infrastructure designed to mitigate larger floods should not be accounted for in future conditions mapping for several reasons. The main reason is that many large projects are studied for years, but are never actually constructed for multiple reasons.

3.4.4 Establishment of a Future Conditions Design Elevation Criteria

The public needs to have a design elevation that is similar to every other number an engineer provides to the public. The design elevation should include the unknowns and uncertainties to keep the individual safe during times when the design storm is encountered. Figure 3-34 shows the elements that should be incorporated into a future design elevation.



Figure 3-31: Failed Levee



Figure 3-32: Debris on a Bridge



Figure 3-33: Massive Land Development

$$ELEV_{design} = [ELEV_{median} + ELEV_{ci} + ELEV_{breach} + ELEV_{debris} + ELEV_{future}] \times FoS$$

$ELEV_{design}$	Design elevation: Average or mean flood elevation	$ELEV_{debris}$	Additional elevation resulting from potential debris blocking bridges and culverts
$ELEV_{median}$	Median or nominal elevation	$ELEV_{future}$	Additional elevation resulting from potential future development
$ELEV_{ci}$	Additional elevation equal to selected confidence interval	$xFoS$	Factor of Safety
$ELEV_{breach}$	Additional elevation resulting from potential breach or failure of flood control structure(s)		

Figure 3-34: Design Elevation Equation.

Sub-Recommendation 3-7. FEMA should publish multiple future conditions flood elevation layers that incorporate uncertainty so as to provide a basis for building designs that lower flood risk.

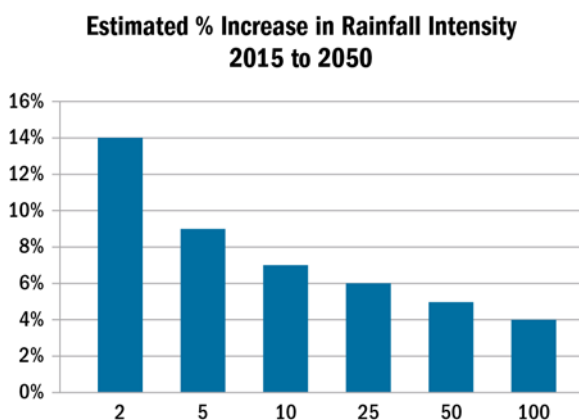
4 Information Needed to Incorporate Future Conditions

Significant changes in weather patterns are now the new normal; the frequency, severity, and intensity of the full range of calamities are resulting in unprecedented destruction, misery, and loss of life, and disasters are becoming more interrelated. For instance, severe drought can lead to widespread wildfires, and the burn scars are then at increased risk of flooding and landslides. Severe rainfall is increasing (see Figure 4-1) and can also involve tornadoes and lightning, in addition to flooding. Calls to build back stronger, increase resiliency, and reduce risk are often heard. Flood mitigation and floodplain management efforts are aimed at reducing loss of life and reducing annualized losses.

The number of organizations working on natural hazard mitigation, climate adaptation, and resilience has mushroomed in recent years.⁷⁴ Climate adaptation is an emerging field that closely resembles the work of natural hazard mitigation.

One significant difference is the perspective. While flood hazard mitigation relies on information from the past years of record, climate adaptation looks into the future.

This section explores these issues, and includes recommendations for FEMA's consideration regarding the information and data needed in order to better identify and map future flood risk.



**Figure 4-1: Percent Increase in
Rainfall Intensity versus Return Interval**

4.1 Topographic Data Needs

The accuracy of the NFIP flood hazard maps, as well as the accuracy of all underlying core datasets, like topographic or bathymetric Light Detection and Ranging (LiDAR), Digital Elevation Models (DEMs), and hydrologic and hydraulic models, is of paramount importance to all stakeholders who use maps for insurance, floodplain management, emergency management, hazard mitigation, and other uses.

One way to evaluate the accuracy of measurements and maps is to compare new or existing information to a known reference system, such as the National Spatial Reference System (NSRS). The NSRS is the most up-to-date version of positional truth available in the United States, so data referenced to the NSRS inherently gain the built-in accuracy of that system. For this reason, LiDAR data collection must include tying to the NSRS as part of the quality assurance and quality control procedures.

FEMA is heavily invested in the USGS-led 3D Elevation Program (3DEP) program. FEMA should continue to assure that topographic and bathymetric LiDAR acquisition is consistent with 3DEP and Interagency Working Group on Ocean and Coastal Mapping standards and that all geospatial data for the flood mapping program is referenced to current national datums and the NSRS.

⁷⁴ Watson, 2015.

4.1.1 Riverine Topographic & Bathymetric Needs

There are several aspects of current flood data collection and mapping processes that need improvement:

- Structure footprints should be a standard derivative of raw LiDAR data. Accurate footprints on the same geospatial platform as the DEM will eliminate a source of incorrect flood risk determination.
- Ground LiDAR should be used to supplement aerial LiDAR collection for stream channel areas. Current aerial LiDAR does an inadequate job in confined areas and considerable extra effort is needed to correct hydraulic models, which also introduces a risk of error.
- Bathymetric information is important for hydraulic analysis of perennial streams. If the underwater topography is unknown, an informed estimate is often applied, introducing another source of error.
- The raw data or point cloud data should be protected in order to reprocess the data for future requirements.

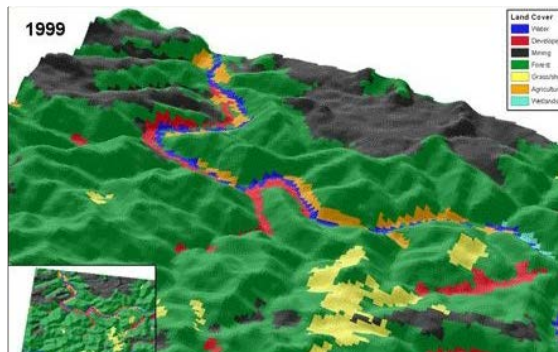


Figure 4-2: Topographic Change

4.1.2 Refresh requirements

Topographic and bathymetric data should be regularly refreshed due to land cover changes. The rate of land cover change will determine the refresh rate.

4.1.3 Hydrography and Watershed Boundaries Datasets

The USGS National Hydrography Dataset (NHD) and Watershed Boundary Dataset (WBD) are used to portray surface water on The National Map. The NHD represents the drainage network with features like rivers, streams, canals, lakes, ponds, coastline, dams, and stream gages. The WBD represents drainage basins as enclosed areas in eight different size categories.

Future conditions floodplain mapping could leverage these datasets in order to maintain consistency across Federal initiatives and watershed studies.

4.2 Coastal Bathymetric Data Needs

Bathymetric data describes the elevation of the land under water. These data are used by FEMA in the development of stillwater elevations and BFEs for the NFIP. Bathymetric data are used in large-scale, regional storm surge modeling and also in more localized wave setup and runup modeling. This section discusses the availability and currency of bathymetric data as context for a discussion of adjustments to those data to represent future conditions. In coastal areas where relative sea levels are rising, today's topography may become tomorrow's bathymetry so, lastly, this section includes a discussion of future conditions shorelines.

4.2.1 Data Availability

Coastal bathymetric data are not collected as frequently or to the same standards that topographic data are. Other than in ports, shipping lanes, and other areas where there is an economic interest, bathymetric data are typically sparse and can be very outdated, and future conditions bathymetry are practically non-existent.

Bathymetric data collection is improving and likely to continue doing so. Improvements in LiDAR and other topographic data collection technologies allow for the collection of bathymetry in nearshore areas when water conditions are ideal. As this technology continues to advance, bathymetric data are likely to improve in quality and availability. Therefore, guidance for use of bathymetric data in determining future conditions flood hazards should acknowledge the evolution of technologies that will allow for better bathymetric data available more widely in the future.

4.2.2 Adjustments to Approximate Future Conditions

In some cases, it may be necessary to make adjustments to bathymetric data when estimating future conditions flood hazards; however, any adjustments should be made with caution and are likely to introduce significant uncertainty into the estimates. For the most part, open ocean (deep water) bathymetry, such as that typically incorporated into FEMA's regional storm surge modeling, is not likely to change so substantially that it will have significant impacts on storm surge estimates overland. Therefore, it is not unreasonable to use existing open ocean (deep water) bathymetric data as-is when estimating future storm surge hazards. Nearshore bathymetry is likely to change over time and the impacts of bathymetry on coastal flood hazards are increased in shallower water.

Therefore, it may be reasonable to make some adjustments to bathymetric data in the nearshore to account for future conditions that are likely to occur; however, doing so increases the uncertainty of the results. Alternatively, it may be useful to have the ability to evaluate proposed future projects, such as widening and deepening of dredged inlets and shipping channels, thereby identifying their impacts on flood hazards in a fashion similar to the Conditional Letter of Map Revision process. This process would establish a "base" future conditions model that incorporates existing, non-adjusted bathymetry (and topography for that matter), and could facilitate the development of different project scenarios.

4.2.3 Future Conditions Shoreline

The discussion of a future conditions shoreline is germane to several different subsections within this section of the report. The location of the shoreline is related to the topographic and bathymetric data, as well as the shoreline erosion rate data. This discussion is intended to complement these other sections and provide some background on the importance of selecting an appropriate shoreline or shorelines when estimating future conditions.

Human response to rising sea levels likely will have a significant impact on future coastal flood hazards. Local shoreline decisions or policies to maintain the current shoreline location through beach nourishment and/or shoreline hardening, for example, versus a managed retreat from the most highly-erodible areas will have major impacts on the extent of the future conditions floodplain. Figure 4-3⁷⁵ provides a good

⁷⁵ Adapted from AECOM, 2013.

discussion of why this is the case. In addition to open coasts, there are extensive bay, estuary, and other lower-wave-energy shoreline miles that will also be impacted by rising sea levels. It may be anticipated that communities will increasingly turn to hardening of their shorelines as sea levels continue to rise, but evaluating the likelihood of when and where this hardening may occur is difficult. Unfortunately, predicting human response to future climate impacts is highly uncertain and likely to vary significantly from one location to another.

Given that local shoreline policies will have a large impact on future flooding and that predicting these policies may introduce significant uncertainty, it is recommended that a scenario approach be taken when considering shoreline location for the estimation of future conditions flood hazards. At least two scenarios should be evaluated: one where the shoreline is held at its present location, and another in which the shoreline is eroded according to the best available shoreline erosion data. Additional scenarios based on an understanding of local conditions could also be incorporated. This approach will enable communities to evaluate impacts and make informed shoreline decisions and policies.

Sub-Recommendation 4-1: FEMA should use a scenario approach when considering shoreline location for the estimation of future conditions flood hazards. At least two scenarios should be evaluated: one in which the shoreline is held at its present location, and another in which the shoreline is eroded according to the best available shoreline erosion data.

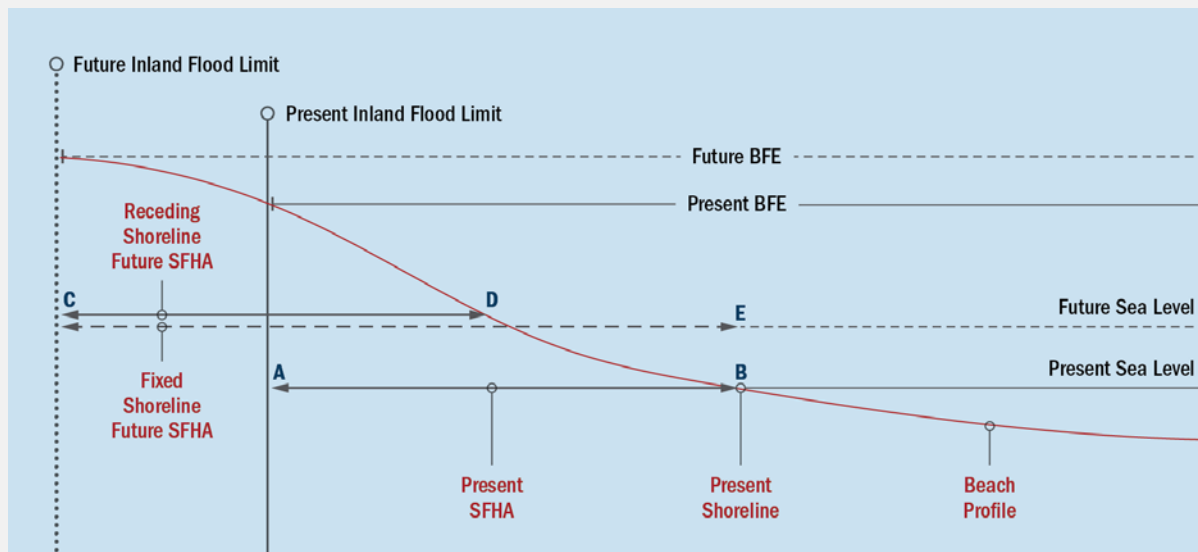
Receding vs. Stabilized Shorelines

Rising sea level and changes in storm intensity and frequency will cause the inland limit of coastal flooding to move landward over time. On a simple beach slope, the action of sea level rise would also cause the SFHA to migrate landward without much change of size, as long as the shoreline was allowed to move freely in a corresponding way. This receding shoreline assumption was adopted in the 1991 FEMA Sea level Rise Study.

It must be expected, however, that many communities will take steps to hold their shorelines in place through stabilization measures of various sorts. In such cases, the SFHA must grow since the inland limit moves landward while the seaward limit does not. Consequently, the area with exposure to the 1-percent-annual-chance flooding would grow, representing enhanced chronic risk to the NFIP.

No attempt has been made in this study to predict how individual communities might respond over time; some will allow shoreline regression, while others will take steps to stabilize and hold their existing shorelines. It is worth noting, however, that as a general trend, densely developed, urban areas could represent the stabilization case, while rural coastal communities could represent the recession case. The financial implications of these two limiting cases are evaluated elsewhere. These alternate assumptions are discussed and illustrated in more detail below.

The following sketch illustrates the concepts discussed above. Note that the sketch is idealized and not to scale, perhaps spanning 10 or 20 feet vertically, but spanning thousands of feet horizontally. Possible changes to the beach profile caused by erosion or stabilization are not shown.



The lowest horizontal line represents present sea level, while the dashed line immediately above it represents future sea level. The upper two horizontal lines show present and future BFEs extending landward to the present and future inland flood limits. Point B is at the present shoreline, with the segment AB representing the present SFHA. Point D is a possible future position of the shoreline after landward migration caused by submergence and erosion; the segment CD represents the future SFHA for that receding shoreline case. Point E represents the future location of the shoreline if held near its present position at B. In this case, the future SFHA extends from C to E exceeding the receding shoreline case CD. The sketch does not show the future beach profile, which could be stabilized (fixed) by seawalls, levees, beach fill, etc.

Since SFHA CE is larger than SFHA CD, it follows that there would be greater chronic exposure to flood losses in the fixed-shoreline case than in the migrating case, unless the fixed-shoreline case were exceptional, such as the Galveston Seawall or the Miami Beach nourishment. The encroachment area between D and E would be on an area of transient losses as storms and sea level rise caused the shoreline to retreat from Point B to Point D; the costs of those transient losses are estimated separately.

Discussion by David Divoky and Robert Dean

Figure 4-3. Receding versus Stabilized Shorelines.

4.3 Water Data

FEMA's process for flood hazard identification requires estimating the potential magnitude and frequency of major flooding.

- For coastal communities, flood frequency is determined from analysis of annual flood peak water-level data acquired at tide gauges or synthesized water levels generated from application of advanced hydrodynamic models driven by tide, storm-track, and wind records.
- For riverine communities, flood frequency is determined from direct analysis of observed annual flood peak flows, or analysis of flood flows synthesized from the application of observed rainfall records or rainfall-depth-duration-frequency estimates to hydrologic and hydraulic models.

Understanding and mapping future flood risk conditions will require more abundant sources and innovative uses of these hydrologic data.

4.3.1 Tide Gauges

The NOAA National Water Level Observation Network (NWLON) provides the foundation of a comprehensive system for observing, communicating, and assessing the impact of changing ocean and Great Lakes water levels nationwide, including U.S. territories. The network consists of 210 long-term, continuously-operating water level stations (tide/water level gauges) and is considered the primary source for commercial sector navigation, recreation, and coastal ecosystem management. The NWLON also provides the national standards for tide and water level reference datums used for nautical charting, coastal engineering, international treaty regulation, and boundary determination.

Originally established to support safe navigation through tide predictions and nautical charts, the gauge network now contributes to NOAA's forecast models, which provide tsunami and storm surge warnings. The NWLON provides historical, as well as present-day water level information. For example, the long-term records from the NWLON are used to compute local relative sea level trends and to understand the patterns of high tide events and extreme water levels from storm events. Sea level trend information is used to develop local relative sea level trends and future sea level projections.

Historical data from NOAA tide gauges are used to verify storm surge modeling for FEMA's coastal FISs and for developing flood-frequency estimates. This is the preferred approach for communities that have data of adequate length and aerial coverage. However, many communities lack the tide gauge data needed for either direct water-level analysis or model verification.

The USGS has pioneered the development of new, mobile storm-tide networks that can supplement traditional tide gauge networks. These mobile networks consist of a few hundred small, self-contained water-level sensors that can be temporarily deployed to an expected hurricane landfall location in the days and hours just prior to the landfall. When coupled with wind and storm-observations, the resulting storm-tide data can be used to calibrate a storm surge model that can subsequently be used to model future storm-driven flooding.

4.3.2 Rainfall Gages

Rain gages provide essential precipitation data needed for the development of flood hazard maps for some communities. In the absence of stream gage-derived flood-flow records, rainfall can be fed into rainfall-runoff models to generate a series of synthetic flood peaks that are then subjected to frequency analysis.

Alternatively, rainfall depth-duration-frequency curves based on rain gage data are commonly used as the basis of a design storm for a unit hydrograph rainfall-runoff model. However, long records of many decades are needed to acquire observations of the storms that produce the large floods needed to model the 1-percent-annual-chance flood and create the flood hazard map.

4.3.3 Stream Gages

The USGS stream gage network is the primary source of observed peak-flow data. Using data from 8,400 currently operational stream gages and about 15,000 stream gages that it once operated, the USGS has compiled the National “Peak Flow File.” This file lists the dates and magnitudes of approximately 750,000 observed annual peak flows at more than 24,000 “gaged” locations for dates extending back, for some sites, to the mid-1800s. For most sites the data are limited to only a few decades in the 20th Century. However, the quality and reliability of a flood-frequency estimate depends on the length of the record; the precision, accuracy, and representativeness of the observations; and the suitability of the analytical tools to the hydrologic conditions prevailing in the community. Despite the size of the USGS peak-flow file, observed flood data—particularly data representing long periods of record—are sparse, hindering the detection and analysis of the changes in the flood hazard that results from urbanization and climate change. Expansion of the dataset by continuing to collect flood data at current stream gages and supplementing these observations with flood measurements at historic, discontinued stream gages, and miscellaneous locations

is needed to provide the data required to manage and map future flood risks.

4.3.4 Doppler Radar

Doppler radar is a tracking system that can determine the location and velocity of storm clouds and precipitation. Doppler radar is calibrated with rainfall gaging stations to predict the distribution of rainfall over a continuous area. Nexrad is an implementation of Doppler radar that stands for Next Generation Radar. The use of Nexrad can help with understanding of storm rainfall and be used to develop better rainfall runoff models.

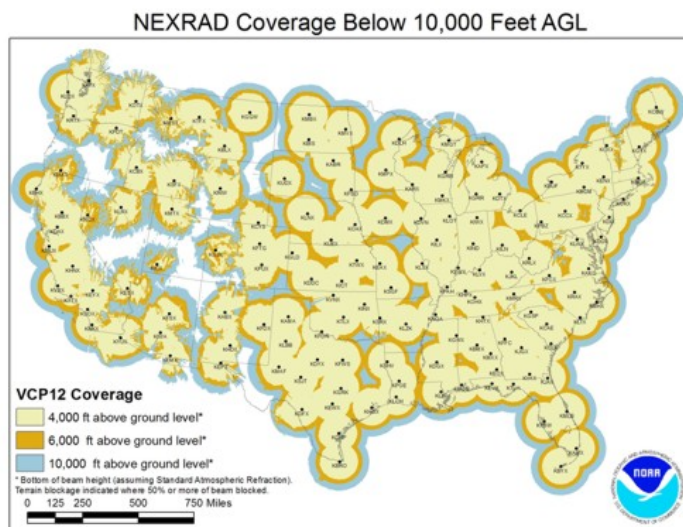


Figure 4-4: Doppler Radar Coverage of the United States.⁷⁶

⁷⁶ NOAA, 2015c.

Sub-Recommendation 4-2: FEMA should support expanded research and encourage innovation for water data collection, for example using Doppler radar.**4.3.5 Estimating Future Conditions Riverine Hydrology and Hydraulics**

Aspects of land cover, such as the extent of impervious surface and vegetation type, and land use, such as residential or open space, impact both the amount of water and the speed of that water entering the system (hydrology), as well as how that water moves through the system (hydraulics). As open space is converted to developed areas, impervious surface generally increases, which decreases infiltration and leads to more runoff during rain events. In addition, the runoff occurs more quickly. The presence of storm sewers further increases these impacts as runoff is more quickly collected and conveyed.

The impacts to hydraulics are not as easy to generalize, but as land converts from undeveloped to developed, watercourses are often relocated, and culverts and bridges are added. In some cases, detention basins or other flood control works are implemented. As land cover and land use change in the future, it is expected that flood hazards will also change.

There is precedent within the NFIP for evaluating potential future land cover and its impact on hydrology. In 2001, FEMA issued regulations recommending that local communities determine their future conditions land use and use that information to determine future condition hydrology. It was acknowledged that land use is an inherently local issue and, therefore, the most reasonable assumptions on where and how development would occur would be made locally.

Since then, guidance has been developed and implemented by FEMA, Denver Urban Drainage and Flood Control District (UDFCD), and Mecklenburg County (Charlotte), North Carolina, for using local zoning and land use planning to identify where and how development would occur and revising hydrologic predictions based on this expected future development condition. It is recommended that this guidance be reviewed and considered a best practice by FEMA for implementing similar efforts nationwide. It is also important to note that experience in the communities previously noted has indicated that land use projections tend to under-predict the actual changes over time.

In terms of hydraulics, there is no precedent for considering the impacts of future land use. Since there is no precedence, there is also no existing guidance available for doing so within the NFIP. Community land use planning provides a reasonable set of assumptions for where development is likely to occur, but there is no corresponding uniform dataset that can be used to accurately identify when and where individual projects are likely to occur that would impact the hydraulics of watercourses. Estimating where these projects are likely to occur would introduce significant uncertainties in flood predictions.

This shortcoming was noted by FEMA when developing the aforementioned regulations and guidance. Therefore, it is recommended that a scenario approach be used to evaluate the impacts of future flood control projects on future flood predictions. In addition to reducing uncertainty, this will allow users of the data to run scenarios in which proposed projects are incorporated to evaluate the effects of proposed projects on future hazards.

Sub-Recommendation 4-3: FEMA should use a scenario approach to evaluate the impacts of future flood control projects on future conditions flood hazards.**4.3.6 Estimating Future Conditions Coastal Analyses**

Coastal flood hazard analyses differ significantly from riverine flood hazard analyses. Coastal flooding is not typically the result of rainfall runoff and does not typically follow well-defined water courses. Thus, the hydrology and hydraulic considerations discussed in the preceding section do not apply to coastal flood hazard identification. However, land use and development can impact coastal flooding.

It may not be necessary to consider future conditions land use when determining future coastal storm surge elevations, including wave setup, because these analyses are typically performed at a large scale or are evaluated at gauges and incremental changes in land use over time are unlikely to impact the results significantly.

Local coastal hazards, such as erosion, wave runup, and overtopping, and the overland propagation of waves are impacted by land use, sometimes significantly. These analyses are typically performed using 1D transect models that account for detailed characteristics of the land, such as vegetation, dunes, houses, and other structures. As these characteristics change over time, so will the hazards at the site. It is likely possible to utilize local zoning and land use planning to identify where and how land use will change in the future and incorporate that information into the local coastal hazard modeling process, but there is no precedence or any guidance for doing so within the NFIP.

4.3.7 Community Land Use Plans

There is no national requirement that communities develop comprehensive land use plans. Some States do mandate long-range planning; however, this is not uniform across the Nation. Many communities also develop a comprehensive land use plan because it guides the land entitlement process, provides community focus and branding, and supports subdivision and zoning regulations. The planning process usually includes stakeholder and citizen collaboration in order to understand the community vision and support neighborhood vitality.

Land use changes land cover over time, which in turn changes the nature of the watershed. Thus, flood risk changes over time. In order to adapt to future flood hazards, communities must look forward to predict and respond to changes in hazards. Many communities are engaged in watershed planning studies and hazard mitigation efforts.

Most NFIP communities have hazard mitigation plans as a pre-condition for FEMA grants. Each State and FEMA regional office has planning specialists to assist communities with plan creation and updating. Hazard mitigation plans can also be cross-referenced with CRS requirements for additional CRS points.

4.3.8 Plan Integration

One shortcoming of comprehensive land use plans is the exclusion of hazard and risk identification. Land use planning should include hazard mitigation planning, watershed master planning, and risk analysis (see Section 4.8). FEMA should provide guidance and incentivize the integration of local planning efforts.

Sub-Recommendation 4-4: FEMA should develop guidance for how local zoning and land use planning can be used to identify where and how land use will change in the future, and incorporate that into local hazard and risk modeling.

Sub-Recommendation 4-5: FEMA should support research on future conditions land use effects on future conditions hydrology and hydraulics.

Sub-Recommendation 4-6: FEMA should develop guidance for incorporating future conditions into coastal inundation and wave analyses.

Sub-Recommendation 4-7: FEMA should evaluate previously-issued guidance for future conditions land use and hydrology to incorporate best practices and lessons learned from communities that have implemented the guidance since 2001.

4.4 Shoreline Erosion Data Needs

Shoreline erosion data needs are mostly dependent on determining the long-term erosion rate.

4.4.1 Determination of long-term erosion rate

Many States establish coastal setback lines or erosion hazard areas (EHA) to use for State-based regulatory or non-regulatory purposes. The EHAs are normally based on an erosion rate determined by analyzing the positions of two or more known historical and recent shorelines (known as shoreline change reference features [SCRFs]) that are plotted on historical shoreline change maps. These maps are produced by digitizing SCRFs from various sources, such as historical maps (especially National Ocean Service T-sheets, which in some locations date back to the mid-1800s), aerial photographs, Global Positioning Systems, and LiDAR. This process is followed by combining and overlaying shorelines onto a common coordinate system. Most regional studies for low-relief, sandy beaches use the high water line as the SCRF, although the berm crest, vegetation line, or erosion scarp is sometimes used. In coastal regions characterized by high topographic relief, the top edge of bluffs or cliffs is commonly used as a reference point.⁷⁷

Historical shoreline change maps for the United States often contain four to eight or more digitally-plotted shorelines and can span up to 150 or more years. Erosion rates are typically calculated from the digital maps by digitizing or plotting a line approximately perpendicular to the multiple shorelines and measuring the amount of movement over a period of time, which is defined and constrained by the dates of the digital shorelines. In many cases, subsets of the historical shorelines are used, particularly in areas where prolonged and perhaps permanent physical changes to the beach system have occurred (e.g., inlet openings), or where construction of man-made structures (e.g., groins, jetties, sea walls) makes older data unrepresentative of the long-term trend.⁷⁸ Various empirically-based statistical methods have been used to calculate long-term erosion rates, but because of the scarcity and uneven sampling of historical and recent shorelines, it is questionable whether higher-order statistical methods are better at predicting future shoreline positions than “simple” methods, such as linear regression.⁷⁹

⁷⁷ Crowell, Honeycutt, and Hatheway, 1999.

⁷⁸ Crowell, Leatherman, and Douglas, 2005.

⁷⁹ Crowell, Douglas, and Leatherman, 1997.

Once a historical erosion rate is determined for a particular area, this rate is then multiplied by a timespan (e.g., 30-, 60-, or 100-years) to define an EHA. The inland extents of EHAs are measured landward from an erosion reference feature (ERF), such as a vegetation line, dune line, or top edge of bluff. Note that regional geomorphologies determine both the SCRF and ERF, and for any given stretch of shoreline, the SCRF and ERF may not necessarily be the same feature.

The above-described empirical method for determining long-term erosion rates and future shoreline locations typically assumes stationarity; that is, the predicted rate of shoreline change is assumed to be linear and equal to the historical linear rate of shoreline change. As such, the method does not consider potential acceleration or deceleration caused by geophysical processes, such as changes in the rate of relative sea level rise. Long-term sea level rise, however, is an “enabler” of long-term coastal erosion; thus, both processes are linked geophysically. As sea levels rise, land is inundated by the rising waters and higher water levels allow increasing erosion. As such, the location of a receding shoreline is dependent on both SLR-induced inundation combined with dynamic erosion. If SLR is projected to accelerate, then long-term erosion rates should also be projected to accelerate.

One of the best known models to link SLR with erosion is the Bruun Rule. The Bruun Rule is a two-dimensional model that predicts a landward and upward displacement of the beach profile in response to sea level rise.⁸⁰ The Bruun rule, however, has long been controversial and while it may be suitable for regional scale assessments, it is generally recognized as unsuitable for localized studies which require reliable estimates of shoreline retreat.⁸¹

Recent studies have used other methods for predicting future shoreline locations. For example, one study⁸² used a Bayesian Network to produce probabilistic forecasts of future shoreline locations assuming accelerated SLR. A more recent study⁸³ employed a combination of historical erosion rates with a Bruun-derivative model that incorporates projected acceleration in SLR.

Sub-Recommendation 4-8: FEMA should develop consistent methods and models for long-term coastal erosion hazard mapping.

⁸⁰ Ranasinghe, et al., 2012.

⁸¹ Ibid.

⁸² Gutierrez, et al., 2011.

⁸³ Anderson, et al., 2015.

4.5 Riverine Erosion Data Needs

Riverine systems change over time, both laterally and vertically. Changes in river morphology over longer time periods can affect the potential flood risk at any specific location. A significant amount of research and practical experience has occurred in the field of geomorphology and stream restoration.⁸⁴

An additional recognition of these natural processes is the Make Room for the River project.⁸⁵ Sufficient data and analytical tools currently exist to map riverine erosion and migration zones.



Figure 4-5: Fish Creek in Estes Park, Colorado

Riverine systems can also change in very short time periods as was seen in the Vermont during Hurricane Irene in 2011 and Colorado flooding in 2013 (see Figure 4-5⁸⁶). In both these events, considerable losses occurred outside of the SFHA. Hundreds of miles of State and Federal highways were destroyed and in Boulder Colorado, thousands of structures were lost resulting nearly \$260 million in private property destruction. See Figure 4-6 for an assessment of EHZ and SFHAs, showing that EHZs are not confined to the SFHA.

Event-driven erosion is not as well understood and is not mapped in the context of flood hazard identification. The current FEMA policy of assuming clearwater and rigid boundary conditions for flood hazard mapping can significantly under-identify flood hazards and, thus,

convey a false sense of flood risk. This is especially true for mountainous terrain and alluvial fans as was seen in the Vermont and Colorado flooding. Massive debris flows contributed to the destruction in Boulder.

The States of Vermont and Washington have developed erosion zone mapping and regulatory frameworks⁸⁷ Planning-level channel migration zones (pCMZ) methodologies are currently underway in Colorado based on the Vermont and Washington work. These pCMZs are based on the space the river system requires for lateral adjustment. Regulatory standards typically take the form of required setbacks from the channel based on the pCMZ.

⁸⁴ FEMA, 1999.

⁸⁵ Dutch Room for the River Programme, 2015.

⁸⁶ Image by Brian Varrella, City of Fort Collins, and Terry Martin, ICON Engineering, 2013.

⁸⁷ Vermont Agency of Natural Resources, 2008.

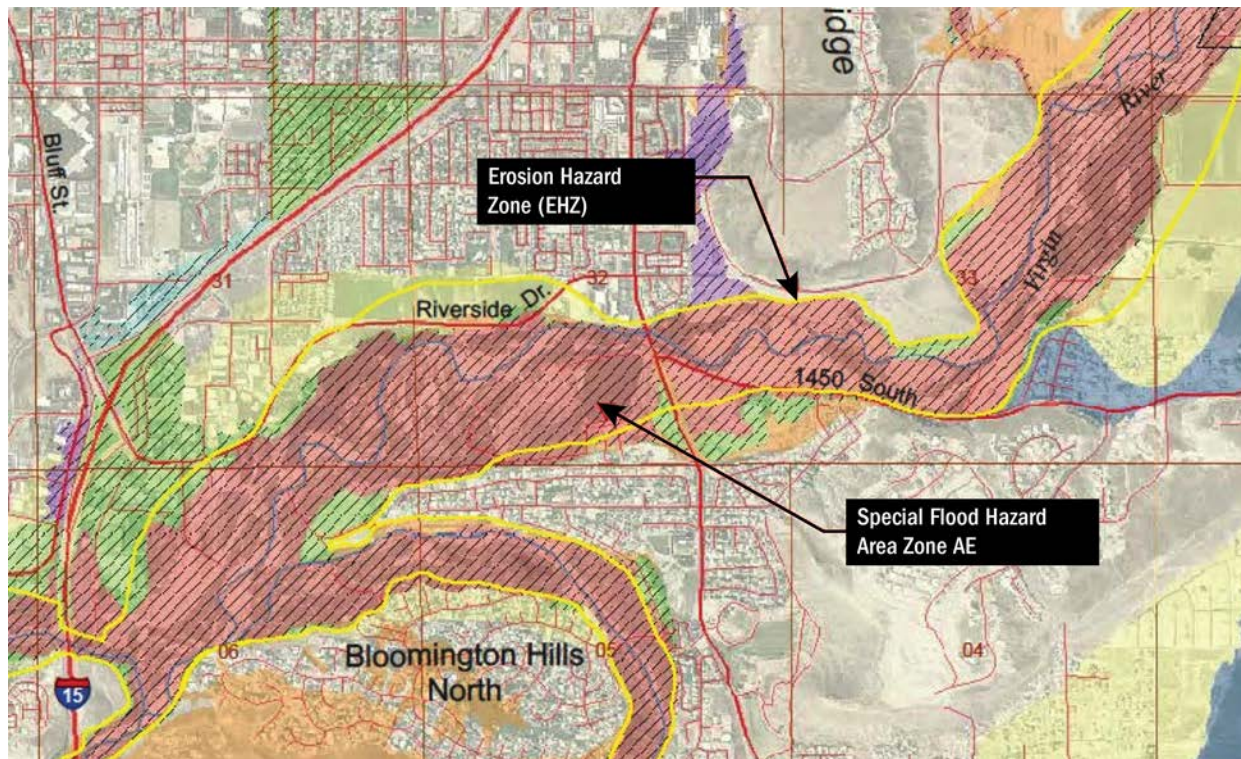


Figure 4-6: Portion of the Flood-Hazard Map for the St. George-Hurricane Metropolitan Area in Utah.⁸⁸ Notice the Erosion Hazard Zone is both inside and outside of the Special Flood Hazard Area.

The information needed to establish pCMZs includes topographic and bathymetric mapping (LiDAR), soil data, and aerial photography. Acquisition of historical photography is very useful in erosion zone and river meander evaluation, and so is aerial photography going forward. Historic and new, geo-referenced aerial photography housed in a database would be the most useful tool for erosion hazard identification.

Alluvial fans are a subset of riverine erosion. Alluvial fan hazard identification is especially difficult because of the geology (groundwater and subsurface activity) and geomorphology (small channel formation that belies the risk). Erosion and avulsion activity is more pronounced in the context of alluvial fans. Alluvial fans also react more dramatically to anthropogenic changes. The recent advent of two-dimensional hydraulic modeling has proven to be very useful in improved hazard identification.⁸⁹ One downside of two-dimensional models is the regulatory context.⁹⁰ The current practice is to convert the two-dimensional model to a traditional one-dimensional model for flood hazard mapping and regulatory purposes. FEMA should develop guidance for the use of two-dimensional models for flood hazard mapping and floodplain development regulation purposes.

Sub-Recommendation 4-9: FEMA should determine long-term riverine erosion hazard areas for areas subject to high erosion and provided to the public in a digital layer.

⁸⁸ Utah Geological Survey, 2008.

⁸⁹ Icon Engineering, Inc., 2014.

⁹⁰ ASFP, 2014.

Sub-Recommendation 4-10: FEMA should utilize a national standard for riverine erosion zone delineations that reflects geographic variability.

Sub-Recommendation 4-11: FEMA should develop a policy and standards on how to consider and determine erosion zones that are outside of the SFHA as they ultimately affect flooding and environmental conditions within the SFHA.

4.6 Demographic Data Needs

The U.S. population is expected to grow by nearly 100 million from 2010 to 2050. Past experience suggests that population and population densities will be greatest in close proximity to coastal or riverine areas. Living near the water has always been and will continue to be desirable. Population management is not a FEMA directive; however, a framework for managing growth that is based on a clear and accurate description of current and future risk is necessary in order to get ahead of the curve.

4.6.1 Existing demographic data

The U.S. Constitution mandates a national census every 10 years. The Census Bureau conducts the national census once every decade. The national census is an enormous task involving scores of field workers, analysis, and reporting. However, this information may not be adequate to inform future conditions flood hazard analysis.

4.6.2 Projected demographic data

The decennial census may be too infrequent for flood hazard identification and floodplain management response. For this, real-time demographic data are required. Information will also be needed regarding how the built environment evolving, how we will safely accommodate the next 100 million Americans, what our neighborhoods will look like, how 21st century land use and zoning will differ from past practices, and how our transportation and transit systems will react to increasing flood risk. These and many other questions should be considered in the context of future flood risk.

Micro demographic trends and future projections are fundamental in deploying the Whole Community Approach to mitigation, preparation, response, and recovery. Understanding communities at the community level is also essential for getting better market penetration for flood insurance.

4.7 Consistency of Data

A large amount of data is required to evaluate both current and future flood hazards. The sections that follow provide details of many of them and this section is intended to provide a brief discussion related to the consistency of the data necessary to evaluate future conditions.

Required datasets for flood hazard analyses, for both current and future conditions, are typically collected from a variety of sources and range from global-, to national-, State-, and local-scales. In some cases, even property-specific data may be available. Given the wide variety of data and the lack of consistency, careful attention should be paid to selecting the best available, actionable data for analyses. In all cases, an understanding of the quality, resolution, coverage, time horizon, and other important metrics is needed to assess the end product and should be documented.

There is a tendency for national programs to rely on national datasets, but national datasets may not be the best available data for use when there are more local datasets available. With respect to climate data, there are global and national datasets available that provide insight into how the climate is expected to change in the future, but in many cases these datasets do not down-scale well and can lead to unrealistic estimates at a local level. For example, global SLR estimates do not provide a good estimate of relative sea level change in areas where local effects such as subsidence play a major role. When local-scale data have been developed that provide an improvement over similarly-available national datasets, the local data should be evaluated and utilized if possible and appropriate.

Maintaining consistency with respect to land use data may be more challenging. Section 4.3.7 highlights the importance of community-developed land use projections when determining future conditions. Unfortunately, community-developed datasets are likely to vary significantly from one community to another, unless standards for the development of these data are put in place. Even then, it would likely be decades before consistent data become available. However, local land use projections are an integral dataset for future conditions flood hazard analyses and should be used. Achieving consistency across community-supplied land use and zoning datasets is unlikely, but FEMA should strive to achieve consistency with respect to how those datasets are used to estimate future conditions flood hazards.

Another aspect of consistency to consider is with respect to the methods used to evaluate current and future hazards. Employing similar methods consistently will enable meaningful comparisons of results from one area to another and also between current and future conditions. There are also likely to be efficiencies gained by employing similar methods of analyses when estimating current and future flood hazards. Finally, using consistent methods will also help to drive consistency with existing products and usages. Therefore, when current projections of flood hazards already exist, such as NFIP flood hazard studies, future projections should rely on those current projections as a starting point for evaluating future hazards.

Sub-Recommendation 4-12: FEMA should develop guidance for evaluating locally-developed data from States and communities to determine if it is an improvement over similarly-available national datasets and could be used for future condition flood hazard analyses.

4.8 Risk Assessment

Risk assessment represents the “A” in Risk Mapping, Assessment, and Planning (Risk MAP). Assessment is part of the mitigation cycle of first identifying the hazard, then assessing the consequences, and then planning around the assessed risk.

An excellent example of Federal/regional partnership is the work FEMA Region VIII has done with the UDFCD. The regional staff commissioned a Risk MAP alignment study between UDFCD floodplain mapping and master planning products and the Risk MAP regulatory and non-regulatory outputs. The study concluded that the UDFCD products lacked only a risk assessment. Regional staff have worked closely with the local communities within the UDFCD service area, leveraging community-supplied parcel and structure data to achieve very detailed risk assessments.

4.8.1 Service Life Considerations of Structures

The decisions a community makes today will have long-term impacts in terms of the community's risk profile. New structures built in harm's way will be in harm's way for decades to come. See Section 3 for a deeper discussion of structure service life, including the life expectancy of various structure classes.

4.8.2 Flood Risk Assessment

Risk assessment is the product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.⁹¹ Risk assessment is fundamental to hazard mitigation planning and long-term risk reduction.

Risk assessment that addresses future conditions will require the combination of community-developed land use and development projections and the hazard data needs described in this section.

To understand how risk may change and how vulnerability may increase or decrease, an analysis of how communities may look and grow in the future with the expected characteristics (i.e., frequency, intensity) of hazards in the future is required. Improvements in data and methods are needed in each.

The outputs of this risk analysis must be in terms that planners, policy makers, and citizens can use in making decisions about future investments, allocation of resources, and when and where to adopt stronger regulatory approaches. A primary goal is to build overall capacity at all levels of government to engage in useful risk assessments by:

- Designing outputs of models and assessments to have real application for planning and decision making; and
- Improving accessibility and usability of tools and software, such as Hazus, for end users and providing training and outreach to build skills.

4.8.3 FEMA's Hazus Program

FEMA's Hazus program is a nationally-applicable, standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses GIS technology to estimate physical, economic, and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, flood, and hurricane. Users can then visualize the spatial relationships between populations and other more permanently-fixed geographic assets or resources for the specific hazard being modeled, which is a crucial function in the pre-disaster planning process.

The input data for Hazus analysis ranges from very generalized to very detailed. Level 1 Hazus analysis uses national datasets for population, building stock, and hazards. Level 1 is considered too coarse at the community scale. Level 2 data can include effective floodplains and other local hazard conditions, as well as community-supplied building, facilities, and infrastructure data. Community-supplied building datasets currently come in all forms. FEMA can assist communities by developing standardized protocols for organizing and serving up the data.

⁹¹ FEMA, 2013.

Hazus output should be in a format that is useful to community planners, emergency managers, floodplain managers, and policy makers. FEMA should focus on improving the utility of Hazus for local users to build greater capacity in risk assessment. A key focus should be an update to the flood module to analyze future development, mitigation, and climate adaptation scenarios. Risk assessment information can be used by communities to consider the consequences of land use decisions, planned infrastructure investment, and resiliency. The goal is to encourage safe development that reduces a community's overall risk profile.

The Hazus community of users includes all levels of government and the private sector. FEMA supports a variety of user forums and a national conference. FEMA should support more training and outreach in order to enlarge both the size and skill of Hazus practitioners.

Sub-Recommendation 4-13: FEMA should develop better flood risk assessment tools to evaluate future risk, both population-driven and climate-driven. Improve integration of hazard and loss estimation models (such as Hazus) with land use planning software designed to analyze and visualize development alternatives, scenarios, and potential impacts to increase use in local land use planning.

5 Approaches for Future Conditions Calculation and Mapping

For the purposes of addressing how to calculate and map future conditions, the TMAC has organized the discussion and recommendations in this section by primary flooding source type: coastal and riverine. Coastal areas are determined by the extent of the current and future tidal influence as well as Great Lake shorelines. Riverine areas include all inland or non-coastal flooding sources (e.g., alluvial fans, major rivers, tributaries, and rivers that are influenced by coastal effects as applicable).

Section 3 discusses the uncertainty associated with future conditions information, including natural and manmade changes, and Section 4 details the types of data currently available for determining current flood risk, data needed to project future outcomes, and current data gaps. FEMA's current flood hazard identification methods for both coastal and riverine areas rely on historical trend data (i.e., streamflow statistics and coastal water levels) and existing ground conditions as data inputs. Modeling the current flood risk involves determining how much water will be in the riverine or coastal system from a statistically-derived 1-percent-annual-chance flood event (hydrology), and how that water flows overland and through channels and structures (hydraulics). Simply put, hydrology determines how much water and hydraulics determine how high the water will rise. Both analyses are needed to identify flood hazards and both require data inputs that can affect the model outcome.

Calculating and mapping future conditions can be accomplished by using the existing FEMA modeling framework, but requires additional information and data about future natural and manmade changes. Using future conditions data requires a different approach that must account for a potential future that is not based on the past. In other words, the rules of stationarity (i.e., the assumption that data and processes do not change over time), upon which existing conditions mapping is based, will no longer be valid. Non-stationarity (i.e., the assumption that data and processes will change over time) must be taken into account. Incorporating non-stationarity into the existing modeling framework requires different approaches that deal with future uncertainty (e.g., future manmade actions; changing natural systems, such as climate change and SLR).

This section describes a new flood risk management philosophy that uses a scenario approach to address this uncertainty, discusses the current state of coastal and riverine science, addresses future geomorphology changes that could impact future flood risk, describes current and recommended future study methods, and provides case studies.

5.1 Flood Risk Management Philosophy

Managing flood risk is only possible when the types of future risks that may occur in a particular location in addition to those that have occurred in the past are understood. For example, methods to accommodate some types of observed changes in riverine flooding (e.g., land use change, regulation) are addressed in the *Guidelines for Determining Flood Flow Frequency*.⁹²

⁹² Interagency Committee on Water Data, 1982.



Figure 5-1: Risk MAP Process

Incorporating uncertain future conditions that affect flood-related processes into standard methods for estimating future flood risk requires a risk management framework. The ultimate goal for estimating future flood risk is to provide unbiased estimates of future flood risk at any location, as well as to quantify the corresponding uncertainties. These estimates should account for the various authorized purposes and agency operations and missions, and should allow for future adjustments and refinements as the land surface and actionable science evolve.

The current Risk MAP conceptual process (see Figure 5-1) addresses future risk at the risk assessment phase (Phase 2). Identifying and mapping future flood hazards is needed as part of Phase 1 (Mapping Risk Data), but may require approximate or simplified methods to estimate future flood

changes due to limitations in the ability to project development and agricultural uses and their related changes in land use and land cover, as well as other changes impacting future hydrologic conditions, such as climate change.

5.1.1 Challenges of Flood Risk Estimation

While the theory behind risk-based flood management is well established and sound, as a practical matter, it is not always easy to estimate flood risk given limited data⁹³ and is especially difficult when attempting to detect changes in the frequency of rare events. Recently, additional complications have emerged associated with changes in climate and weather, combined with other changes, such as land use and land cover. The Third NCA⁹⁴ reported several trends, including rising global sea levels and increases in the frequency of heavy precipitation events in some regions of the United States (see Section 3.3).

Conversely, local sea levels are falling relative to land movement in some areas, such as Alaska. In some places in the southwestern United States, there is an observed trend toward decreased flood magnitude, where nearby locations are experiencing an increasing trend.⁹⁵ To date, uncertainties remain an important factor in assessing both observed records and projected changes. These uncertainties, and the possibility of substantial shifts in flood frequencies over the coming decades, require us to expand beyond traditional approaches, which assume that flood processes are stable and “vary within an unchanging envelope of natural variability,” so that the past represents the future.⁹⁶ This assumption of stationarity has been challenged, and scientists and engineers now recognize and account for non-stationary processes^{97,98} using a variety of methods.⁹⁹

⁹³ Federal Interagency Floodplain Management Task Force, 1987.

⁹⁴ National Climate Assessment, 2014.

⁹⁵ Hirsch and Ryberg, 2012.

⁹⁶ Milly, et al., 2008.

⁹⁷ Chow, 1964.

⁹⁸ Hirsch, 2011

⁹⁹ Kiang, et al., 2011.

5.1.2 Deterministic/Probabilistic or Scenario Approaches

Scenario approaches are often used to analyze problems that are characterized by large uncertainties with large potential consequences. For example, due to the complexity of the physical processes involved in changing sea levels and limitations in our understanding of important interactions and feedback cycles, the use of SLR scenarios^{100,101} is a common method to deal with uncertainties.

The reason for selection of this method is not only because of the uncertainty related to climate, but also because of uncertainty due to vertical land movement that can result from many factors. This uncertainty is magnified when considering: (1) the variability in responses of coastal systems and processes, and (2) the combined effects of SLR and altered storm frequency or intensity.¹⁰² For riverine systems, uncertainty related to future hydrology and hydraulics caused by many factors, including land use changes, climate change, and channel configurations, can be dealt with by using various future outcomes employing scenario approaches as well.

Probabilistic approaches, such as those proposed for SLR,¹⁰³ are generally based on knowledge about the probability distributions of different factors (e.g., ocean dynamics, isostasy, mass redistribution), thus explicitly incorporating uncertainty. Conversely, deterministic approaches are used when a great deal is known about the process in question. That is why deterministic approaches are so common in evaluating past events—because methods are based on observations and enable best-guess estimates of important factors. The difficulty in taking a deterministic approach to future conditions arises in part because the concentration of atmospheric greenhouse gas is greater than in recent past history (see Section 3).

The resultant increase in global average temperature and its impact, particularly on ice masses in Greenland and Antarctica, is thus difficult to project. Commonly-employed scenarios encompass a wide variety of deterministic projections and those based on the observed record. Though deterministic approaches have been proposed, they cannot be proven or otherwise validated until the future comes to pass. Thus, selection now of one particular deterministic approach entails the risk of false precision and decision-making based on a single future that may not materialize. Scenario analysis allows the user to test the robustness of future choices against a range of plausible futures. A broader risk-management approach enables a range of possible outcomes to be examined, as well as the uncertainty surrounding their likelihoods.¹⁰⁴

Figure 5-2¹⁰⁵ illustrates the relationship between deterministic, probabilistic, and scenario approaches. Scenario approaches can be used together with an analysis of risk tolerance to determine the best scenarios for mitigating future flood risk (see Section 5.2.2.1).

100 Parris, et al., 2012.

101 USACE, 2013.

102 Woodruff, et al., 2013.

103 Kopp et al., 2014.

104 Kunreuther, et al., 2013.

105 Slingo and Palmer, 2011.

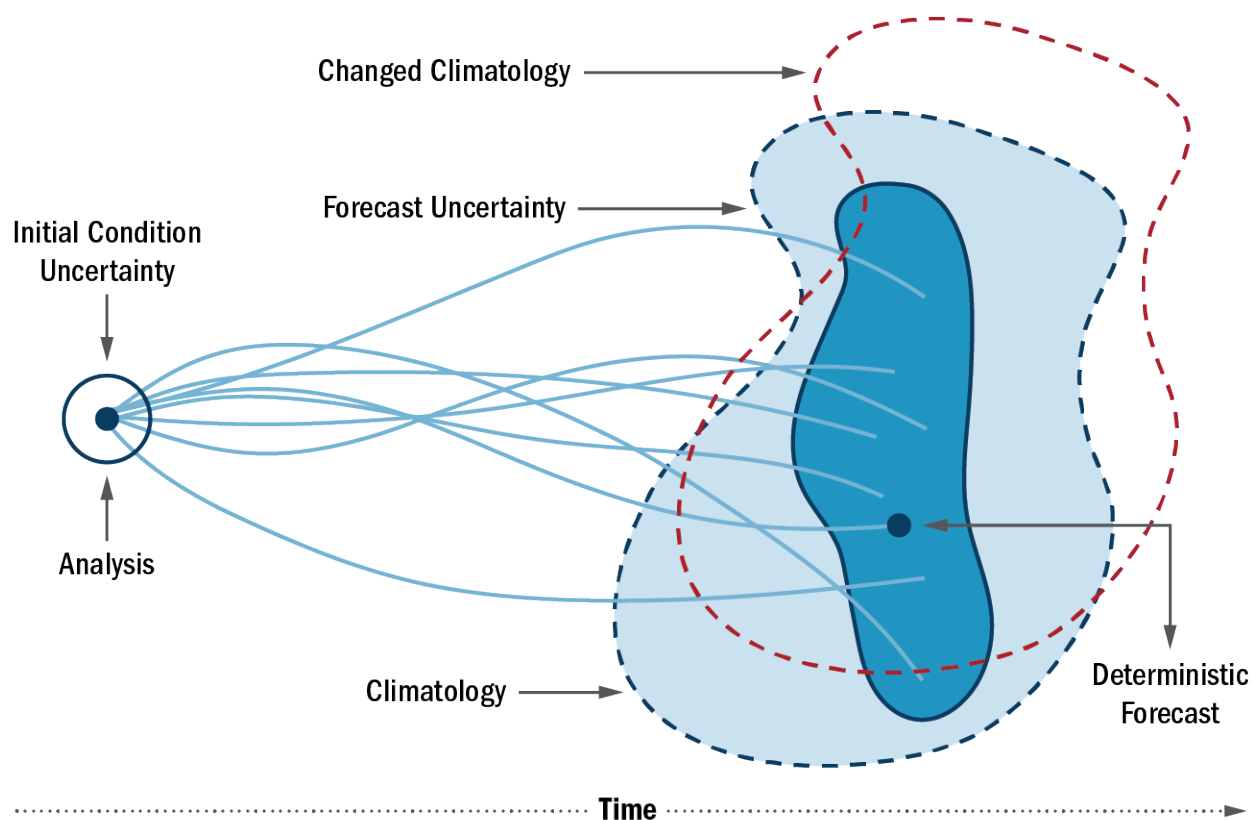


Figure 5-2: Graphical Depiction of Deterministic versus Scenario versus Probabilistic Forecasts.

This shows one future outcome (blue dot) vs. scenario forecasts showing many future possible future outcomes (blue curves) vs. probabilistic forecast showing a distribution (light and dark blue areas) of future outcome. Red dashed line shows how future climate change may completely shift future outcomes due to non-stationarity.

Sub-Recommendation 5-1: Future flood hazard calculation and mapping methods and standards should be updated periodically as we learn more through observations and modeling of land surface and climate change, and as actionable science evolves.

Sub-Recommendation 5-2: FEMA should use a scenario approach for future conditions flood hazards calculation and mapping that will allow users to evaluate the robustness of proposed solutions to a range of plausible future conditions, including uncertain land use and climate change impacts.

Sub-Recommendation 5-3: FEMA should conduct future conditions mapping pilots to continue to refine a process and methods for mapping and calculating future flood hazards and capture and document best practices and lessons learned for each.

5.2 Best Available Coastal Science

Defining future coastal flood hazards requires an assessment of how sea level change will influence the frequency and magnitude of future extreme water level events. Future storm tides and waves may reach

higher elevations than past storms and may do so with more frequency in most areas of the country, increasing the area impacted by future coastal flood hazards.

5.2.1 Sea Level Change Trend Data

Global sea level, also sometimes referred to as global mean sea level (GMSL), is the average height of all the world's oceans. Global (eustatic) SLR is caused by the global change in the volume of water in the world's oceans in response to three primary processes: (1) ocean mass change associated with long-term forcing of the ice ages, ultimately caused by small variations in the orbit of the earth around the sun; (2) density changes related to total salinity; and, most recently, (3) changes in the heat content—and, therefore, the volume—of the world's oceans, which recent literature suggests may be accelerating due to a warming climate. Global SLR can also be affected by basin changes, through such processes as seafloor spreading.

At any location, changes in local relative sea level (LRSL) reflect the integrated effects of GMSL change plus local or regional changes of geologic, oceanographic, or atmospheric origin. Atmospheric origin refers to the effects of the climate oscillations, such as the El Niño-Southern Oscillation and North Atlantic Oscillation, which in turn impact LRSL at decadal time scales. Section 3.3 discusses current and future climate trends and the impacts on global SLR.

5.2.1.1 Past Sea Level History

Figure 5-3¹⁰⁶ shows large variations in GMSL elevation over the last 400,000 years resulting from four

natural glacial and interglacial cycles. GMSL was approximately 4 to 6 meters (m) higher than present during the last interglacial warm period 125,000 years ago and 120 m lower than present during the last ice age, approximately 21,000 years ago.¹⁰⁷ Figure 5-4¹⁰⁸ illustrates the rise in GMSL at variable rates over the last 18,000 years as the earth moved from a glacial period to the present interglacial warm period. The rise was rapid but highly variable, slowing about 3,000 years ago. Recent acceleration is not noticeable at this scale.

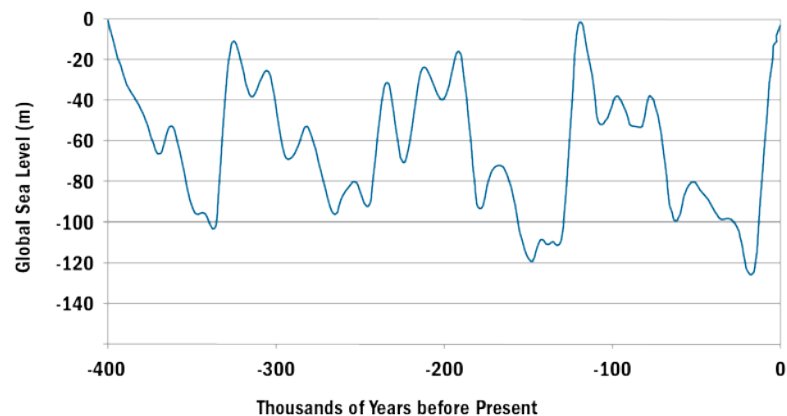


Figure 5-3: Global Sea Level Change.
Global sea level change from 400,000 years ago to the present

¹⁰⁶ Climate Change Science Program, 2009.

¹⁰⁷ Ibid.

¹⁰⁸ Ibid.

5.2.1.2 Global Sea Level Rise and Future Projections

The average annual GMSL change in millimeters (mm) is shown in Figure 5-5.^{109,110,111,112} The estimated trend over the past century, based on analyses of tide gauge records around the globe, is 1.7–1.8 mm/yr. Recent research has addressed the potential ranges of GMSL rise by year 2100^{113,114,115,116,117,118,119,120} (see Figure 5-6^{121,122}).

The most recent NRC report¹²³ projects an upper bound of approximately 1.4 m, which is very close to the upper bound of 1.5 m used in U.S. Army Corps of Engineers (USACE) guidance. The 2012 report by NOAA¹²⁴ states that "...we have very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100." A credible upper bound for 21st century GMSL is about 2 m.¹²⁵

There are other research papers that suggest the upper bound may be larger than 2.0 m.¹²⁶

However, consensus reports^{127,128} conclude that exceeding 2.0 m by 2100 is not likely. An additional study¹²⁹ produced probabilistic sea-level rise projections out to 2100 and 2200 (see Figure 5-7¹³⁰).

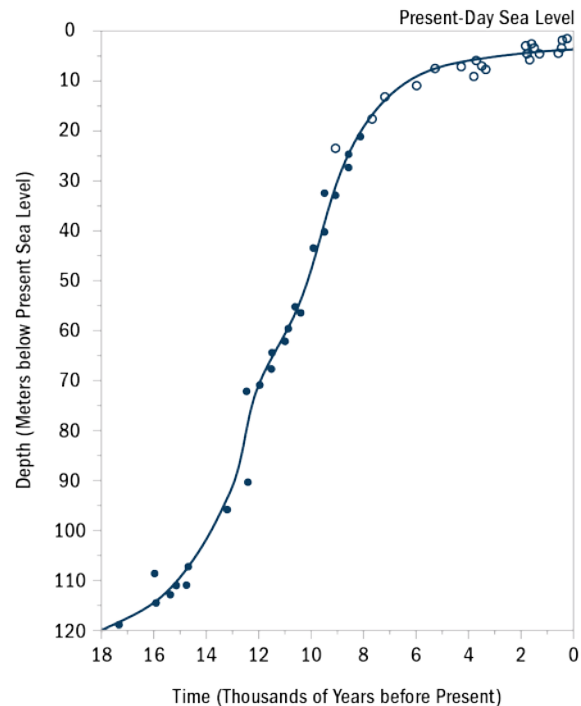


Figure 5-4: Global Mean Sea Level Rise. Rise in global mean sea level over the last 18,000 years.

¹⁰⁹ National Research Council, 2012.

¹¹⁰ Rahmstorf, 2007.

¹¹¹ Holgate and Woodworth, 2004.

¹¹² Leuliette, et al., 2004.

¹¹³ National Research Council, 1987.

¹¹⁴ National Research Council, 2012.

¹¹⁵ Rahmstorf, 2007

¹¹⁶ Horton, et al., 2008.

¹¹⁷ Pfeffer, et al., 2008

¹¹⁸ Vermeer and Rahmstorf, 2009.

¹¹⁹ Jevrejeva, et al., 2010.

¹²⁰ Katsman, et al., 2011.

¹²¹ USACE, 2014.

¹²² The red bar to the right on Figure 5-6 represents the guidance in the USACE Engineer Regulation 1100-2-8162 and the 2009 and 2011 Engineering Circular guidance it supersedes.

¹²³ National Research Council, 2012.

¹²⁴ Parris, et al., 2012.

¹²⁵ USACE, 2013.

¹²⁶ Grinsted, et al., 2010.

¹²⁷ Bindoff, et al., 2007

¹²⁸ Parris, 2012.

¹²⁹ Kopp, et al., 2014.

¹³⁰ Ibid.

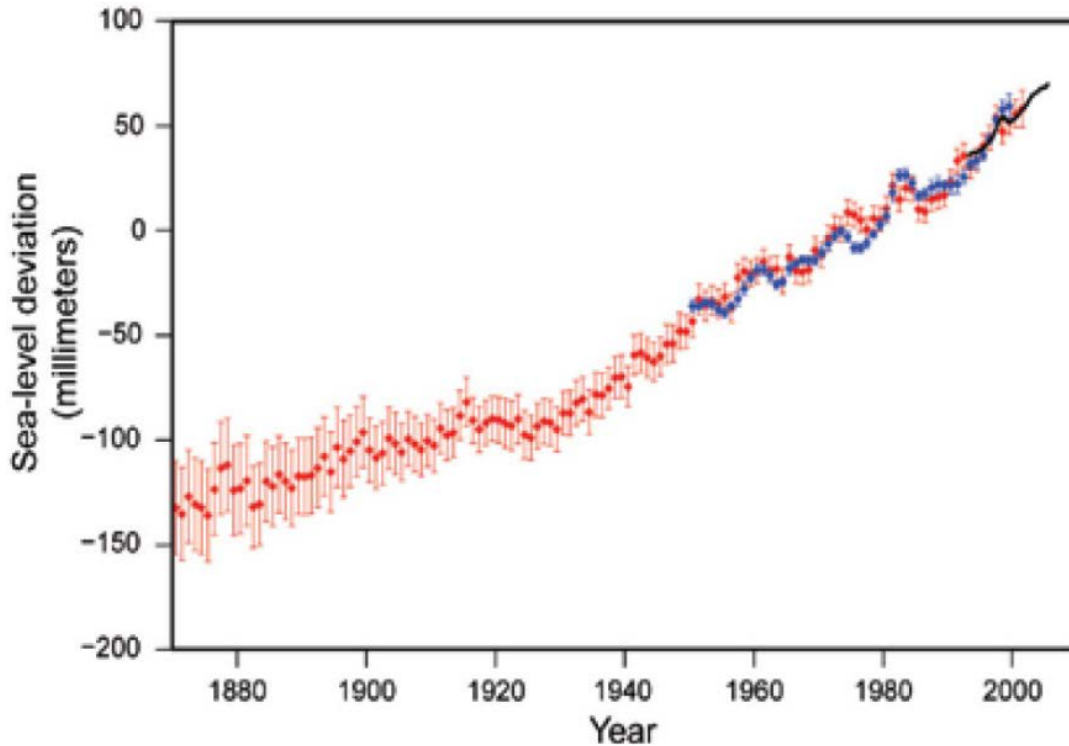


Figure 5-5: GMSL change since 1870. The red curve shows sea level variation from tide gauge observations since 1870. The blue curve displays adjusted tide gauge data and the black curve is based on satellite observations.

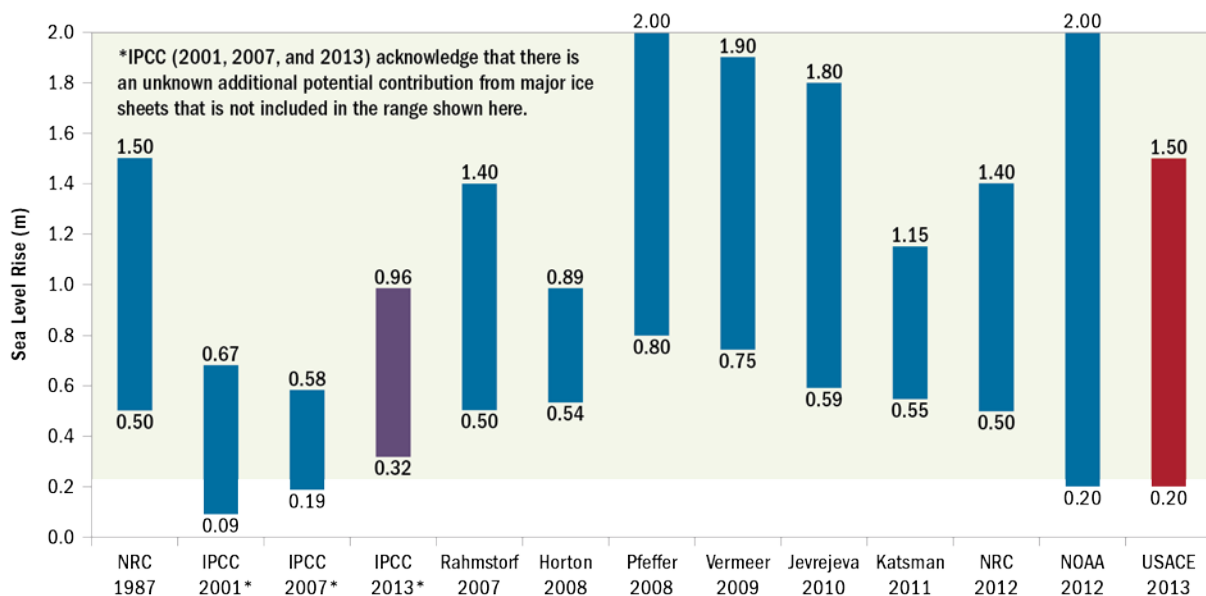


Figure 5-6: Comparison of Peer-Reviewed Research Estimates for Global SLR by 2100. The red column on the right hand side of the plot shows the USACE range of global SLR consideration at USACE projects, although higher estimates can be considered. As shown in this figure, IPCC scenarios give a lower range of SLR but at the high end they acknowledge that there is an unknown additional potential contribution from major ice sheets. The other estimates shown in the figure do not have this limitation.

GMSL Rise from 2000 to:	Likely (17–83%)	1-in-20 (95%)	1-in-200 (99.5%)	Max. Poss. (99.9%)
2100, RCP 8.5 (High Emissions)	62–100 cm (2.0'–3.3')	121 cm (4.0')	176 cm (5.8')	245 cm (8.0')
2100, RCP 2.6 (Low Emissions)	37–65 cm (1.2'–2.1')	82 cm (2.7')	141 cm (4.6')	210 cm (6.9')

Figure 5-7: Global Mean Sea Level Rise Probabilities. Global mean SLR probabilities from 2000 to 2100 under low and high emission scenarios (Subsection 3.3).

Tide Gauge Information

The term “tide” is used to define the alternating rise and fall of the oceans with respect to the land produced by differential variations in the gravitational attraction of the moon and sun. Non-astronomical factors, such as the configuration of the coastline, local depth of the water, ocean-floor topography, and other hydrographic and meteorological influences, play an important role in determining the range of tide, delay times of the tide, and the time interval between high and low waters.

Although the astronomical influences of the moon and sun upon the earth would seem to imply a uniformity in the tide, the type of tide can vary both with time at a single location and in distance along the coast. As the tides travel through ocean basins, the frequency and amplitude can be either amplified or damped by the oceanic bathymetry (see Figure 5-8).

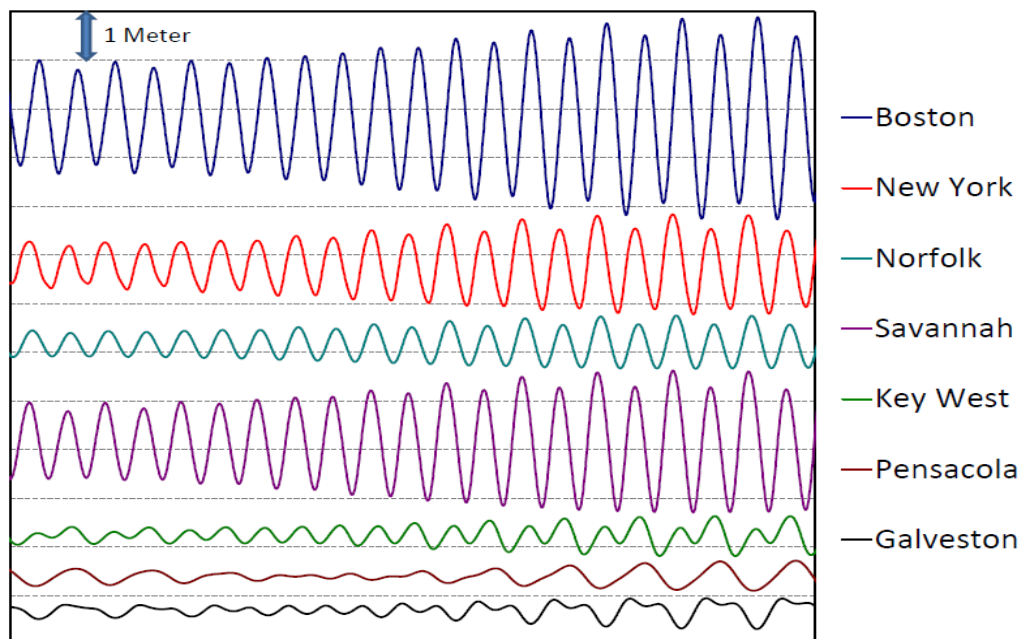


Figure 5-8: Characteristic Tide Curves. Characteristic tide curves near port facilities along the U.S. East and Gulf Coasts showing the variations of tidal amplitudes and frequencies.

LRSL is best determined using trend data from established tide gauges (see Section 4.3.1). The length of the tide gauge record impacts the robustness of the estimated historical relative mean sea level change. Interannual, decadal, and multi-decadal variations in sea level are sufficiently large that misleading or erroneous sea level trends can be derived from periods of record that are too short.¹³¹ Tide gauge records with a length of two tidal epochs (an epoch is 18.6 years) or 38 years is suggested. Closure on 18.6 years takes into account variations in the range of tide due to a slowly varying orientation of the lunar orbit. NOAA does not publish sea level trends from tide gauge records unless they are at least 30 years in length.¹³² NOAA does not publish sea level trends from tide gauge records unless they are at least 30 years in length because the error in the trends increases exponentially with decreasing series length.

The question of the required proximity of a tide gauge to be used in estimating trends is heavily influenced by regional factors, such as vertical land movement, and local factors, such as the exposure of the tide gauge (see Figure 5-9¹³³).

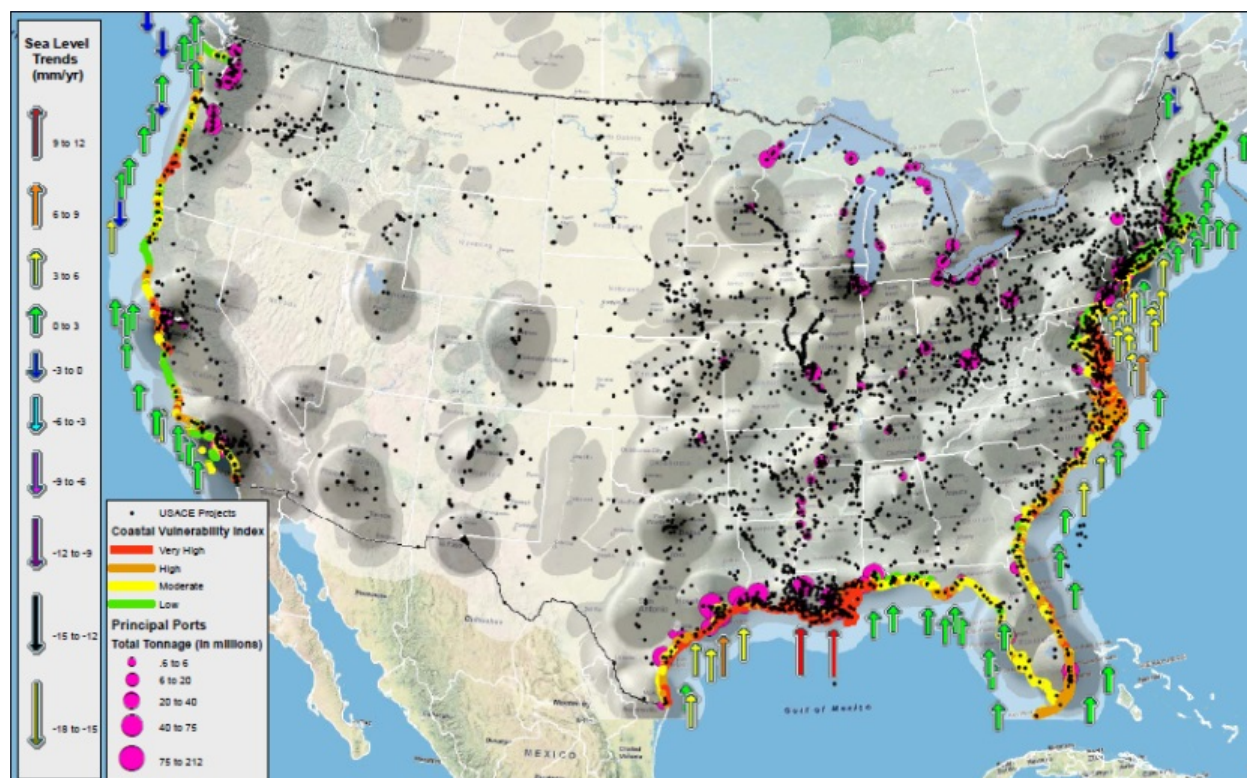


Figure 5-9: Changing Sea Levels at Tide Gauges.

Changing sea levels at tide gauges in the U.S. are illustrated by color, length, and direction (NOAA), Coastal Vulnerability Index (USGS), USACE Projects, and Port Tonnage on map of Population Density.

Over time, sea level variations are tracked relative to a fixed station datum maintained by the benchmark network. As a result, it is critical to consider vertical datums, including past and potential future shifts in datum, when estimating future LRSL.

¹³¹ Zervas, 2009.

¹³² Ibid.

¹³³ USACE, 2014.

Global Mean Sea Level over the Period of Record from Satellite Altimetry

Since 1992, satellite altimetry has provided an additional method to estimate sea level changes. An estimate of the present trend in global SLR based on a series of overlapping satellite altimeter missions, capturing a rate of 2.9 mm/year for the global oceans. This relatively short period of record is not sufficient to determine a sea level change trend.

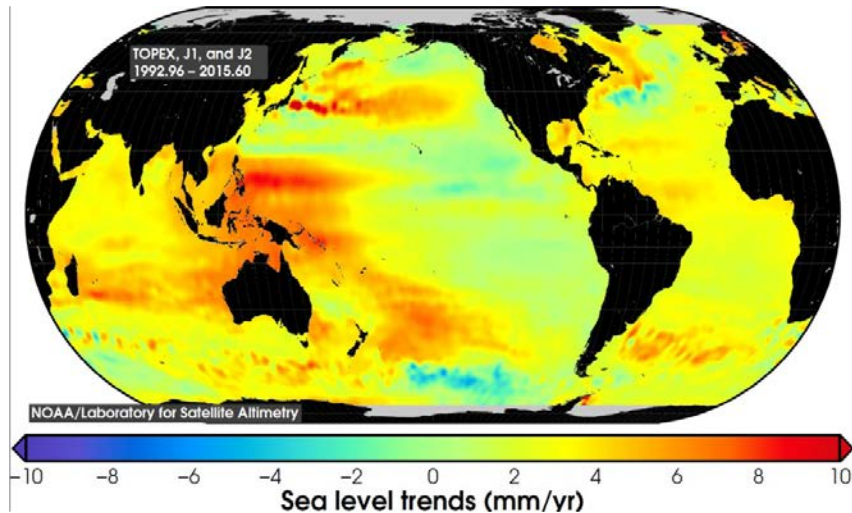


Figure 5-10: Local Sea Level Rise. LRSL is a combination of global, regional, and local sea level changes caused by estuarine and shelf hydrodynamics, regional oceanographic circulation patterns (often caused by changes in regional atmospheric patterns), hydrologic cycles (river flow), and local and/or regional vertical land motion (subsidence or uplift).

5.2.1.3 Local Sea Level Rise

LRSL is the local change in sea level relative to the elevation of the land at a specific point on the coast. LRSL is a combination of global, regional, and local sea level changes caused by estuarine and shelf hydrodynamics, regional oceanographic circulation patterns (often caused by changes in regional atmospheric patterns), hydrologic cycles (river flow), and local and/or regional vertical land motion (subsidence or uplift) (see Figure 5-10). Thus, LRSL is variable along the coast. LRSL is a specific type of sea level change that affects many applications, since the contribution to the local relative rate of rise from global SLR is expected to increase. Some areas are experiencing relative sea level fall, which can also have ecological and societal impacts. Additionally, some localized areas exhibit a more dramatic relative sea level trend than the generally observed globally, unless data are filtered to account for local geophysical anomalies (e.g., Southern Louisiana).

Although Figure 5-11¹³⁴ suggests a global average sea level trend of 2.9 mm/year, the altimeter data show a wide range of regional sea level trends which make up the global average. Some trends are positive and some are negative since 1993. Tide gauge records show similar regional variability.

¹³⁴ NOAA, Center for Satellite Applications and Research, 2015a.

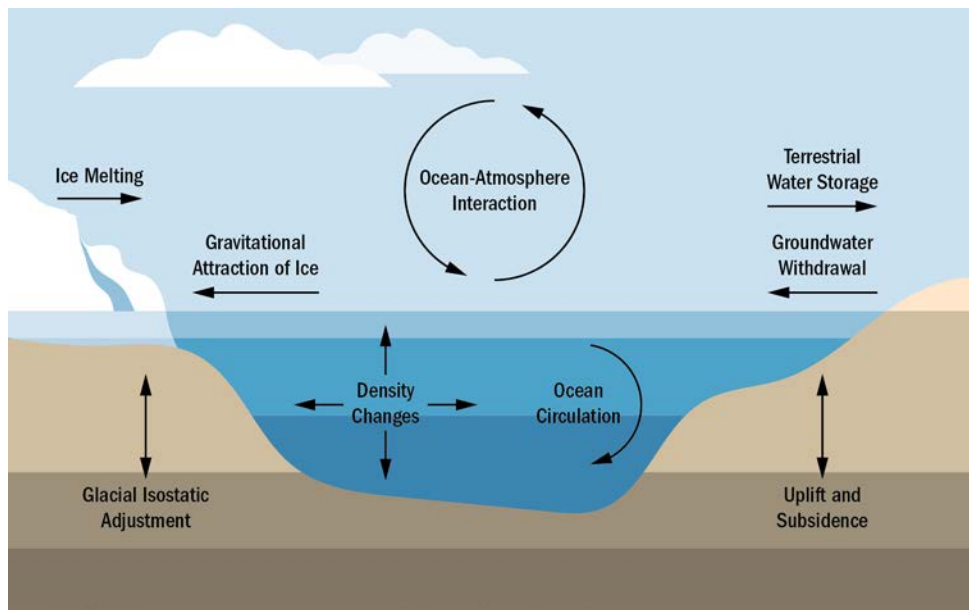


Figure 5-11: Sea Level Trends. Regional rates of sea level change from overlapping satellite altimeter missions.

When GMSL information is applied to a particular location, it must be adjusted due to regional and site-specific effects. Most significant among these are vertical land movement (either uplift or subsidence) and ocean/atmospheric conditions at the project site. The long-term data obtained from tidal

records capture these effects as they are represented by historical conditions, but they do not capture potential changes into the future.

Some new research¹³⁵ provides sea level projections at a global network of tide gauges. This approach starts to regionalize the global projections and captures subsidence and other impacts. Regionalization of existing global sea level projections is needed for mapping future conditions flood hazards. Ideally, these regional scenarios would be vetted by regional and local stakeholders and used for consistent future flood hazard assessment.

Subsidence Trends

Vertical land movement (VLM) is a primary component of local relative SLR. VLM can be caused by many factors, such as regional tectonic movement, regional vertical land subsidence or uplift, compaction of sedimentary strata, crustal rebound in formerly-glaciated areas, and subsidence due to local withdrawal of subsurface fluids (water or hydrocarbons). In many locations, direct estimates of local vertical land uplift or subsidence can be obtained from Continuously Operating Reference Stations (CORS). The CORS allows for centimeter-level accuracy of vertical change.

Rates of vertical land motion can be factored into local SLR projections by co-location of CORS with tide gauges.¹³⁶ For example, the USACE Sea Level Calculator uses information at NOAA tide gauges to add vertical land motion to global sea level projections to make the projections relative to what is happening locally (LRSL). Extrapolation or interpolation of VLM should also be performed with caution, as many areas have large gradients in VLM rates of short geographic distances (e.g., coastal Louisiana and Texas). VLM rates are often assumed to be linear for long time periods; however, in some tectonically-active areas or in

¹³⁵ Kopp, et al., 2014.

¹³⁶ NOAA, 2015b.

areas where groundwater and hydrocarbon fluid withdrawal is stopped or mitigated, the trends will change over shorter time periods.

Variability of Components of Water Level

The primary components of coastal water level predictions are: sea-level rise, tidal variation, seasonal effects, storm surge, wave set-up, and wave runup. The relative importance of the magnitude of components of total water along coastlines can be illustrated by a wide range of non-tidal residuals as well as storm climates. Figure illustrates potential components from a representative extreme event over wide-varying coastlines.

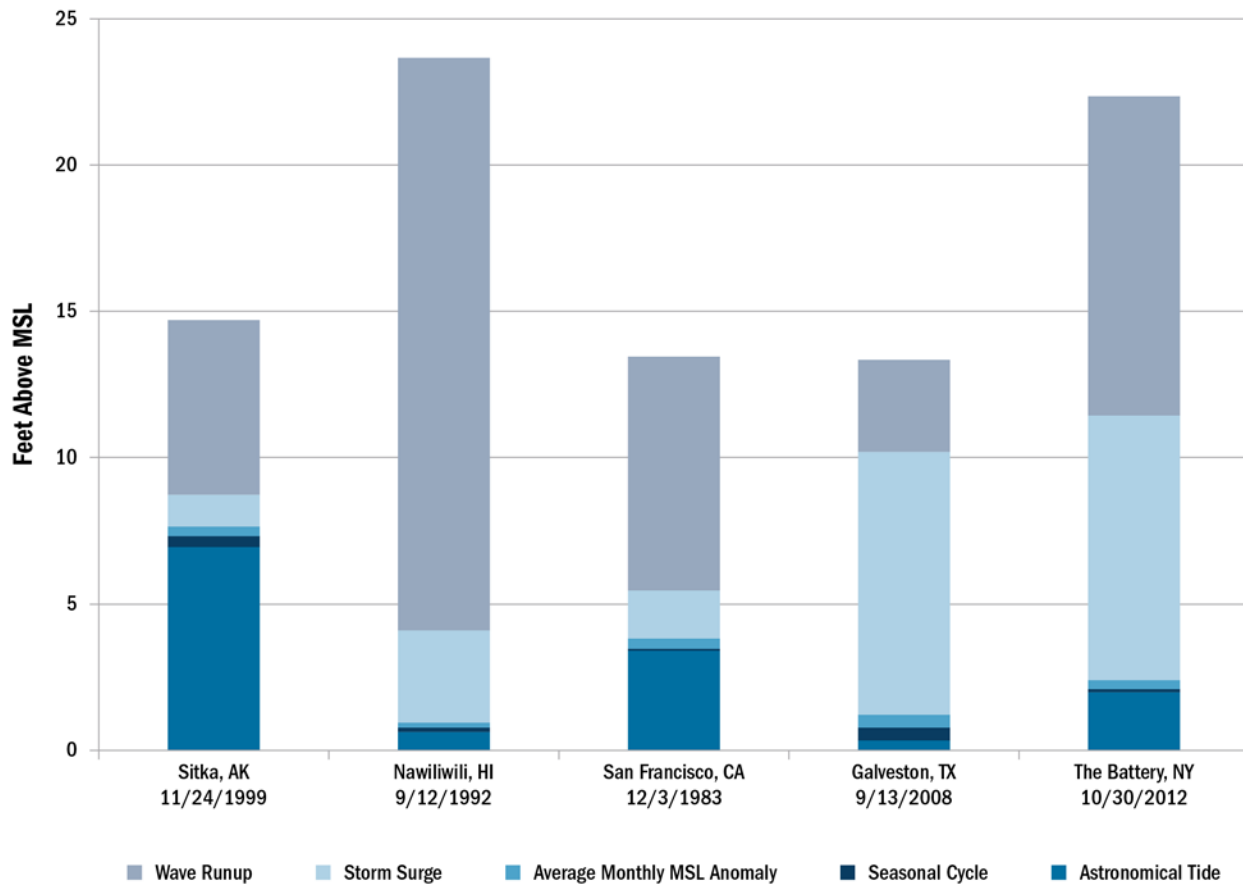


Figure 5-12: Components of Water Level. Relative importance of Total Water Level (TWL) Components for Different Coastlines and Example Extreme Events.

At any given time, the elevation of the SWL, relative to a fixed datum, is comprised of mean sea level, the deterministic astronomical tide, and non-tidal residual. The non-tidal residual is defined as any elevation change in the SWL not related to the astronomical tide, including the seasonal cycle. This non-tidal residual can be substantial (on the order of tens of centimeters) due to low frequency cyclical changes in water temperature, currents, and other forcing mechanisms (e.g., processes associated with El Nino Southern Oscillation), as well as relatively high frequency water level changes due to the presence of winds and low atmospheric pressure (e.g., storm surge).

In sheltered environments, precipitation and river discharge also contribute significantly to non-tidal residual. The dynamic still water level (DSWL) (see Figure 5-13¹³⁷) combines the SWL wave-induced changes to the mean sea surface and wave-induced water level fluctuations on the order of minutes. DSWL includes the mean water level in the presence of waves, including wave setup (a superelevation of the water level due to wave breaking, which reaches its maximum at the shoreline) and setdown. DSWL also includes additional low-frequency water level fluctuations due to waves caused by processes like bound long waves and wave groups.

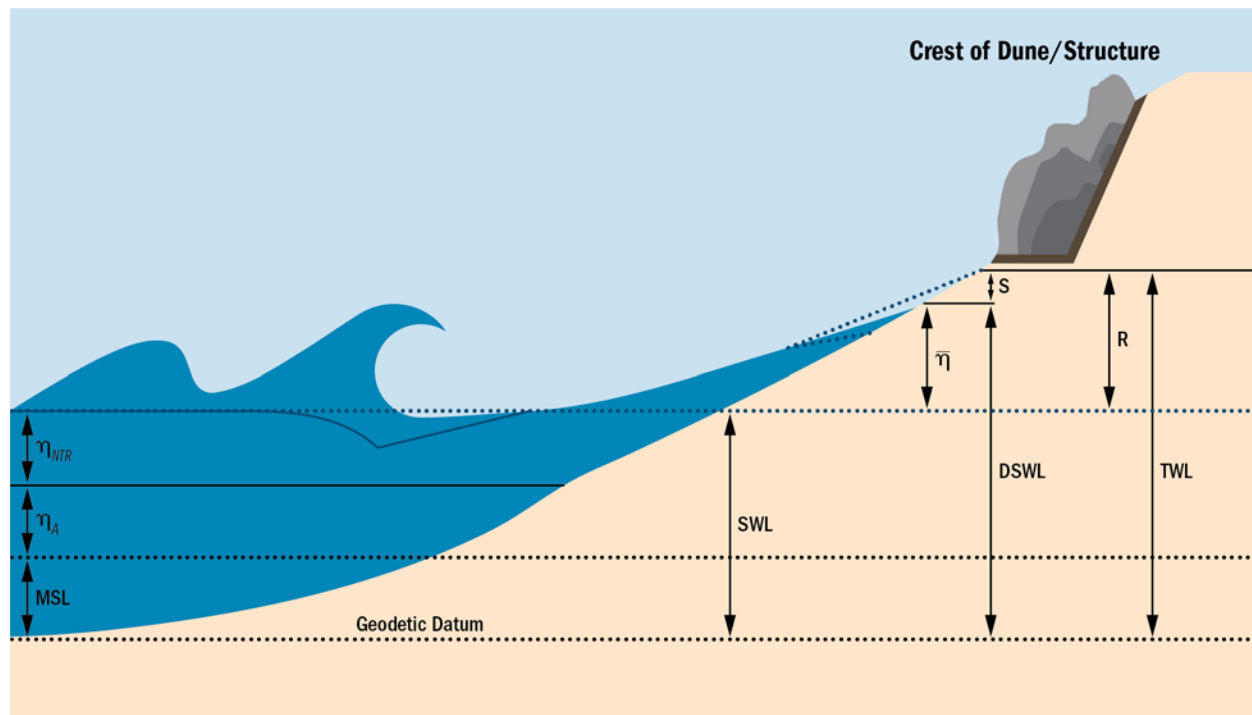


Figure 5-13: Profile View of Total Water Level Components.
Generic profile view schematic of the components of total water levels (TWL), including Stillwater level (SWL) and dynamic Stillwater level (DSWL) relative to a geodetic datum.

5.2.2 Uncertain Future Conditions

Section 3.3 discusses future projected sea level trends from the NCA and that there is a wide range of SLR based on uncertainty of the future contribution of ice melt to SLR and which emission scenario used in global climate models ends up being reality. Due to this uncertainty, a scenario approach has been adopted by many agencies for future project planning. The USACE sea level change adaptation process¹³⁸ explains the need for a multiple scenario approach.

5.2.2.1 Use of Scenarios

The dynamic nature of climate change as it affects coastal and hydrologic processes requires us to fully explore whether plans, designs, operations, and maintenance based on the principle of stationarity are still

¹³⁷ Ibid.

¹³⁸ USACE, 2013.

valid.¹³⁹ For example, USACE sea level change (SLC) adaptation addresses the potential for nonstationary conditions through the use of a multiple scenario approach, which includes a range of future potential SLC rates. Due to the uncertainty and variability of future SLC, social, economic, and ecological changes, as well as their associated interactions, USACE employs a robust framework for project performance that is flexible and adaptable to multiple future scenarios.

Emphasis should be placed on both how the project operates within a larger system and how project decisions made today can influence future system responses to perturbations through adjustments, feedbacks, or cascading impacts. Robustness here is considered to be the ability of a project or system of projects, or their adaptation strategies, to continue to perform satisfactorily under changing conditions and over a wide range of conditions.¹⁴⁰

Because of the uncertainty about future changes in climate, it is necessary to examine a range of scenarios that reflect complete, coherent, and internally-consistent descriptions of plausible future states. This approach allows an examination of cases for exposure to extreme events and performance for the project alternatives. As one study¹⁴¹ pointed out, "Rather than focus on a single without project condition as the base, scenario planning acknowledges uncertainty by considering an array of futures based on different potential values of key uncertainties. In this context, plans are formulated that both address each of the possible futures but also are robust in achieving the desired objectives regardless of the future."

5.2.2.2 Risk Framing

Risk cannot be eliminated entirely. Evaluation of SLR scenarios and flood levels is guided by the risk inherent in planning, designing, and implementing particular types of projects and by their location. For example, projects with high consequences from failure may be more risk-averse than projects with lower consequences of failure. It is recommended, therefore, that scenarios be communicated in the context of risk tolerance (see Figure 5-14) to improve transparency and credibility.



Figure 5-14: Risk Tolerance. We have a high tolerance for things like a path in a public park (left), and low tolerance for things like air safety (right).

The four interagency scenarios presented in *Global Sea Level Rise Scenarios for the United States National Climate Assessment*¹⁴² (see Figure 5-15) have been framed as such and the Federal community and partners have begun using the information for future planning (see FFRMS in Section 2.5). This framing offers several

¹³⁹ Milly, et al., 2008.

¹⁴⁰ Moser, et al., 2008.

¹⁴¹ Ibid.

¹⁴² Parris, et al., 2012.

points (see bulleted list below) worth considering in the development and application of sea level change scenarios for mapping future coastal flood hazards.

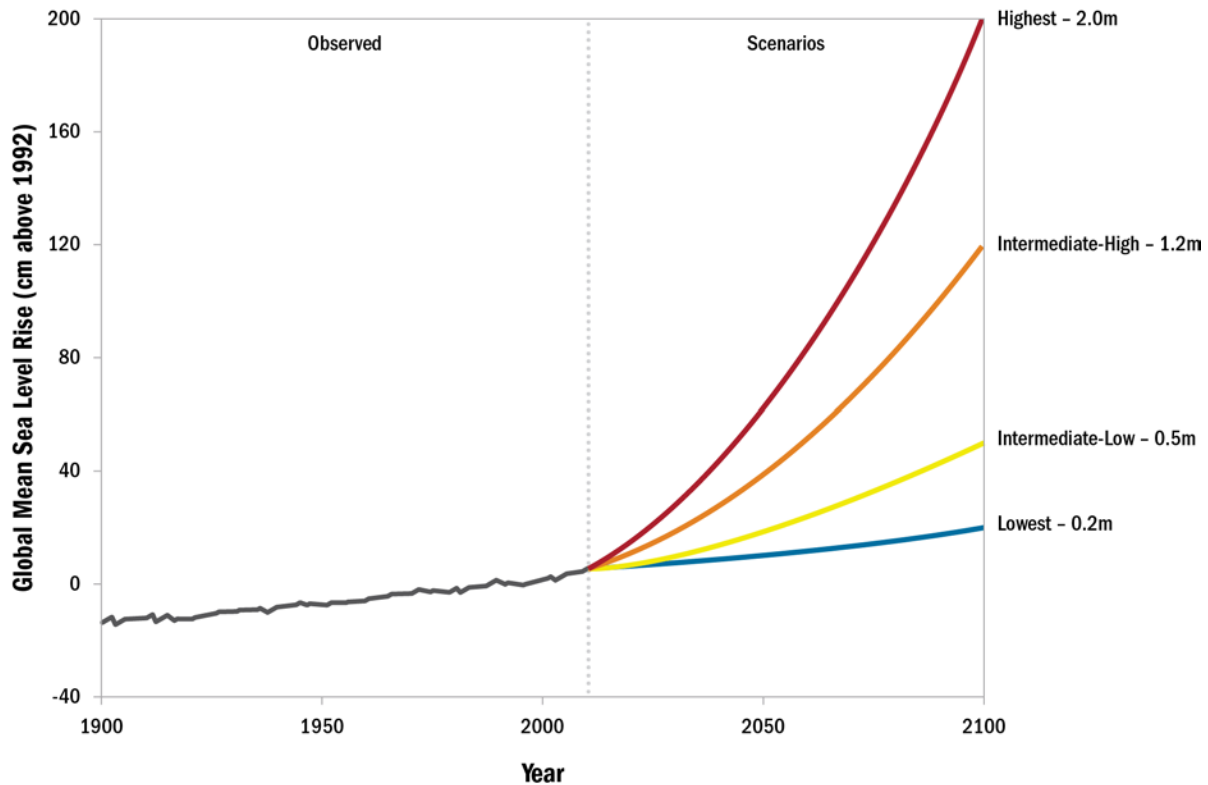


Figure 5-15: Global Mean Sea Level Rise Scenarios from Parris et al., 2012.

Table 5-1: Global Mean Sea Level Rise Scenarios from Parris et al., 2012, for 2100 in Table Form.

Scenario	SLR by 2100 (m)*	SLR by 2100 (ft.)*
Highest	2.0	6.6
Intermediate-High	1.2	3.9
Intermediate-Low	0.5	1.6
Lowest	0.2	0.7
* Using mean sea level in 1992 as a starting point.		

- The low and intermediate low scenarios, or comparable data, may be appropriate where there is a high tolerance for risk (e.g., projects with a short lifespan or planning areas with flexibility to make alternative choices within the near-term). These scenarios primarily address ocean warming.
- Where LRSL is falling, the use of the lowest scenario may be appropriate.

- The intermediate-low scenario has been recommended as the minimum scenario where LRSL is rising because it includes ocean expansion, whereas the lowest scenario is simply an extrapolation of the existing sea level trend into the future.
- The intermediate high and high scenarios, or comparable data, should be considered in situations where there is little tolerance for risk. These situations include projects with a long lifespan, where losses would be catastrophic, where there is limited flexibility to adapt in the near- or long-term, and those that serve critical economic and ecological function (e.g., ports or endangered species refuges). These scenarios primarily address both ocean warming and contributions from ice sheets.
- If more refined or recent regional sea level rise projections are available that are based on credible and salient climate science (e.g., information developed from highly resolved numerical models), they can be used instead of the *Global Sea Level Rise Scenarios for the United States National Climate Assessment* interagency scenarios.¹⁴³

Communities Could Decide Their Own Future Risk Tolerance

Much like the current guidance for future riverine conditions hydrology¹⁴⁴ a coastal community could determine which SLR scenarios to use in future conditions mapping. These scenarios would be based on a community's risk tolerance and desired future planning horizons (2020, 2050, and 2100). The community would then be able to evaluate consequences of future risk and begin to adapt and mitigate for them.

At the national level, FEMA could provide guidance on defining a minimum risk tolerance that communities would have to meet. The end mapping product could be a non-regulatory product, much like the existing coastal +1, +2, and +3, maps that are options as part of the current Risk MAP program (see Section 5.5.1.5).

Sub-Recommendation 5-4: FEMA should use Parris et al., 2012, or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.

Sub-Recommendation 5-5: FEMA should work with other Federal agencies (NOAA, USACE, USGS), the U.S. Global Change Research Program (USGCRP), and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parris et al., 2012, scenarios, for the coastal regions of the United States out to the year 2100 that can be used for future coastal flood hazard estimation.

5.3 Best Available Riverine Science

Defining future riverine flood hazards requires an assessment of future hydrologic and land use change that will influence the frequency and magnitude of extreme precipitation events. Future river discharges may increase, causing higher flood elevations than during past events, and may do so with more frequency in some areas of the country, thereby increasing the area impacted by future riverine flood hazards.

¹⁴³ Parris, et al., 2012.

¹⁴⁴ FEMA, 2001.

5.3.1 Land use Impacts on Future Riverine Conditions

Urban development and other changes in land use influence the magnitude of flood flows by modifying how rainfall and snowmelt are stored and run off the land surface into streams. Where much of the land surface is impermeable (e.g., covered by roads, parking lots, and buildings), watersheds have less capacity to store and retain rainfall and snowmelt, which leads to more rapid runoff and higher peak flows.

Many FIRMs have been issued for communities in watersheds undergoing rapid urbanization. For such basins, there is a need to account for the urbanization in flood-frequency estimates. Regression relations have been developed¹⁴⁵ for converting flood-frequency estimates derived from evaluation of flood-frequency relations for rural areas into estimates of flood-frequency for urban watersheds.

These equations employ seven parameters, including drainage area; basin slope; a measurement of the two-hour, two-year rainfall; and a basin development factor. These and other equations are implemented in USGS StreamStats,¹⁴⁶ whose estimates assume natural flow conditions and should be adjusted for trends in urban development or other impactful human activities. However, the equations are dated and may not reflect new trends in urban development that attempt to mitigate stormwater runoff through flood detention and enhanced infiltration.

Flood flows for 78 USGS gauged streams subject to varying degrees of urbanization over the last three decades were studied¹⁴⁷ to develop a peak discharge adjustment methodology that accounts for progressive urbanization. Flood frequency analysis, coupled with nonlinear regression techniques, were used to generate a set of equations for converting peak discharge estimates determined from rural regression equations to a set of peak discharge estimates that represent known urbanization.

Two sets of equations—one set based on imperviousness and one based on population density—were developed by the USGS. Both sets of equations are dependent on rural peak discharges, a measure of development (average percentage of imperviousness or average population density), and a measure of homogeneity of development within a watershed. Average imperviousness was readily determined by using GIS methods and commonly-available land cover data. Similarly, average population density was determined from census data. A key advantage to these equations is that they do not require field measurements of watershed characteristics as did the USGS urban equations developed earlier.¹⁴⁸

5.3.2 Climate Impacts on Future Riverine Conditions

A warmer climate will result in two outcomes: (1) increased evaporation from oceans and other water bodies, thus leading to increased precipitation intensities and correspondingly more rapid runoff; or (2) increased evaporation from arid lands, leading to reduced runoff in arid regions and correspondingly lower river discharges. According to the Clausius-Clapeyron equation, air can hold about 7 percent more moisture for each 1 degree Celsius increase in temperature,¹⁴⁹ thus allowing back-of-the-envelope predictions of how higher global temperatures would affect annual global runoff. Droughts and floods, however, result from complicated interactions involving the timing, duration, and magnitude of multiple meteorological,

¹⁴⁵ Sauer, et al., 1983.

¹⁴⁶ USGS, StreamStats, 2015.

¹⁴⁷ Moglen and Shivers, 2005.

¹⁴⁸ Sauer, et al., 1983.

¹⁴⁹ Held and Soden, 2006.

watershed, channel, and other local and regional factors. Predicting precisely how flood risk will change due to increased global temperatures, specifically in a given watershed, is not currently possible using simple physics.

In addition to temperature, there are other systematic changes that are important in altering riverine hydrology. Future development in the floodplain, land use changes in the watershed, regulation and deregulation of flow by addition or removal of flood control structures, increases in carbon dioxide (CO₂) in the atmosphere, and changes in other critical atmospheric components (e.g., the future availability and distribution of water vapor) will affect the statistical characteristics of flood flows. Such changes, or non-stationarities, can affect the mean, maximum, variability, and timing of flood peaks.

As physical processes change, flood risk changes as well. The goal in flood frequency analysis is to characterize the population of future floods taking into account knowledge of non-stationarities and their likely impact on flood hydrology. This characterization represents a change in how flood frequency estimates are computed. The previous assumption of stationarity implied that information about past floods could be relied upon to characterize future floods, and this may no longer be the case. Figure 5-16 illustrates processes that can cause non-stationarity.

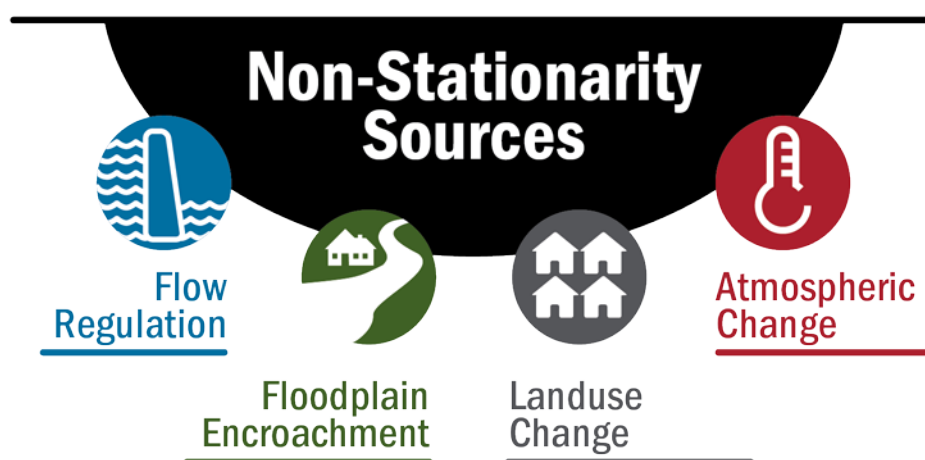


Figure 5-16: Sources of Non-Stationarity

Section 3.3 discusses observed precipitation changes from the NCA that show that, although long-term trends in average annual precipitation are variable and significant increases across the country were not pronounced, heavy rainfall has been increasing just about everywhere. However, extreme precipitation such as the 1-percent-annual-chance event does not appear to be increasing.

Similarly, analysis of USGS long-term streamflow records indicates many highly-significant trends for very low and moderate (non-flood) flows, such as those corresponding to the 90th-percentile through median flows.¹⁵⁰ Moving to higher flows, the examination of the partial-duration flood series (all of the peak flows above a stated threshold) reveals some significant trends.¹⁵¹

¹⁵⁰ Lins and Slack, 1998.

¹⁵¹ Villarini, et al., 2011.

However, study of annual peak flows (the base observations on which flood-frequency analysis is generally based) reveals few significant trends and no consistent national pattern. This finding is because peak-flow data are typically noisy, flood records are short, and major floods are rare. Even where trends have been detected in annual floods, there is no strong association with climate indicators. For example, a study of trends in flood magnitude versus global CO₂ levels¹⁵² noted that none of the four regions of the country showed strong statistical evidence for flood magnitudes increasing with increasing CO₂. Changes in flood magnitude are more likely influenced by other factors, including future land use changes, because flood data records are typically noisy and rare, and are therefore they difficult to detect (see Figure 5-17¹⁵³).

Trends in Flood Magnitude

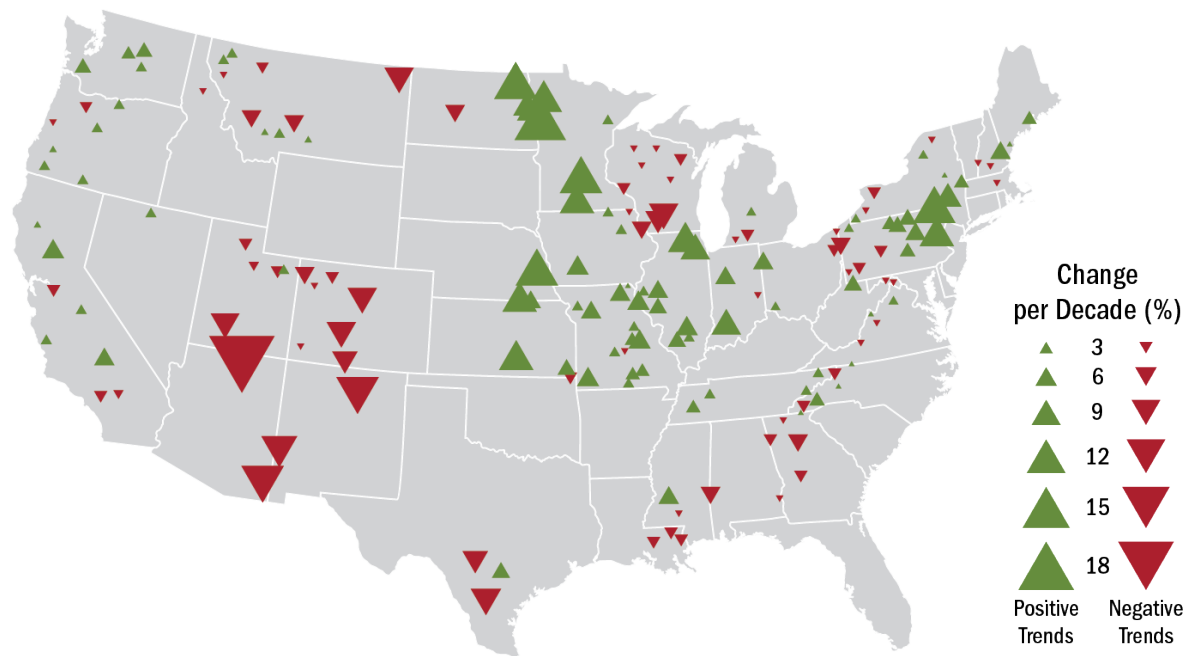


Figure 5-17: Trends in Flood Magnitude.

River flood magnitudes (from the 1920s through 2008) have decreased in the Southwest and increased in the eastern Great Plains, parts of the Midwest, and from the northern Appalachians into New England. The map shows increasing trends in floods in green and decreasing trends in brown. The magnitude of these trends is illustrated by the size of the triangles.

5.3.3 Climate Projections

Projecting climate conditions relies on different storylines, or narratives, that describe the future conditions. An example of a storyline includes the different representative concentration pathways that describe how greenhouse gas concentrations change over time.¹⁵⁴

Due to the complexity of hydrologic processes, developing narratives of climate change for the water sector must encompass the full suite of uncertainties associated with: (1) global climate modeling; (2) climate

¹⁵² Hirsch, et al., 2012

¹⁵³ Melillo, et al., 2014.

¹⁵⁴ Van Vuuren, et al., 2011.

downscaling; and (3) hydrologic modeling. The process of defining climate change narratives for the water sector is an active area of research, with two major challenges.

- First, the models available were not specifically designed to capture uncertainties and, thus, may provide a biased and incomplete sampling of the range of possible climate futures.
- Second, all models are not created equal (i.e., some models are better than others).

The selection and/or weighting of climate models is also an active area of research, where many groups are experimenting with alternative methods to combine output from multiple climate models.^{155,156,157,158}

Moving forward, it is important to comprehensively characterize uncertainties in global climate modeling,^{159,160} climate downscaling,¹⁶¹ and hydrologic modeling,¹⁶² and to carefully select climate change narratives that reflect these myriad of uncertainties^{163,164,165} (see Figure 5-18).

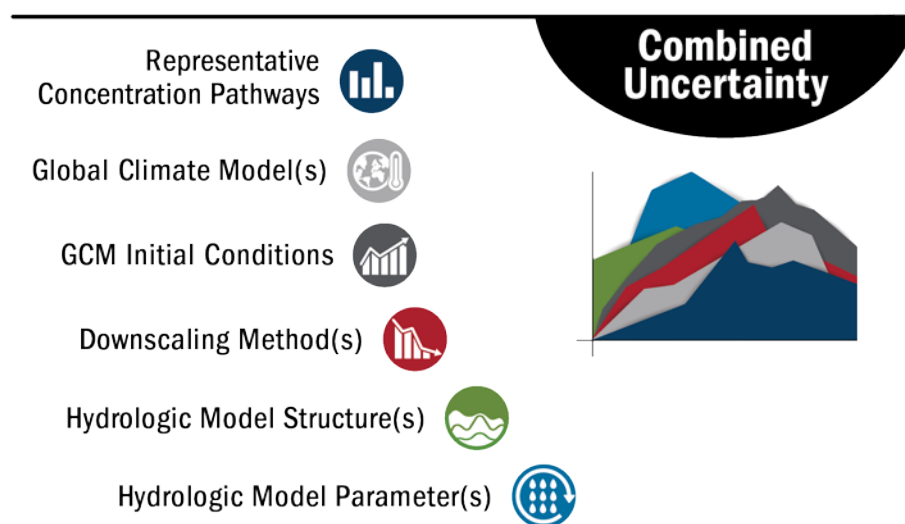


Figure 5-18: Sources of Uncertainty. Projecting climate hydrology involves a number of steps, each of which introduced uncertainty into the final result.

5.3.3.1 Climate Downscaling

Different types of downscaling have revealed a number of uncertainties that should be considered. From a dynamical downscaling perspective, the results from the coarse-resolution North American Regional Climate Change Assessment Program reveal that regional climate model simulations can have very different climate change signals compared to the parent global model.¹⁶⁶ From a statistical downscaling

¹⁵⁵ Knutti, et al., 2010.

¹⁵⁶ Mote, et al., 2011.

¹⁵⁷ Bishop and Abramowitz, 2013.

¹⁵⁸ Evans, et al., 2013.

¹⁵⁹ Deser, et al., 2012a.

¹⁶⁰ Deser, et al., 2012b.

¹⁶¹ Gutmann, et al., 2015.

¹⁶² Clark, et al., 2015.

¹⁶³ Knutti, 2010.

¹⁶⁴ Knutti and Sedláček, 2013.

¹⁶⁵ Addor, et al., 2014.

¹⁶⁶ Mearns, et al., 2013.

perspective, a comprehensive assessment reveals substantial biases, inadequate representation of extremes, inadequate representation of the spatial scaling characteristics that are important for hydrology,¹⁶⁷ and often a complete (and unjustified) reliance on the precipitation change signals from global climate models.

It is possible to select among a range of downscaling methods based on their capability to produce unbiased information,¹⁶⁸ and to adequately represent extremes and the spatial scaling characteristics that are important for hydrology.¹⁶⁹ As with global climate modeling, the selection of downscaling methods must proceed with caution, as there can be unintended consequences of over-correcting the noise in climate model simulations (e.g., interpreting internal variability as a model bias), over-confidence in the change signal from the global models, and reliance on downscaling methods that are unable to represent non-stationarity.^{170,171} It is important to note that any model downscaling can result in missing a potential realization in the future due to uncertainty.

5.3.3.2 Hydrologic Modeling

The opportunities to reduce uncertainty in hydrologic modeling relate to the selection and configuration or calibration of hydrologic models. In terms of model selection, the challenge is to use models that appropriately represent the dominant hydrologic processes, because neglecting processes (e.g., groundwater-surface water interactions) or over-simplifying the process representations (e.g., temperature index snow models) leads to unreliable portrayal of climate change impacts.^{172,173} In terms of model parameters, the objective is to avoid problems associated with parameter interactions and parameter non-uniqueness and reduce model uncertainty by selecting smaller subsets of behavioral model parameters.

Sub-Recommendation 5-6: FEMA should take the impacts of future development and land use change on future conditions hydrology into account when computing future conditions for riverine areas.

5.4 Future Geomorphology Changes

Section 3 discusses both manmade and natural changes that will likely occur in the future and how those changes will impact current floodplains. Riverine and coastal floodplains are dynamic systems, with constantly-changing geomorphologies in response to physical phenomena operating over a wide range of

¹⁶⁷ Gutmann, et al., 2014.

¹⁶⁸ Teutschbein and Seibert, 2012.

¹⁶⁹ Gutmann, et al., 2014.

¹⁷⁰ Ehret, et al., 2012.

¹⁷¹ Gutmann, et al., 2014.

¹⁷² Milly and Dunne, 2011.

¹⁷³ Lofgren, et al., 2013.

spatial and temporal scales (see Figure 5-19).

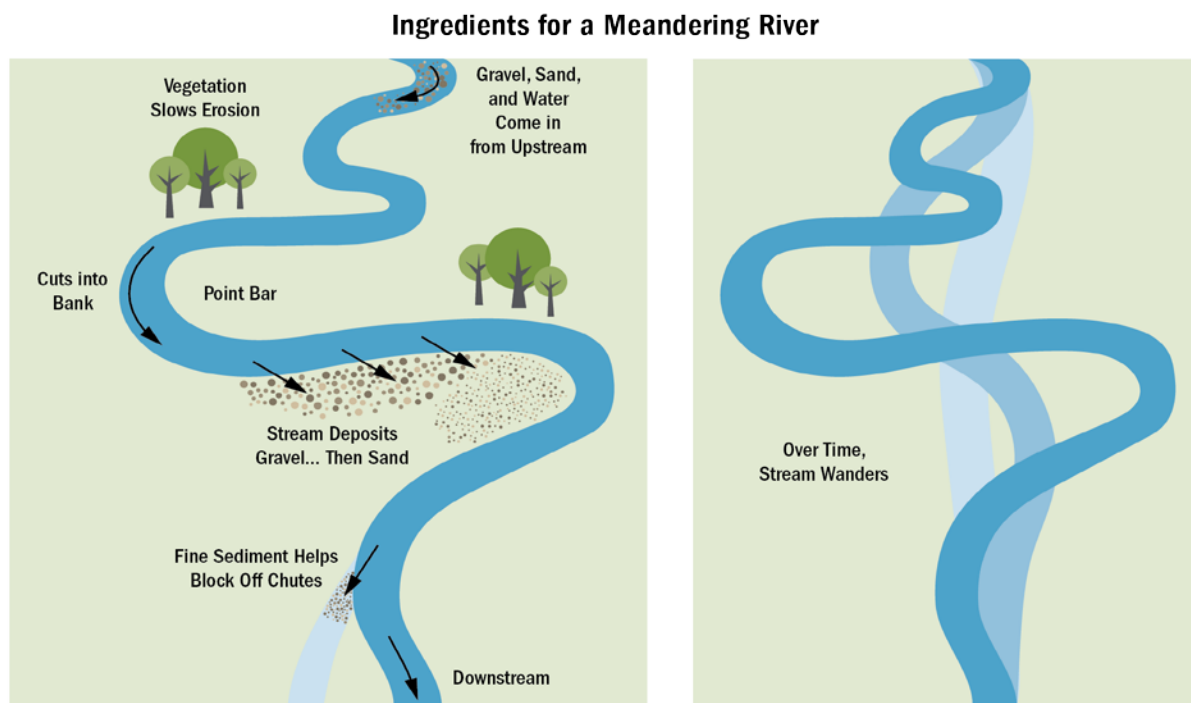


Figure 5-19: Riverine Floodplain.

Floodplains are dynamic systems, with constantly-changing geomorphologies in response to physical phenomena operating over a wide range of spatial and temporal scales

Coastlines and beaches evolve over time, transgressing or regressing in response to variations in storminess (surge and waves), water levels (SLR or fall), sediment volume, and underlying geology (see Figure 5-20¹⁷⁴). Coastal inlets will migrate (some cyclically) in response to these same drivers. Riverine floodplains meander and expand or contract based on flow, sediment regimes, and underlying geology. Changes in riverine geomorphology and in sedimentation can cause channel degradation (lowering the bed) in some locations and aggradation (elevating the bed) in others.

¹⁷⁴ Maine SeaGrant, 2015.

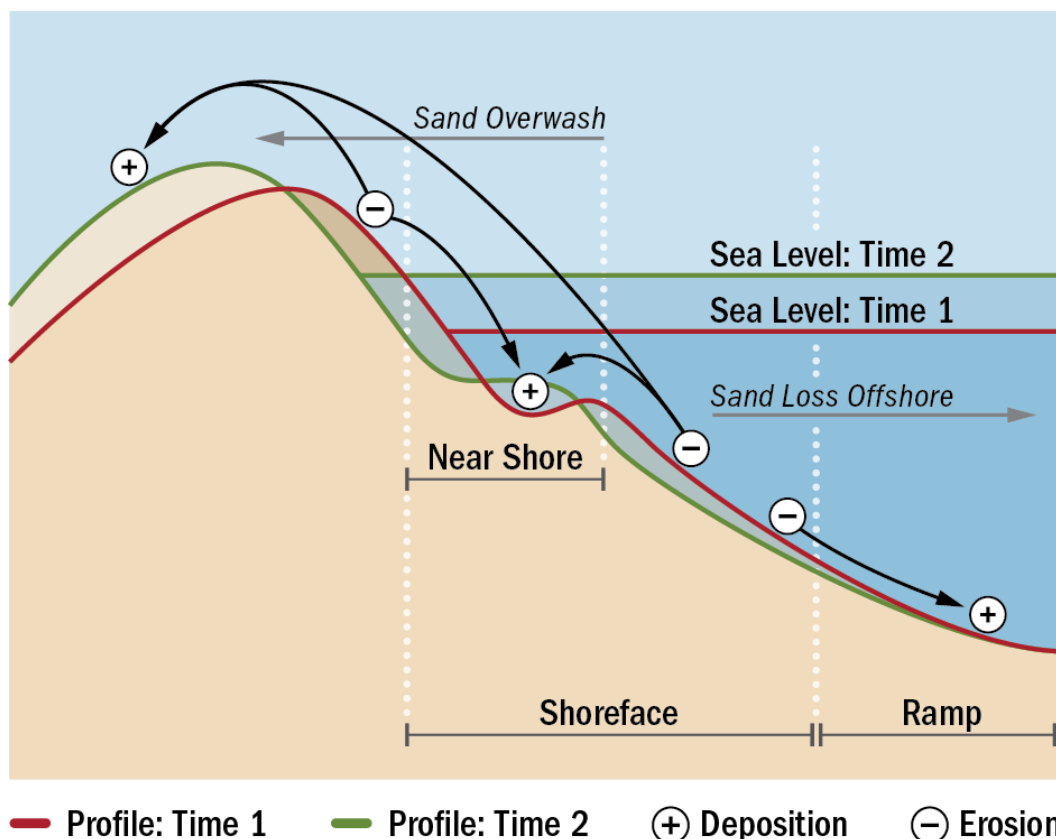


Figure 5-20: Coastline Change. Coastlines subject to a combination of storms, sea level rise, and erosion can change dramatically over time. A typical existing conditions beach profile is shown as the curvy red line. Over time, the profile will migrate landward as seen by the curvy green line. Sand is deposited (+) offshore or inland as overwash and eroded (-) from the nearshore and active drive beach. Sea level rise (horizontal red and green line) can exacerbate long-term coastal erosion.

5.4.1 Coastal Erosion

Shorelines erode and prograde in response to a complex set of forcing phenomena, as noted above. Owing to their importance to navigation, commerce, and defense, U.S. shorelines have been mapped for more than a century by the U.S. Coast Survey and successor agencies.

As mapping technologies have evolved, shoreline data have been collected more frequently and with greater accuracy by the Federal Government and other entities. Most coastal reaches of the United States have sufficient data to support calculation of long-term rates of change, information that is vital to government agencies and other coastal stakeholders concerned with managing coastal hazards.¹⁷⁵

Although shoreline change can have a significant impact on the geographic distribution and severity of coastal flooding, FIRMs do not incorporate long-term erosion into the underlying flood modeling or depict erosion information separately. The *National Flood Insurance Reform Act of 1994* required the Director of FEMA to submit a report to Congress that evaluated the economic impact of erosion and erosion mapping on coastal communities and the NFIP. FEMA contracted with the Heinz Center to prepare the report, which

¹⁷⁵ For example, see the USGS's National Assessment of Coastal Change Hazards, or one of the many State-based coastal erosion mapping programs.

was delivered to Congress in April 2000, and which recommended that Congress: (1) instruct FEMA to map coastal erosion hazard areas, and (2) require FEMA to include the cost of expected erosion losses when setting flood insurance rates along the coast. While FEMA has taken steps to address losses stemming from long-term erosion in the NFIP's insurance premium rate structure, FIRMs do not include any erosion hazard information. See Section 2.6 for more information on this and other attempts to map long-term erosion in the NFIP.

While the research community is making advances in the modeling of coastal geomorphic response to storms and sea level rise,¹⁷⁶ consensus models are not currently available to determine detailed future flood hazards. In the interim, resources are available to assess the severity of long-term erosion hazards along U.S. shorelines; however, the granularity (or resolution) may or may not be sufficiently detailed to support detailed (i.e., parcel-scale) assessment.

Coastal scientists can combine analyses of SLR and erosion based on simplified methods with tools like the USGS's Coastal Vulnerability Index (CVI)¹⁷⁷ to identify vulnerable coastal reaches where a more detailed analysis may be required to more fully capture risks. The CVI provides national maps with an index of vulnerability and probabilities of high shoreline loss. The CVI was recently updated using probabilistic shoreline change data to predict long-term shoreline change associated with SLR through the use of a Bayesian Network¹⁷⁸ (see USGS Coastal Vulnerability and Shoreline Change in Section 5.5.1.5).

5.4.1.1 Impact with Coastal Erosion and Sea Level Rise

As sea levels rise, the increase in water depth allows higher energy waves and currents to impact the active beach profile, thereby increasing the probability of potential erosion due to sediment redistribution landward and seaward.¹⁷⁹ Beach recession is caused by a combination of static inundation from rising sea levels and dynamic sediment lost caused by erosion. Because of this combination of factors, simplified methods of expressing impacts of SLR, such as linear superposition (i.e., the bathtub approach), which, among other things, ignore erosion, may underestimate long-term risk to structures and other infrastructure located along the coast.

5.4.1.2 Implementation Challenges (National vs. State)

The biggest challenge for including long-term erosion hazard information on future flood risk products is using consistent shoreline erosion data and calculation methods. Though there is a national dataset provided by the USGS, as mentioned above, there is not a guaranteed funding source to keep that product updated in the future.

Many coastal States have beach monitoring programs in which to develop their own long-term erosion rates to establish erosion and building setback lines in which they multiply the long-term rates (e.g., x feet/year) by a certain number of years (e.g., 30 or 40). These data could be used by FEMA to map future erosion areas; however, States collect data and calculate rates using slightly different methods, which would cause inconsistency between States for a national mapping program. Developing national standards

¹⁷⁶ Holman, et al., 2015.

¹⁷⁷ Thieler and Hammar-Klose, 1999.

¹⁷⁸ Gutierrez, et al., 2014.

¹⁷⁹ National Research Council, 2012.

for erosion rate calculation and mapping would need to take into account the current State standards so States would be able to use these data for beachfront management. It is recognized also that FEMA does not currently provide a long-term erosion product, and that additional funding would be needed if this aspect were added to their hazard assessment procedures to accommodate the additional effort and resources needed.

Sub-Recommendation 5-7: FEMA should prepare map layers displaying the location and extent of areas subject to long-term erosion and make the information publicly available. Elements include:

- Establishing the minimum standards for long-term erosion mapping that will be used by FEMA that must be met by partners/communities if it is to be incorporated into the FEMA products.
- Working with Federal, State, and local stakeholders to develop these minimum standards via pilot studies.

5.4.2 Riverine Erosion

Practitioners have long recognized that being able to predict the effects and magnitude of future human activities is a necessary constituent in properly considering riverine erosion.¹⁸⁰ As described by Lagasse,¹⁸¹ practitioners typically consider geomorphic and hydraulic factors as affecting stream stability and riverine erosion.

In 1999, FEMA concluded that it was technologically feasible to determine and map riverine erosion hazard areas,¹⁸² and that, to address site-specific conditions, flexibility in the choice of analysis techniques is needed. Changes in river morphology can impact future conditions mapping. Expansion of the floodplain, meandering, erosion and sedimentation, shifting riverbank stability, and altered sediment supply and underlying geologic influence (e.g., Mount St. Helens eruption): all these factors can have a significant impact on riverine flood levels and lateral migration. FEMA provided a solid foundation for evaluating Riverine Erosion Hazard Areas, where erosion hazard areas are defined as locations where potential “erosion or avulsion [lateral migration] is likely to result in damage to or loss of buildings and infrastructure within a 60-year period.”¹⁸³

¹⁸⁰ Richardson, et al., 1975.

¹⁸¹ Lagasse, et al., 2012.

¹⁸² FEMA, 1999.

¹⁸³ Ibid.

These determinations could be made based on erosion rate information and other historical data, or riverine erosion studies such as geomorphic analyses, engineering analyses, and mathematical modeling. FEMA noted that, while riverine erosion involves highly complex and interacting physical processes (see Figure 5-21), “it is entirely feasible to analyze channel history and infer trends in the stream alignment and average migration rates.”

Since 1999, a large amount of research and numerous river engineering studies have been focused on geomorphological changes as they relate to riverine erosion and potential flood hazards. In particular, there have been improvements in understanding the important processes in bank stability and seasonal effects on stability, channel migration, and other natural and anthropogenic effects on river morphology. There have been substantial advances in analytical and numerical modeling and GIS techniques that support decision-making with varied levels of complexity, from field screening approaches¹⁸⁴ to very detailed 2-D and 3-D computer models.¹⁸⁵ Riverine erosion zones in areas identified by Federal, State, local, or tribal entities as having channel migration risk are candidates for future mapping.

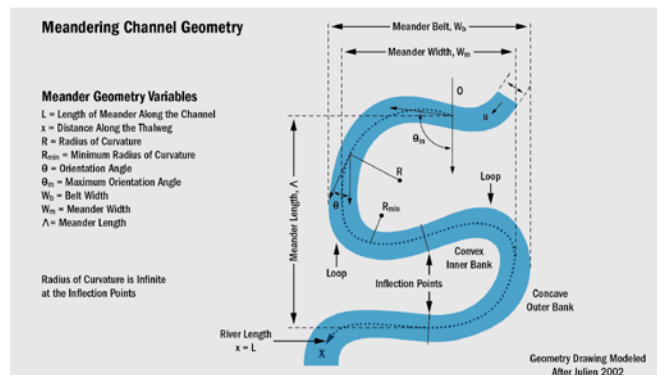


Figure 5-21: Meandering Channel Geometry.
Illustration of the complex processes in channel meandering; other river morphology processes have similar levels of complexity.

Sub-Recommendation 5-8: FEMA should implement riverine erosion hazard mapping (E Zones that define channel migration zones), leveraging existing data, models, and approaches that reflect site-specific processes and conditions.

5.5 Calculating and Mapping Future Coastal Flood Hazards

5.5.1 Geographic Coastal Approaches

It is important to understand existing hazards in order to begin to understand how those hazards may change in the future. Therefore, it is recommended that analyses of future coastal flood hazards build off existing current conditions flood hazard analyses, such as those prepared by FEMA for the NFIP. This consistency will facilitate comparisons between current and future projections of extreme water levels and will also enable compatibility with existing programs and uses.

This section describes the primary drivers of existing coastal flood hazards and provides recommendations on how to account for changes to these hazards in the future. More detailed discussions and guidance on these topics are found in FEMA's guidelines and standards for coastal flood hazard identification for each of these coasts and also in FEMA's Coastal Construction Manual.¹⁸⁶

¹⁸⁴ Bledsoe, et al., 2012.

¹⁸⁵ Duan and Julien, 2010.

¹⁸⁶ FEMA, 2011.

**COMPARISON OF IMPORTANT FLOOD
HAZARD FACTORS BY COAST****Atlantic and Gulf Coasts**

- Hurricanes and Nor'easters
- Large storm surges
- Concurrent waves and water levels

Pacific Coasts

- Longer period swell
- Wave setup, runup, and overtopping
- Tsunami

Great Lakes Coasts

- Concurrent waves and water levels
- Lake-level changes
- Ice cover
- Water level regulation

Flood hazards vary significantly from coast to coast as illustrated in Figure 5-22¹⁸⁷ below and the text box to the left. Therefore, it is important to begin an analysis of flood hazards by identifying the principal flood hazards (e.g., storm surge or erosion) and forcing functions (e.g., hurricanes or tsunamis) affecting the area of interest.

It may not be necessary to account for every flood hazard in every study (erosion hazards may not be significant in a low wave energy environment) or every forcing function (the impacts of Nor'easters along the Gulf of Mexico are minimal), but the principal aspects and causes of flooding should be addressed. A thorough understanding of the current hazards impacting an area will help to prioritize and focus the evaluation of future

hazards. The sections below provide a generalized description for each coast (Pacific, Atlantic, Gulf, and Great Lakes); however, a detailed site-specific assessment of principal flood hazards is recommended.

¹⁸⁷ FEMA, 2002.

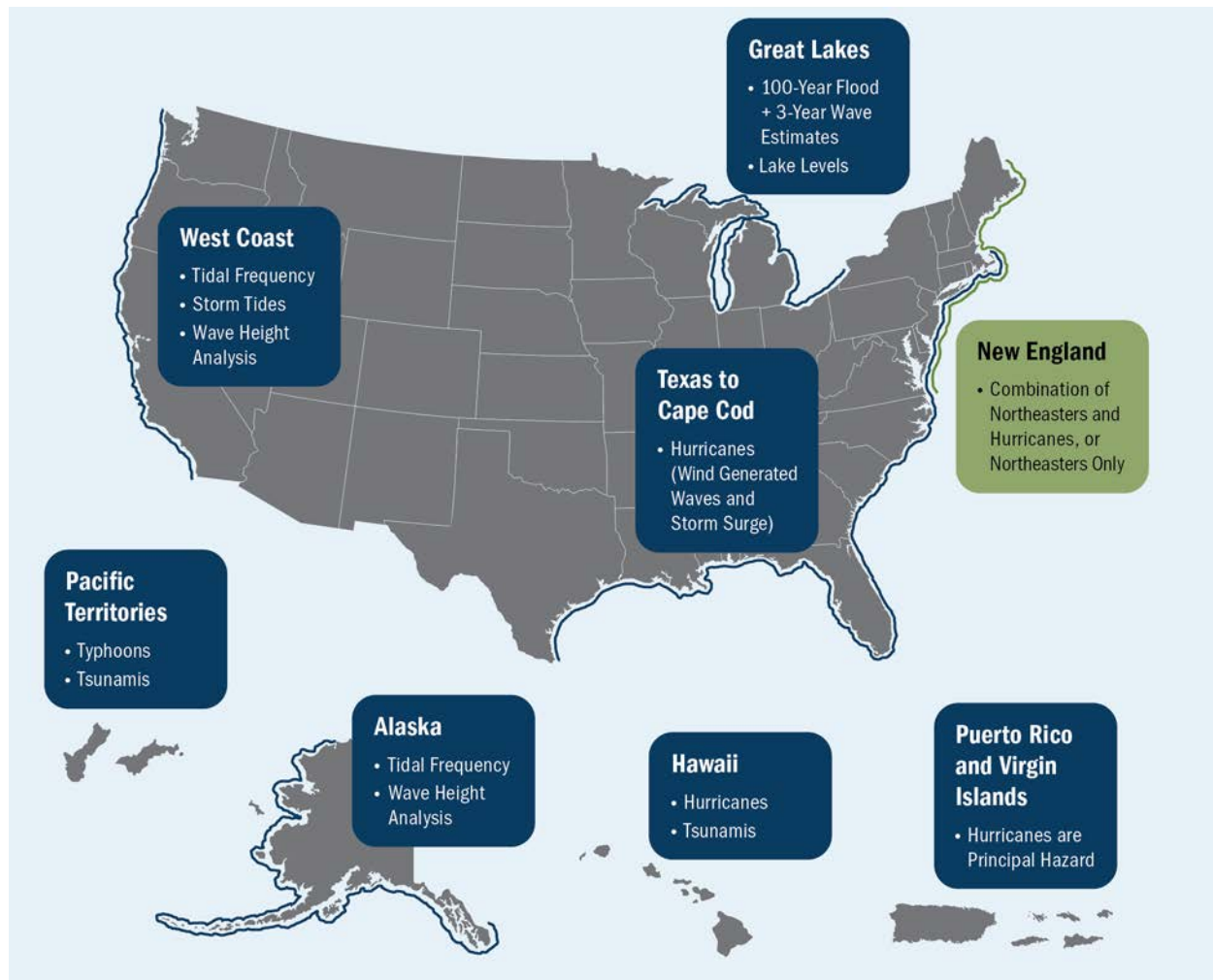


Figure 5-22: Flood Hazards Impacting Different Coastlines. This is an excerpt from FEMA's guidelines and standards highlighting some different aspects of flooding from coast-to-coast.

Long-term erosion is another important consideration when determining future conditions and is not discussed here. Section 5.4.1 of this report contains a detailed discussion of long-term erosion and future hazards.

Another important consideration impacting nearly all U.S. coasts except the Great Lakes is tides. Tides vary significantly from coast to coast and can play an important role in determining extreme water levels. Tides can be expected to change slightly as basins change in shape, depth, and size as a result of changing sea levels. NOAA incorporates these incremental changes as they update tidal epochs. These changes are generally small and may be negligible for short-term predictions of future hazards; however, they may become important when making longer-term predictions.

5.5.1.1 Atlantic and Gulf Coasts

The Atlantic and Gulf Coasts of the United States span a large geographic area, include a wide range of different settings and characteristics, and are impacted by a variety of flood hazards from various types of

forcing functions. Still, there are commonalities generally shared across these areas and specific aspects that differentiate them from other coasts.

Elevated water levels and waves associated with tropical and extra-tropical storms (hurricanes and Nor'easters, respectively), are the primary coastal flood hazard forcing functions along the Atlantic and Gulf Coasts. The presence of a relatively wide continental shelf and a generally submerging coastline results in significant storm surges that propagate into bays and estuaries and inundate normally dry areas where development is likely.

In the future, storm surges will generally increase as local sea levels rise. Other climate change impacts, such as changes in the frequency and intensity of coastal storms, will also affect future storm surge levels.

Another defining aspect of coastal flood hazards on the Atlantic and Gulf Coasts is the coincidence of wind-driven waves with storm surges from the same event. There are some areas where this is not the case, such as embayments with inefficient connectivity to the open coast or areas sheltered from high winds; however, even in these cases, there is likely to be wave impacts associated with high storm surges. Additionally, since the storms which produce these impacts generally occur near to the coast, the wave periods associated with these storms are typically shorter than those experienced on the Pacific Coast.

As with other coasts, the impacts of storm-driven waves are generally dependent on the characteristics of the shoreline they are acting on. For example, wave runup will be a dominant factor along steep shorelines or those armored with seawalls and revetments, whereas in low-lying areas, the presence of waves over land that is normally dry is likely to be the dominant flood hazard factor, and sandy shorelines typically experience erosion during flood events. Many of these impacts are not specific to the Atlantic and Gulf Coasts, but their occurrence during periods of high water (i.e., storm surge) is an important consideration in assessing coastal flood hazards. Rising sea levels will result in deeper flooding, which makes the presence of larger waves possible. Changes in the frequency and intensity of coastal storms will also have impacts on wave hazards in the future. Lastly, as shoreline characteristics change as a result of adaptation to rising sea levels, the impacts of the wave hazards are also likely to change.

5.5.1.2 Pacific Coast

The basic coastal hazards (e.g., elevated water levels, waves, shoreline responses) that impact the Atlantic and Gulf Coasts also impact the Pacific Coast, but these processes interact in different ways and to different levels of magnitude. In contrast with other coasts, the overall geology of the Pacific Coast is determined by the existence of tectonic activity throughout and a narrow and steep continental shelf. In addition, the Pacific Coast is not as heavily impacted by tropical cyclones or other nearshore storm surge events. These conditions result in hazards that differ in frequency and magnitude along the Pacific Coast from those on the Atlantic and Gulf coasts. Whereas the dominant source of coastal hazards on the Atlantic and Gulf coasts is associated with large storm surge and coincident waves, the narrow continental shelves of the Pacific Coast preclude surges greater than a few feet. The relative importance of these individual components of coastal flood hazards is not expected to change significantly in the future.

The Pacific Coast is on the eastern rim of a very long wave-generating fetch; both near- and far-field wind events produce waves that impact the Pacific Coast. Far-field wind events result in waves with very long periods—greater than 20 seconds in major storms impacting the coast. This exposure to long waves

generated anywhere in the Pacific Ocean also yields the potential for tsunami impacts along the Pacific Coast. The exposure of the Pacific Coast to waves and the relative influence of waves versus storm surge mean that wave impacts, such as wave setup, runup, and overtopping are also of greater relative importance along these coasts. The steep shorelines generally found on the Pacific Coast reduce the importance of overland waves here, although low-lying areas where these impacts are prevalent do exist.

Additional research is needed to characterize how a changing climate will result in changes in wave conditions along all of the U.S. coasts, particularly the Pacific Coast, where the wave action is the dominant flooding source. In addition, wave impacts are not highly correlated with sea levels; changes in sea level are likely to have a non-linear response to wave impacts.

5.5.1.3 Great Lakes

Similar to other coasts, hazards along the Great Lakes result from storm surge and/or storm waves. These impacts do not always occur concurrently. However, the most significant impacts typically occur when they do, and so this concurrence is of particular concern. Notable differences in Great Lakes hazards are the lack of tides and the presence of seiches. The Great Lakes are not directly connected to the Atlantic Ocean and are therefore not impacted by global sea level changes. Locally, however, lake levels are changing primarily as a result of isostatic rebound, where the land is rising with respect to the lake levels.

The magnitude of historic lake level changes make lake levels an important aspect of coastal flood hazards along the Great Lakes; and this is expected to remain an important aspect in the future. The lake levels change over many distinct time scales (e.g., hourly, daily, monthly, yearly, and long-term).¹⁸⁸

The other two drivers of water-level change are seasonal-scale changes and storm event-scale changes. FEMA's Great Lakes study process accounts for all three of these lake level changes when determining current flood hazards. Climate changes will impact lake levels at all three of these time scales, but the magnitude, timing, and other important considerations of these changes are currently not well understood. Therefore, accounting for future lake level changes as a result of climate change is not recommended at this time.

GREAT LAKES CONSIDERATIONS

Accounting for future Great lake level changes as a result of climate change is not recommended at this time.

Ice cover can also play an important role in coastal hazards along Great Lakes coastlines. Current FEMA methodologies incorporate considerations of how shore-fast ice impedes wave action. An understanding of how ice cover on the Great Lakes could change in a changing climate is likely to be an important consideration for determining future hazards.

The Great Lakes are heavily regulated on a lake-by-lake and a system-wide basis. Lake-level regulation and navigation structures, such as dams and locks, are present on most lakes as illustrated in Figure 5-23.¹⁸⁹ Changes in how the lakes and system are regulated to account for water needs, navigation, environmental considerations, and other considerations will impact lake levels in the future, but projecting future regulation regimes entails a high level of uncertainty.

¹⁸⁸ A more detailed discussion of long-term lake level changes is included in Section 3 of this report.

¹⁸⁹ Michigan SeaGrant, 2015.

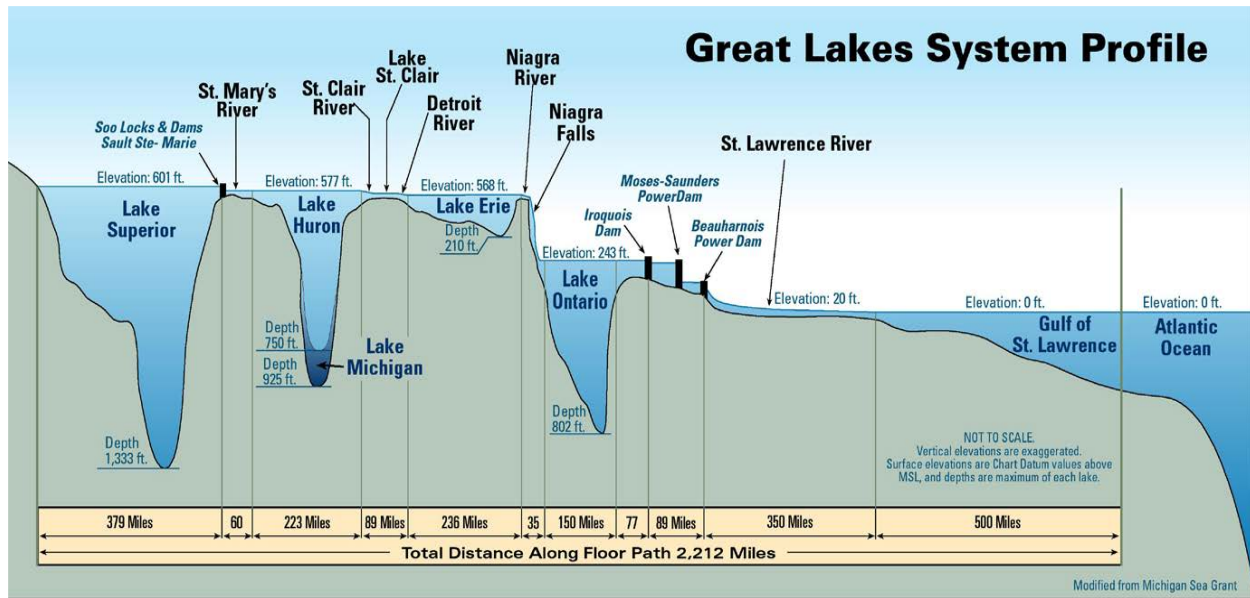


Figure 5-23: Great Lakes System Profile. This excerpt from FEMA's guidelines and standards shows the interconnectedness of the Great Lakes and control structures.

5.5.1.4 Linear vs. Non-Linear Responses to Sea Level Rise

The different coastal geomorphologies and dominant processes highlighted in the above coastal modeling approaches also cause different responses that impact the BFE when sea level is introduced. The response with either be linear (e.g., 1, 2, and 3 feet of SLR causes 1, 2, and 3 feet of increase to the BFE) or non-linear (e.g., 1, 2, and 3 feet of SLR does not correspond to same increase to the BFE).

There are 2 ways to include future sea level rise into the existing coastal study modeling and mapping process: (1) dynamic (direct) analysis or (2) static (linear superposition/bathtub) analysis:

- Dynamic coastal flood modeling can be defined as using physics-based computer simulation techniques that include the effects of factors such as wind, atmospheric pressure, waves, and friction in calculation of coastal flood elevations (i.e., hydrodynamic modeling).
- Linear superposition or bathtub analysis is a common technique for mapping flood extents whereby a flood elevation increase is extrapolated landward until it reaches the equivalent contour height on land. Topographic elevations at or lower than this height are considered flooded. The method is also often used to add sea level rise onto existing BFEs, then spread further onto the floodplain using hydrologic connectivity rules.

On steeper, wave-dominated coasts like most of the west coast, wave run-up is the dominant flooding process. Because of this, adding sea level at the end of the modeling process via linear superposition underestimates the BFE (see case study in Section 5.5.1.5). On shallower, tide-dominated coasts like most of the east and gulf coasts, storm surge is the dominant flooding process. Due to this reason, adding sea level via linear superposition may be a good proxy for the future BFEs in open coast areas. The North Atlantic Coast Comprehensive Study (NACCS) also used this approach to add 3 feet of SLR to the 1-percent-annual-chance flood for the year 2068 to determine vulnerability.

Two pilot studies, one in New York and one in Puerto Rico, showed that there were some differences between dynamic and linear superposition analyses, but the differences in the stillwater BFEs were minimal except in some areas.

- The New York study pointed out that some locations in New York Harbor saw differences between the two. These differences can be more pronounced in back bay and estuary areas versus open coasts. Stillwater elevations calculated by storm surge hydrodynamic models appear to respond fairly linearly on open coasts; however, wave impacts do not seem to behave in the same manner.
- In the Puerto Rico study, depth-limited wave analysis showed that increases in sea level caused higher BFEs due to the increased water depths impacting wave heights. Wave impacts from SLR seem to behave non-linearly and, thus, may need to be estimated to determine future coastal high hazard area locations.

In other situations, when modeled dynamically, back-bay areas behave non-linearly when sea level is added to the stillwater analysis as well.

The State of North Carolina conducted a pilot SLR study¹⁹⁰ that showed that when sea level increased, it changed the flow dynamics of the estuaries and ultimately the land separating Albemarle and Pamlico sounds was inundated, causing the storm surge characteristics to change (see Figure 5-24¹⁹¹). This change in characteristics impacted the BFE in a non-linear fashion.

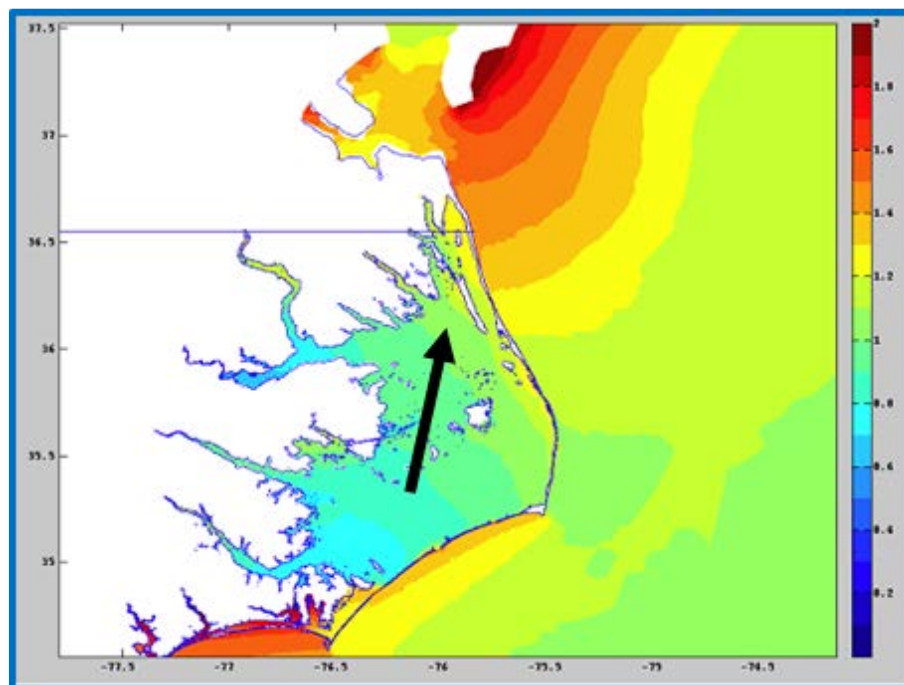


Figure 5-24: Non-Linear Response to Sea Level Rise.
Increased sea level causes Pamlico and Albemarle sounds to become connected in a storm surge event, making the BFEs response to sea level rise non-linear.

¹⁹⁰ North Carolina Coastal Resources Commission Science Panel, 2015.

¹⁹¹ Ibid.

5.5.1.5 Example Case studies

Many case studies and pilot projects have attempted to estimate future conditions coastal hazards. Adding future conditions in the form of SLR, coastal erosion, and other factors is a developing discipline in both science and engineering. Currently, there is not consensus on a single standard method. Some studies employ a more simplistic approach that costs less and others are much more detailed and costly. This section briefly captures some of the recent efforts to estimate future conditions coastal hazards and provides example products to communicate this risk to the public and decision-makers.

New York Panel on Climate Change Scenarios and Maps, New York City Panel on Climate Change

The New York City Panel on Climate Change (NPCC) was first convened by New York City in 2008 as a body of leading climate and social scientists charged with developing local climate projections. The panel released climate and SLR projections in a 2009 report.¹⁹²

In September 2012, New York City formally codified the NPCC by writing the entity into law that requires the NPCC meet twice a year, advise the city on the latest scientific developments, and update climate projections at least every 3 years.

In the wake of Superstorm Sandy, the city reconvened the NPCC on an emergency basis to update its projections to inform planning for rebuilding and resiliency. The updated projections were released in a June 2013 report entitled, *Climate Risk Information 2013*. This report presented information about future climate hazards for the 2020s and 2050s, including SLR, and provided future coastal flood risk maps.

The 2015 NPCC report extended the projections to the 2080s and 2100 for sea level rise, and presented new future coastal flood risk maps for those time slices. It also reported on a study comparing the dynamic modeling of SLR on storm surge with linear superposition (or bathtub) modeling for New York City.

¹⁹² New York City Panel on Climate Change, 2009.

For all time-slices, SLR was presented at the low estimate (10th percentile), the middle range (25th to 75th percentile), and the high estimate (90th percentile). See Figure 5-25¹⁹³ for an example of a high-estimate map.

The presentation of SLR projections in the reports was designed to help New York City decision-makers better understand climate science and the potential consequences for city infrastructure. For example, the high estimate is presented as a more extreme outcome and would be appropriate for those with lower risk tolerances such as critical infrastructure operators.

The NPCC used the FIRM as the base dataset for New York City because the FIRM is used for Building Code regulations and floodplain management practices. The linear superposition (bathtub) approach utilized the 90th percentile for the time slices, added those values to the flood elevations in the FIS report, and then used GIS to spread the floodwater landward until reaching a corresponding topographical elevation.

The NPCC also conducted a study to explore whether there were differences between dynamic modeling of SLR and linear superposition mapping approaches (see Figure 5-26¹⁹⁴). For New York City, they found that in most cases dynamic and static approaches produce very similar results (plus or minus two inches). There were some exceptions. For the New York City region, future flood uncertainties are much larger than the differences between the dynamic and static flood-mapping methods.

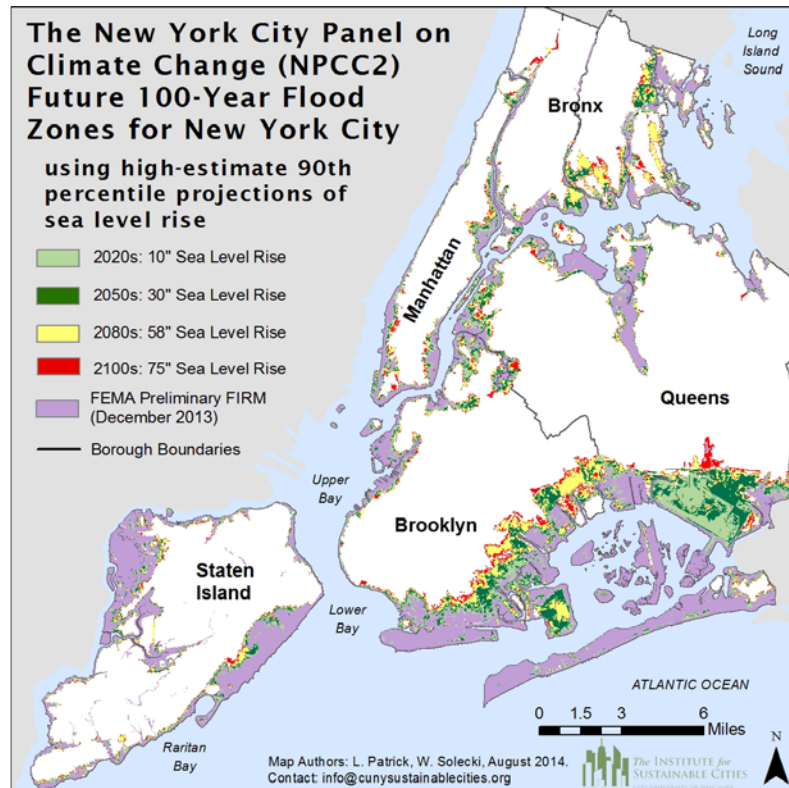


Figure 5-25: New York City Panel on Climate Change Future 100-Year Flood Zones for New York City

¹⁹³ Patrick, et al., 2015.

¹⁹⁴ Orton, "Hydrodynamic Modeling".

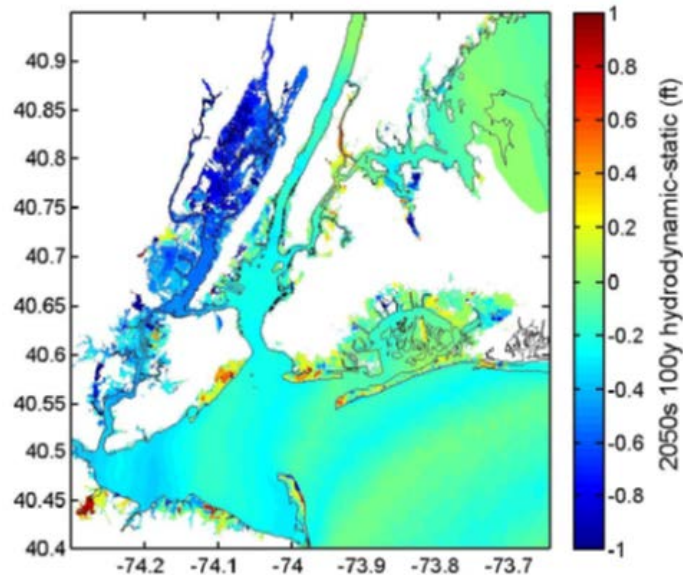


Figure 5-26: Dynamic versus Linear Superposition Mapping Approaches. Map with shading representing the difference—dynamic minus static—mapping results for 1-percent-annual-chance flood elevations (2050's 90th-percentile sea level rise). Results for the combined assessment results (extra-tropical cyclones and tropical cyclones) are shown.

Sandy Sea Level Rise Tool

In the aftermath of Superstorm Sandy, FEMA partnered with the NOAA, the USACE, and the USGCRP to develop a Sea Level Rise Tool (SLR Tool). The SLR Tool used linear superposition methods to add SLR elevations to best available 1-percent-annual-chance flood elevations as developed by FEMA.

The SLR Tool consists of two components: a map tool, and an elevation calculator. The map tool (see Figure 5-27) is an interactive ARC-GIS map developed by NOAA's Office for Coastal Management that allows one to use NOAA SLR curves, or NPCC SLR scenarios, to visualize the future horizontal expansion

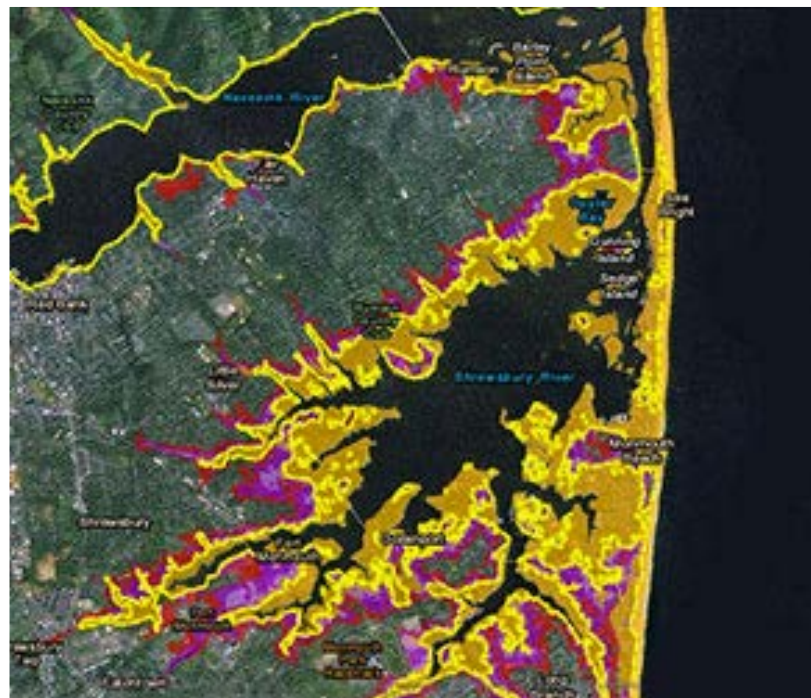


Figure 5-27: Sandy Sea Level Rise Map Tool. Sample map in New Jersey showing future 1-percent floodplain boundaries for various SLR Scenarios.

of the existing floodplain over broad spatial scales and long range (up to 100 years) planning horizons.

The NOAA maps do not denote future site-specific flood depths or elevations within this horizontal extent. They also do not calculate wave effects and denote the future coastal high hazard areas.

The elevation calculator, developed by USACE, complements the map tool in that it calculates site-specific projected flood depths based on current conditions BFEs combined with projected rise in sea levels, out to 100 years (see Figure 5-28).

The SLR Tool has many uses, chief among them to: (1) provide siting and elevation guidance for post-Sandy planning and rebuilding, (2) support scenario planning that may help decision makers prepare for and adapt to uncertainties surrounding the future risks posed by SLR, and (3) help make transparent the level of risk accepted under different scientific assumptions underlying the expected rate of sea level rise in the 21st century.

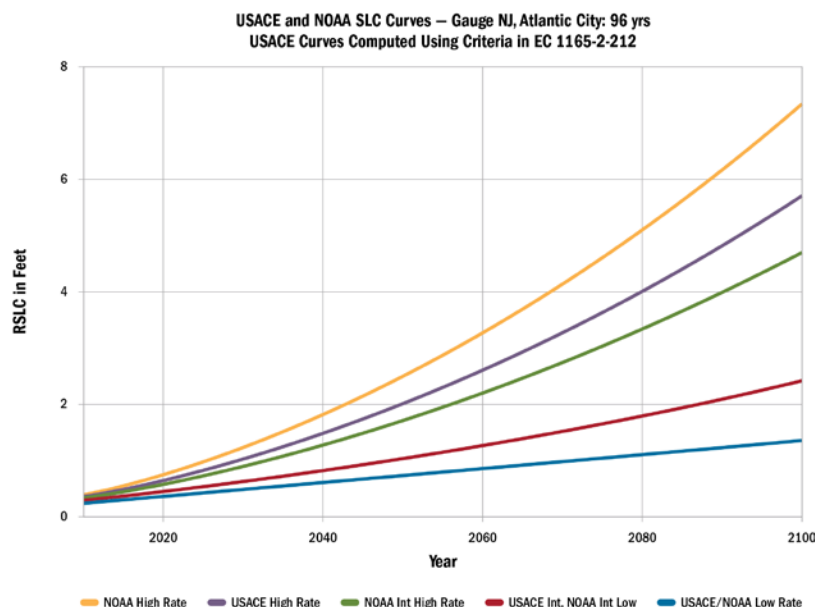


Figure 5-28: Sandy Sea Level Rise Calculator Tool.
The calculator tool generates curves of relative sea level change projected through the year 2100 for coastal U.S. locations (above: Atlantic City, NJ).

San Francisco Sea Level Rise Pilot

Following the development of the SLR Tool for Hurricane Sandy, FEMA initiated pilot studies designed to further test and refine methods for projecting future 1-percent-annual-chance flood elevations.

Pilot studies were initiated for sections of Pinellas and Hillsborough Counties, Florida; San Francisco County, California; and parts of the Washington, D.C. metropolitan area. The first two studies are intended, in part, to test whether linear superposition is an adequate alternative for the more costly and time-consuming methods where SLR elevations are included as input into storm surge and wave models (hereafter, the “direct” approach). Of these pilot studies, only the San Francisco County study has neared completion.

San Francisco County, like almost the entirety of the Pacific Coast, is an area where coastal flooding is dominated by wave runup, rather than storm surge. Whereas some studies in certain storm surge-dominated coastal areas have shown that using super linear position methods may be an adequate first approximation of projected future flood elevations, results from the San Francisco County study indicate that linear superposition, compared to the direct approach, can significantly underestimate future flood elevations in wave runup dominated areas.

Results show that direct analysis better captures the physical processes of wave runup in response to SLR. This was especially true at steep shorelines, such as rocky bluffs and areas of coastal armoring, where the increase in total water level was found to exceed the amount of SLR by a factor of two to four in some instances.

At natural sandy beach and dune areas, the total water level increase was found to be more linear and equal to the amount of SLR. This pilot study also evaluated the impact of long-term erosion based on increased sea level and extrapolating long-term trends. When long-term coastal erosion is taken into account, the effect of SLR on wave runup lessens. Highly-erodible areas will keep a relatively consistent profile (no steepening); thus, wave runup will be less of a factor. Here, linear superposition shows a 1:1 relationship with SLR and BFEs. Less erodible areas will produce steeper beach profiles in the future, thus causing wave runup to increase, leading to almost a 2:1 SLR to BFE ratio (see Figure 5-29).

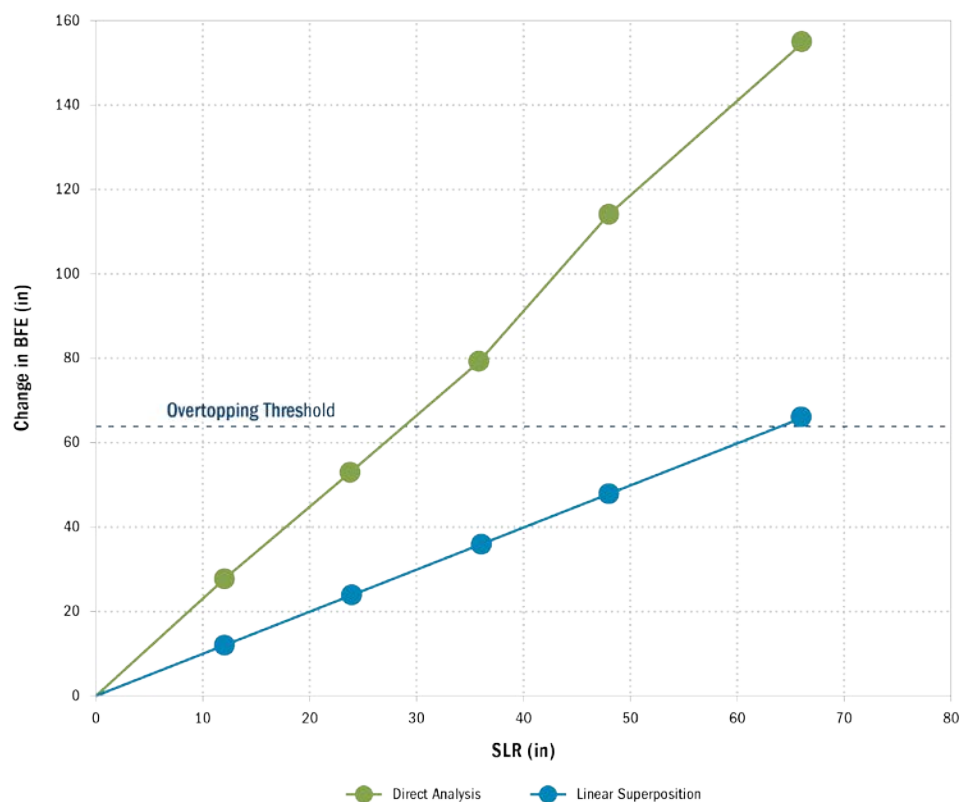


Figure 5-29: Linear Superposition vs. Dynamic (Direct) Analysis.
Dynamic BFEs greatly exceed the linear BFEs by a factor of two.

The pilot study found that for natural sandy beach and dune shorelines, SLR may increase the rate of shoreline retreat by a factor of 3 to 6 through 2050 and 6 to 10.5 from 2050 to 2100. SLR may increase the rate of shoreline retreat by a factor of 1.7 to 2.4 through 2050 and by a factor of 2.4 to 3.2 from 2050 to 2100 for bluffed shorelines. This finding indicates that future special flood hazard areas will increase, not only due to the vertical increase in SLR, but also due to horizontal increase in landward extend due to shoreline retreat.

This study noted that national historical shoreline change data were used and that future studies may wish to refine the shoreline change methods using local or State shoreline change data, where available, for more site specific projections.

North Atlantic Coast Comprehensive Study

The USACE NACCS was a 2-year study to address coastal storm and flood risk to vulnerable populations, property, ecosystems, and infrastructure affected by Superstorm Sandy in the U.S. Northeast. It was designed to help local communities better understand changing flood risks associated with climate change and to provide tools to help those communities better prepare for future flood risks.

The study builds on lessons learned from Superstorm Sandy and attempts to bring to bear the latest scientific information available for State, local, and tribal planners. As part of the study, one of the process steps was to analyze risk and vulnerability by mapping inundation and exposure, assess vulnerability and resilience, and determine areas of high risk. The study mapped inundation areas impacted by future sea level using the USACE low, intermediate, and high scenarios, and the NOAA High scenario^{195, 196} for 26 NOAA gauge locations across the study area at 2018, 2068, and 2100 (based on 5 years following appropriations for construction by 2018, 50 years post-construction, and the commonly-presented sea level change endpoint used in scientific literature (see Figure 5-30¹⁹⁷).

¹⁹⁵ USACE, 2013.

¹⁹⁶ Parris, et al., 2012.

¹⁹⁷ USACE, 2015b.

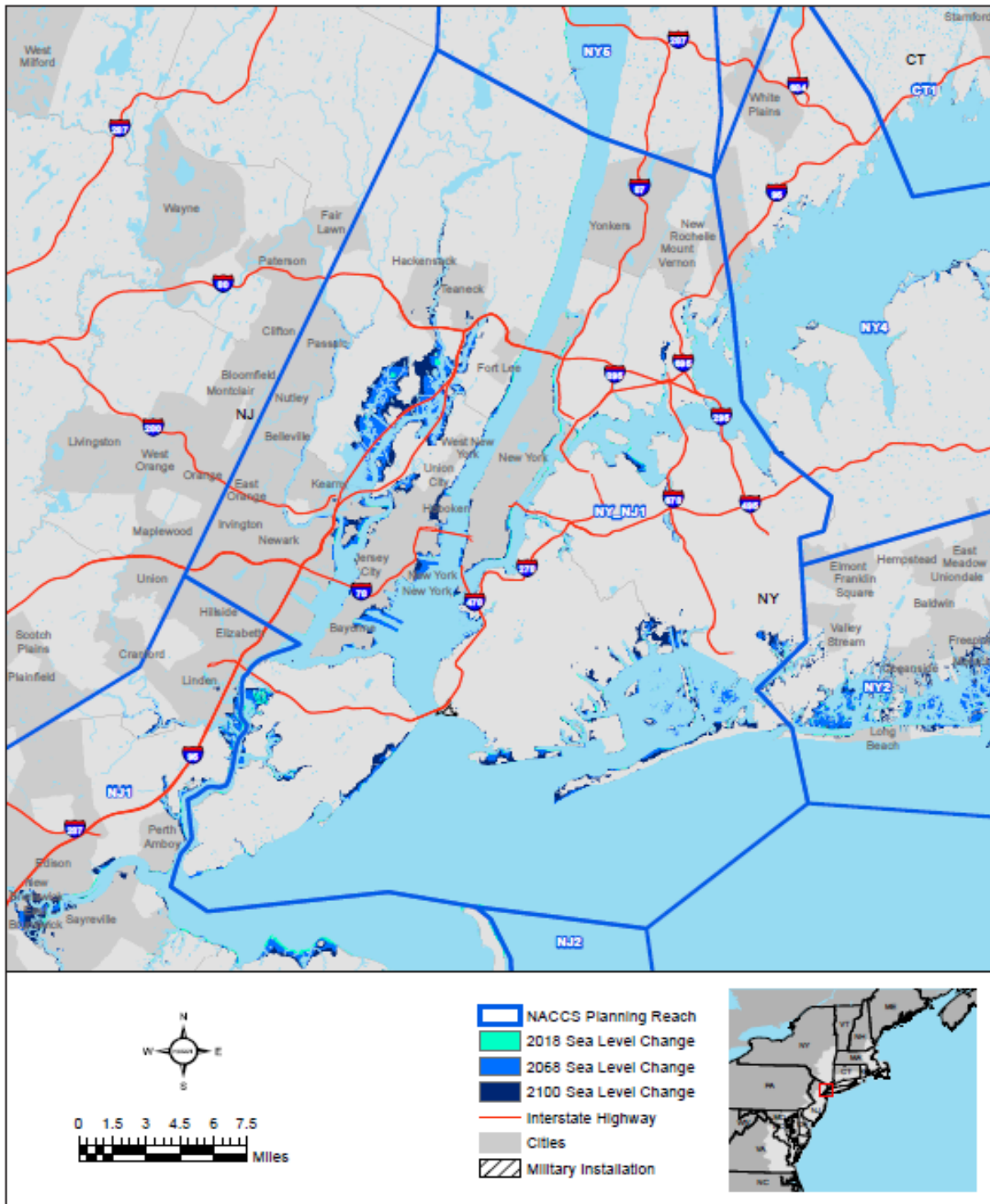


Figure 5-30: USACE High Scenario Future Mean Sea Level Mapping for New York City

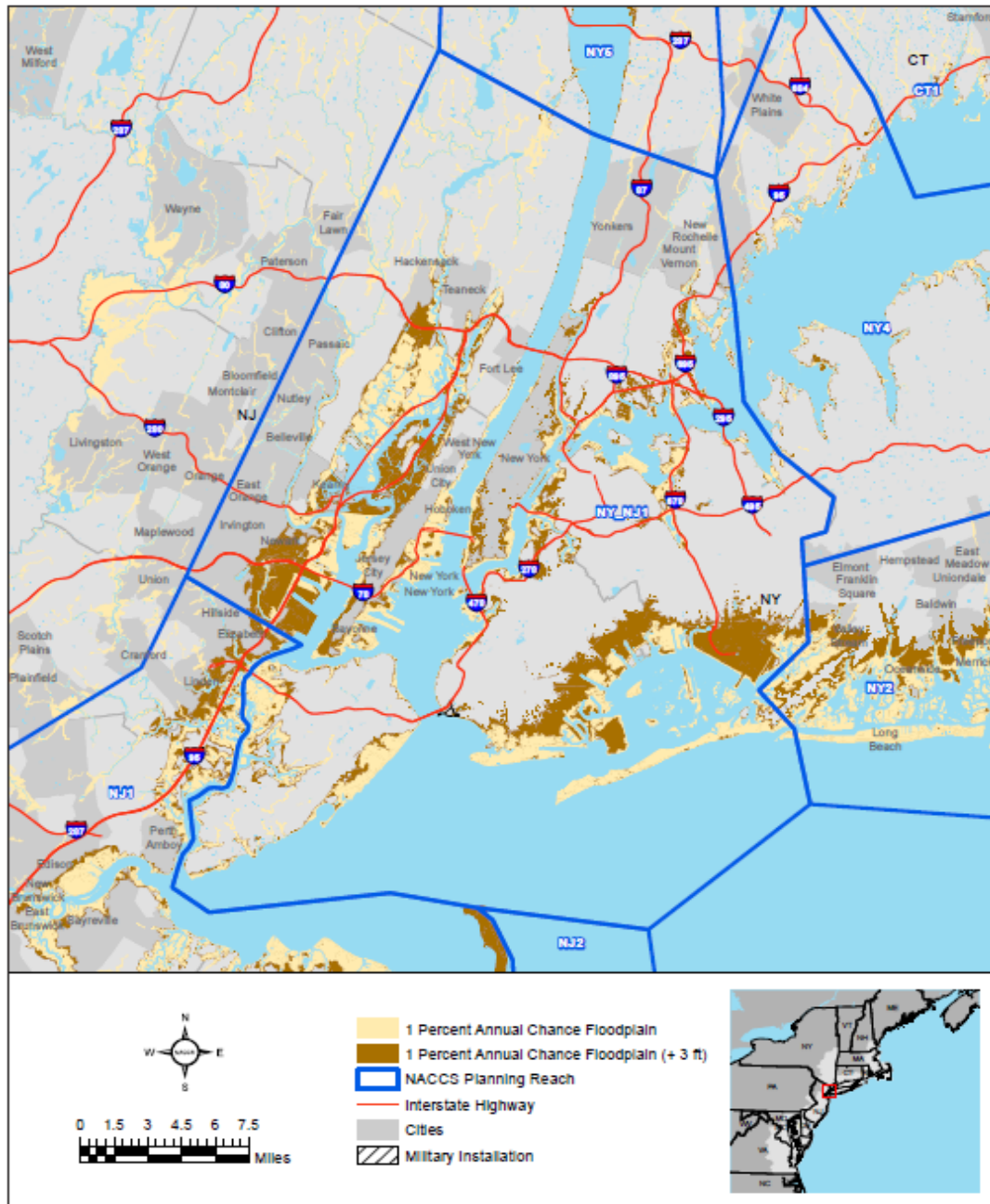


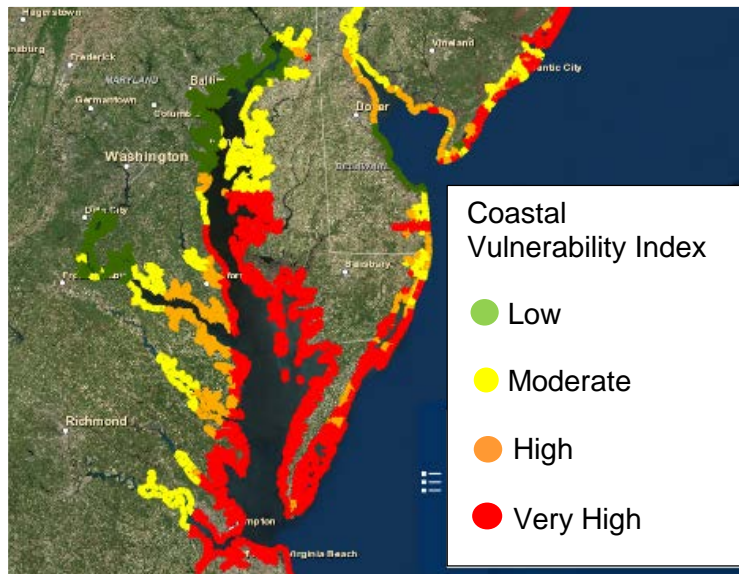
Figure 5-31: Base Flood Elevation plus 3 Feet. Map showing current annual 1-percent chance floodplain plus 3 feet for potential sea level rise by 2068 (USACE and NOAA high scenarios).

The NACCS also mapped areas exposed to the current 1-percent-annual-chance flood plus a 3-foot relative sea level change allowance (see Figure 5-31¹⁹⁸). The 3-foot allowance was closely aligned with the USACE/NOAA high scenario for project relative SLR by year 2068, as well as New York City's recent recommendations.

198 USACE, 2015b.

USGS Coastal Vulnerability and Shoreline Change

The USGS has developed two methods to describe the vulnerability of coastal regions: a Coastal Vulnerability Index (CVI),¹⁹⁹ and probabilistic assessment of shoreline change that uses a Bayesian Network approach.²⁰⁰



The CVI (see Figure 5-32) provides a preliminary overview, at a national scale, of the relative susceptibility of the Nation's coast to SLR. This classification is based upon the following variables: geomorphology, regional coastal slope, tide range, wave height, relative SLR, and shoreline erosion and accretion rates.

The combination of these variables and the association of these variables to each other furnish a broad overview of regions where physical changes are likely to occur due to SLR.

Figure 5-32: Coastal Vulnerability Index for the Atlantic Coast

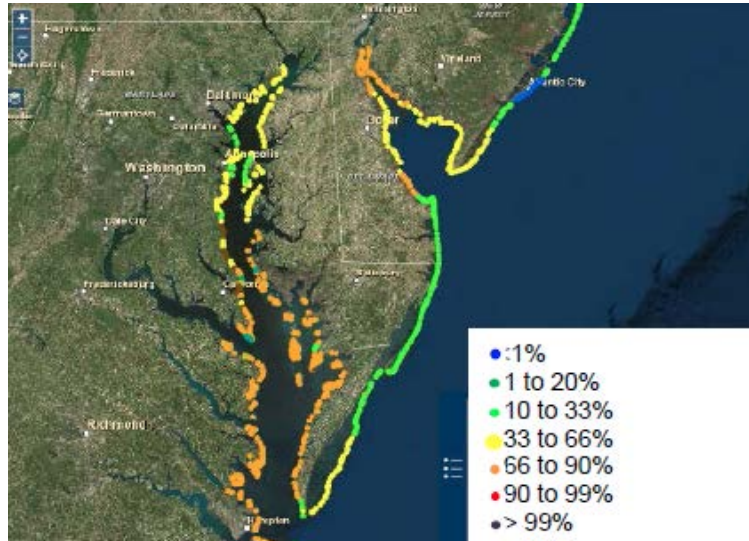


Figure 5-33: Probabilities of High Shoreline Loss

Probabilistic shoreline change data were used to develop and evaluate the performance of a Bayesian Network that predicts long-term shoreline change associated with SLR. The Bayesian Network is used to define relationships between driving forces, geologic constraints, and coastal response, which includes observations of local rates of relative SLR, wave height, tide range, geomorphology, coastal slope, and rate of shoreline change. Using this information, the Bayesian Network is used to make probabilistic predictions of shoreline change in response to different future SLR scenarios (see Figure 5-33).

¹⁹⁹ Thieler and Hammar-Klose 1999.

²⁰⁰ Gutierrez, et al., 2014.

Puerto Rico Pilot and Prototype Sea Level Advisory Maps

FEMA conducted a pilot study in Puerto Rico to assess the feasibility of producing an SLR prototype advisory layer that could be added to a FIRM. The study examined different modeling approaches (e.g., Advanced Circulation and Storm Surge model or ADCIRC, Sea, Lake, and Overland Surges from Hurricanes model or SLOSH, and linear superposition). FEMA compared the results to conclude that linear superposition was a fairly good approximation of SLR impacts on the stillwater elevations, but that wave effects to determine future coastal high hazard areas required at least a depth-limited wave approximate approach if not a full-blown wave analysis (see Table 5-2²⁰¹).

One output of the study was “proof of concept” maps that illustrated the impacts of future flood extents from SLR as advisory maps. These maps were presented as non-regulatory (advisory) products that could be developed as add-on products to Risk MAP studies (see Figure 5-34). The maps convey the future changes to the coastal flood hazard and can be used to guide long-term planning and adaption. Proactive communities could include this product for a fairly low incremental production cost. Uncertainty could also be shown on the maps indicating the imprecise nature of future conditions mapping (see Figure 5-35).

Table 5-2: Puerto Rico Pilot Study Results.
Wave effects increase the BFE non-linearly in this Puerto Rico case study. Linear superposition with depth-limited wave calculations may provide an effective estimate for a lower cost.

Parameter, all units in feet	Baseline Case	SLR Scenarios		

²⁰¹ Batten, Brian, “Case Studies of SLR and Floodplain Mapping”.

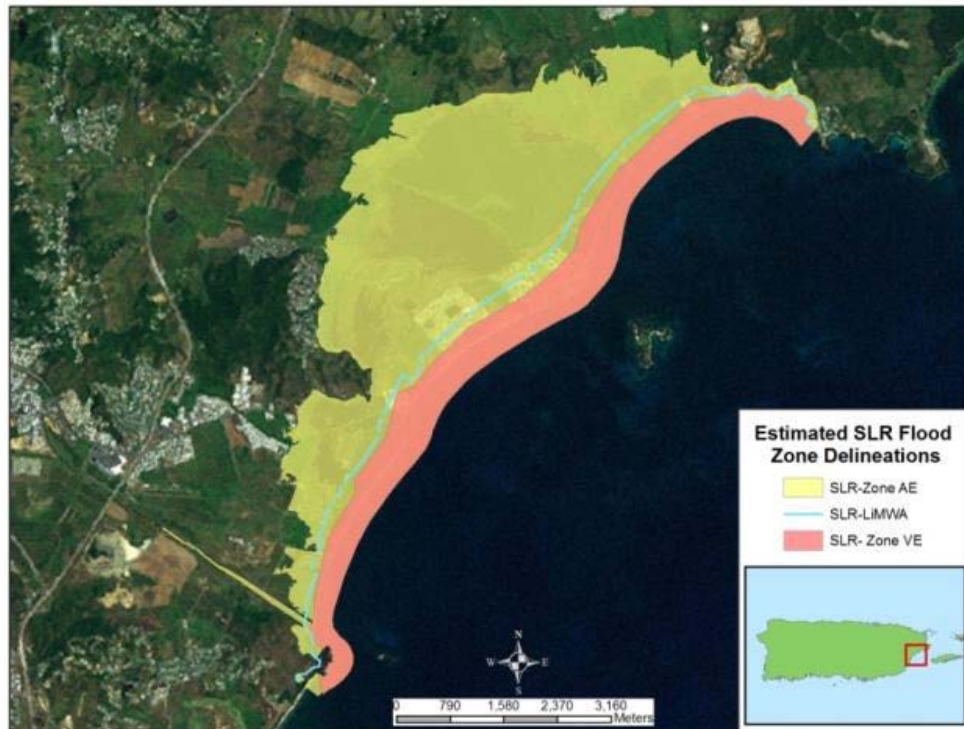


Figure 5-34: Example Sea Level Rise Advisory Layer.
This example shows future Zone AE, Limit of Moderate Wave Action, and Zone VE.

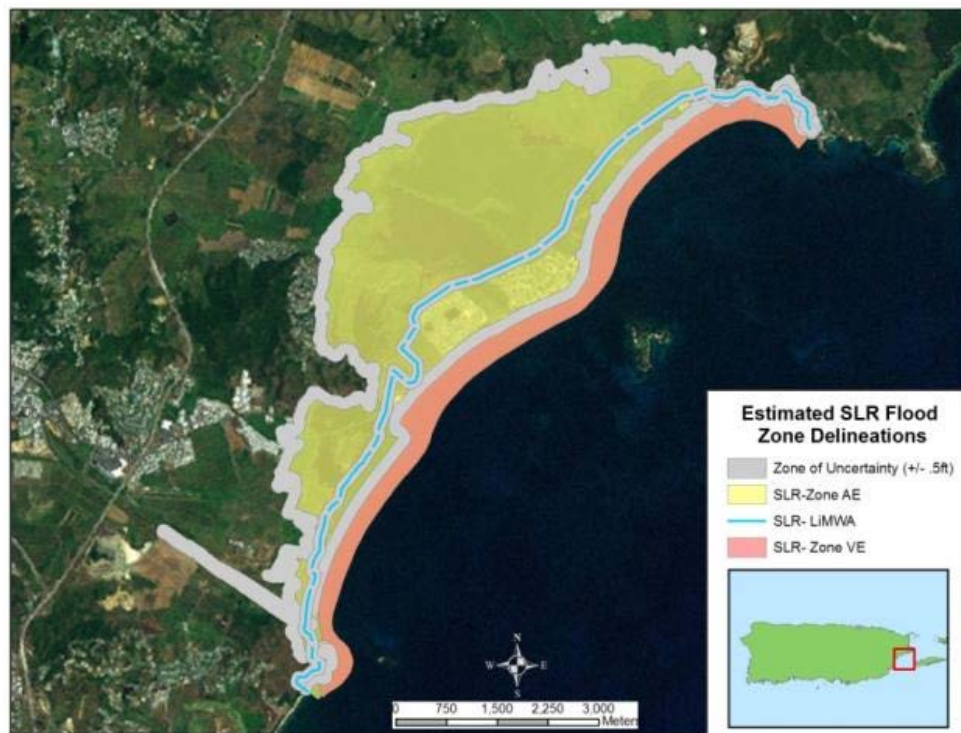


Figure 5-35: Illustrating Uncertainty. Uncertainty bands could also be included.

Probabilistic Maps to Show Future Coastal Flood Hazards

Another method of displaying future coastal flood hazards is in a probabilistic sense. If probabilistic analyses are performed either for long-term coastal erosion or for SLR, the resulting map products could be shown in terms of confidence intervals. The USGS shoreline loss estimates discussed in the USGS case study above show probabilities of high shoreline loss. One study²⁰² provide a good example of a conceptual map based on probability of exceedance for predicted coastal erosion distances based on SLR, other factors including changing wave climate, and frequency of El Nino events (see Figure 5-36).

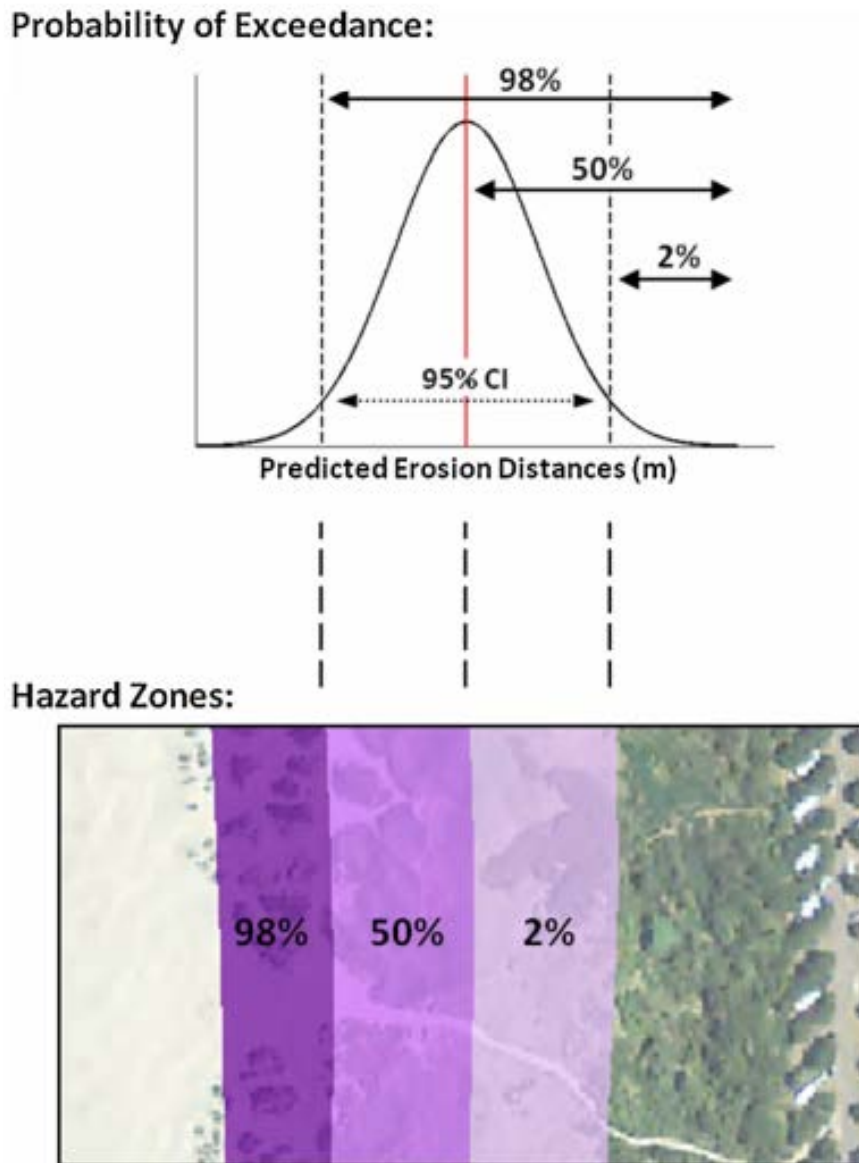


Figure 5-36: Probabilistic Mapping.
Example of mapping hazard zones based on probability of exceedance.

²⁰² Baron, et al., 2015.

Sub-Recommendation 5-9: FEMA should support additional research to characterize how a changing climate will result in changes in Great Lakes and ocean wave conditions, especially along the Pacific Coast. The relative importance of waves on this coast makes this an important consideration.

Sub-Recommendation 5-10: For the Great Lakes, the addition or subtraction of future lake level elevations associated with a changing climate is not recommended at this time due to current uncertainty in projections of future lake levels.

Sub-Recommendation 5-11: Maps displaying the location and extent of areas subject to long-term coastal erosion and future sea level rise scenarios should be advisory (non-regulatory) for Federal purposes. Individuals and jurisdictions can use the information for decision-making and regulatory purposes if they deem appropriate.

Sub-Recommendation 5-12: FEMA should build upon the existing current conditions flood hazard analyses prepared by FEMA for the NFIP to determine future coastal flood hazards.

Sub-Recommendation 5-13: FEMA should incorporate local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process in one of the following ways:

- **Direct Analysis** – Incorporate sea level rise directly into process modeling (ex. surge, wave setup, wave runup, overtopping, and erosion) for regions where additional sea level is determined to impact the BFE non-linearly (ex. 1FT SLR = 2FT or more BFE increase).
- **Linear Superposition** – Add sea level to the final calculated total water level and redefine base flood elevation for regions where additional sea level is determined to impact the BFE linearly (ex. 1FT SLR = 1FT BFE increase).

Wave effects should be calculated based on the higher Stillwater including sea level rise.

Sub-Recommendation 5-14: FEMA should support research for future conditions coastal hazard mapping pilots and case studies using the latest published methods to determine the best means to balance the costs and benefits of increasing accuracy and decreasing uncertainty.

5.6 Calculating and Mapping Future Riverine Flood Hazards

5.6.1 Recommended Approaches for Calculation

Actionable science supporting the future impacts of climate change on hydrology is still evolving. A number of large uncertainties remain to be revealed about downscaling methods, hydrologic model structures, and hydrologic model parameters. The information available today, from the large number of general circulation models (GCMs) and the various projections of greenhouse gas emissions that drive these models, provides a hint of the uncertainties, though all of the sources of uncertainty cannot be known at this time. Therefore, approaches that are tied to a single GCM or a single representative concentration pathway (RCP) are certain to underestimate uncertainty. Currently, available and actionable science does not support the development

of a single, nationwide method for determining future riverine flood risk boundaries based on projected future changes to the watershed due to a combination of land use, geomorphological, climate, or other changes.

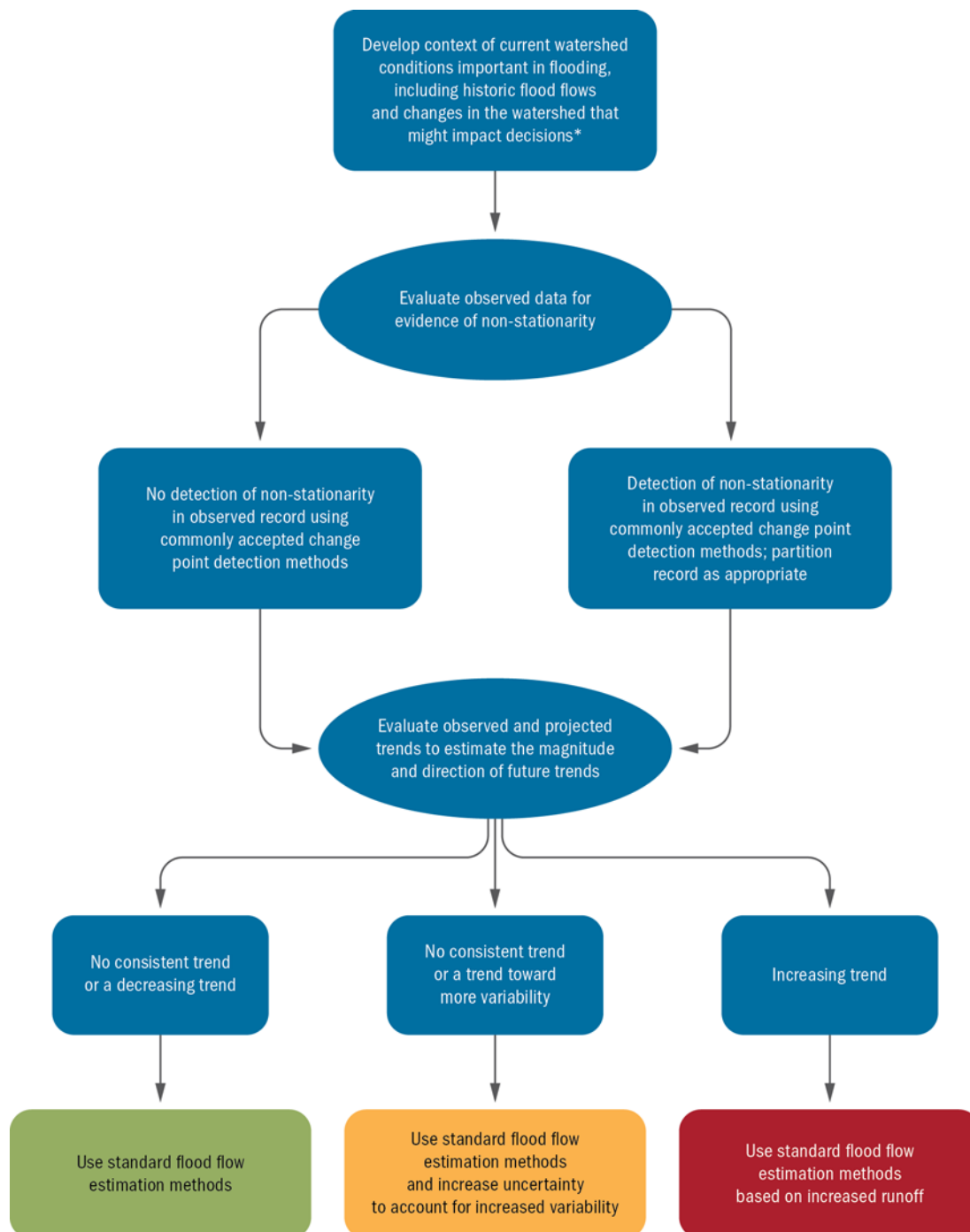
There are major uncertainties in quantitative projections of changes in the hydrological characteristics for a drainage basin. Precipitation, a principal input signal to water systems, is not reliably simulated in present climate models. However, it is well established that precipitation variability increases due to climate change, and projections of future temperatures, which affect snowmelt, are more consistent, such that useful conclusions are possible for snow-dominated basins.

Uncertainty has two implications. First, adaptation procedures need to be developed that do not rely on precise projections of changes in river discharge, groundwater, etc. Second, based on the studies completed so far, it is difficult to assess in a reliable way the water-related consequences of climate policies and emission pathways. Research on methods of adaptation in the face of these uncertainties is needed.²⁰³ On the other hand, observed trends can be explored to help estimate what future conditions might look like. For example, if past records of runoff exhibit non-stationary behavior that can be attributed to a factor that is expected to continue into the future (e.g., land use change, agricultural practices that hinder or speed runoff, climate-induced changes in snowmelt), then a decision about using only a part of the historical record on which to base future projections could then be made. If non-stationary behavior is detected in the observed runoff, and there is no clear consensus in the peer-reviewed climate literature or in an analysis of multi-model behavior about the direction and/or magnitude of projected trends for the future, then the analysis could reasonably continue using the standard methods available today. The flow chart below (see Figure 5-37) provides an example of the decision process.

ACTIONABLE SCIENCE IN RIVERINE AREAS

Currently, available and actionable science does not support the development of a single, nationwide method for determining future riverine flood risk boundaries based on projected future changes to the watershed due to a combination of land use, geomorphological, climate, or other changes.

²⁰³ Intergovernmental Panel on Climate Change, 2007.



*Changes include but not limited to: land use, agricultural practices, construction or removal of dams, and observed climate trends from NCA 3 or other reputable sources.

Figure 5-37: Decision Process.
Example decision process for calculating future flood flow based on climate-informed science.

5.6.2 Case Studies

5.6.2.1 Charlotte-Mecklenburg

In 1997, Charlotte-Mecklenburg Storm Water Services (CMSWS) developed and adopted a *Floodplain Management Guidance Document* that contained a series of strategies to more effectively management floodplains throughout the county.



Figure 5-38: Charlotte-Mecklenburg Stormwater Services logo.

One of the key strategies identified in the document was that “new development should be managed so flood problems are not increased.”²⁰⁴ The evaluation of this strategy

identified the ongoing challenge that FEMA studies were based on existing land use conditions at the time a study was initiated. As a result, new development was occurring in areas that could be subject to flooding in the future as growth continued to increase in each watershed. Working extensively with the development and environmental communities, CMSWS then commissioned the *Mallard Creek Floodplain Analysis and Floodplain Fill Assessment*²⁰⁵ in 1998 to quantify potential increases in flood levels based on future land use changes, the impact of allowing fill to occur in the flood fringe areas, and flood height reductions through the adoption of local water quality buffer regulations.

The results of the study showed that future land use changes in the subject watershed could result in increased flood levels of 4 feet or more in some areas. The report included several recommendations based on these findings including:

- A future conditions floodplain boundary should be developed and used as a regulatory boundary and all new construction should be required to have a finished floor elevation based on the future conditions 1-percent-annual-chance elevation plus some required freeboard, and
- There should be limits on fill placed in the floodplain fringe areas.

CMSWS then initiated a countywide restudy of all streams, including both existing (FEMA floodplain for insurance purposes) and future conditions (Community floodplain) 1-percent-annual-chance flood elevations and floodplain boundaries (see Figure 5-39). In addition, CMSWS developed higher regulatory standards regarding the regulatory floodway to be used on their FIRMs.

CMSWS worked with FEMA regarding the mapping specification changes required to effectively show both the existing and future 1-percent-annual-chance floodplain boundaries and reflect the corresponding flood elevations on the FIRM and in the FIS report effectively. In 2000, Mecklenburg County produced the first FIRM in the United States to show both existing and future conditions flood elevation information. In May 2000, CMSWS adopted the Community Floodplain and flood elevations for regulating development, and the FIRMs have an initial effective date of February 4, 2004.

²⁰⁴ Charlotte-Mecklenburg Storm Water Services (CMSWS), 1997.

²⁰⁵ CMSWS, 1998.

Since the initial May 2000 local adoption of the maps, CMSWS has been able to demonstrate significant reduction in potential flood losses by requiring new development be built in areas outside of mapped future floodplain areas. Some of the studies that have been completed to date estimate the following impacts:

- 1300+ structures will have avoided insured flood losses as a result of the new future flood elevation regulation.
- Losses avoided of > \$160 million for a single 1-percent-annual-chance flood event.

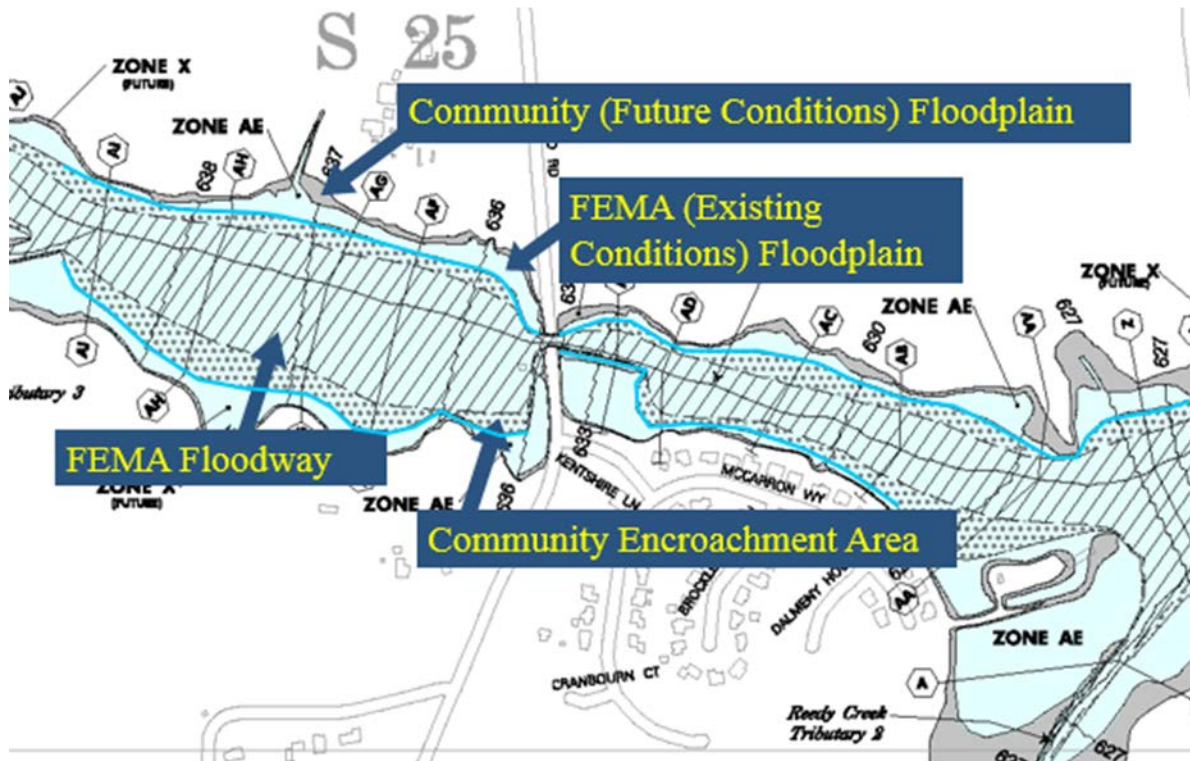


Figure 5-39: Comparison of Existing and Future Conditions Floodplains.
Portion of comparison developed by CMSWS.

5.6.2.2 Licking County, Ohio

Licking County is located in central Ohio, just northwest of the City of Columbus metropolitan area. The west side of Licking County is mostly headwater streams that converge in the City of Newark, which is the centrally-located county seat. These headwater streams form the Licking River, which drains the east side of the county on its way to the Muskingum River. The first permanent settlement in the county occurred in 1798, when there was a need to locate near water bodies for transportation and sanitary reasons. Since this time, the county has experienced significant growth due to its close proximity to the State capital, extensive transportation system and abundant resources.

In 2003, FEMA initiated a FIRM and FIS update for Licking County. Early in the process, it was decided that the updated maps would incorporate future conditions hydrology. In addition to mapping the 1-percent-annual-chance floodplain, FEMA also mapped the future 1-percent-annual-chance stream discharges based on projected land use conditions identified in local zoning maps and comprehensive plans.

There are 25 townships in Licking County, including 19 townships that have zoning plans and 18 townships that have a comprehensive plan. The future condition 1-percent-annual-chance floodplain was mapped as a Shaded Zone X on the FIRM and the flood elevations at particular cross sections were published in the corresponding FIS.

In order to make the data more publically accessible, the information was added to the county's online and searchable GIS and Floodplain Map Viewer. Licking County and 12 of the incorporated communities have adopted local flood damage reduction regulations that utilize the future conditions data to eliminate or reduce damage to proposed development. This objective is accomplished by applying the same regulatory standards that are applied to the 1-percent-annual-chance floodplain to the future 1-percent-annual-chance floodplain.

As a participant in the CRS, Licking County earns points for identifying future condition flood hazard areas. These points improve the county's ranking in the program, and result in reduced flood insurance premiums for property owners and businesses.

5.6.3 Plausible Path Forward for Incorporating Future Climate Impacts into Riverine Studies

Currently, it is very difficult to predict extreme climate impacts in riverine environments. This does not mean that stakeholders should not plan for changes in climate change in the riverine environment. Stakeholders should examine locally-available information and make decisions based on the type of development proposed, the expected occupancy of proposed buildings, and the expected life of the structure. In addition, riverine climate science should be monitored closely for applicability to the NFIP and future conditions flood hazard identification.

Sub-Recommendation 5-15: FEMA should use observed riverine trends to help estimate what future conditions might look like. In watersheds where floods of interest may decrease in magnitude and frequency then use existing riverine study results as the basis for flood hazard mapping. In watersheds where floods exhibit increase in magnitude or frequency then use best available science to determine future hydrology and flood hazards.

Sub-Recommendation 5-16: FEMA should work with other Federal agencies via the Advisory Committee on Water Information's Subcommittee on Hydrology to produce a new method to estimate future riverine flood flow frequencies. This method should contain ways to consistently estimate future climate-impacted riverine floods and address the appropriate range of flood frequencies needed by the NFIP.

Sub-Recommendation 5-17: FEMA should produce, and should encourage communities to adopt, future conditions products to reduce flood risk.

6 Considerations for Future Conditions Mapping Impacts

The previous sections of this report outline the best available methodologies for considering the impacts of sea level rise and future development on flood risk. This section focuses on items to consider before all or some of the future conditions are integrated into FEMA's flood hazard mapping program. During the course of generating this report, several issues were raised concerning future conditions that are important considerations for future conditions implementation, but were not the focus of this report because they were not specifically requested by Congress. What follows is a list of 12 issues that may need to be considered when future conditions are incorporated into flood data collection and analysis and into community floodplain management practices:

1. What future risk-based information should be provided to communities?
2. What is the "base" regulatory condition? Will future conditions information be used for regulatory purposes? If so, how?
3. What is the impact to properties located in riverine and coastal environments if future conditions information become regulatory?
4. How will the rate of future change impact the implementation of future conditions products, tools, and information?
5. How will maintenance of future conditions data be performed?
6. What is the impact of future conditions on mitigation grants?
7. How should future conditions products, tools, and information be released to communities and the public?
8. Can future conditions data be used to improve the public's understanding of flood risk?
9. How should flood control structures be incorporated into future conditions hazard data and information?
10. What are the implications of FFRMS?
11. Should land development changes be separated from climate changes in future conditions data and information?
12. How might floodplain management regulations and the CRS be modified to support future conditions?

6.1 What future risk-based information should be provided to communities?

As discussed in Section 2.3.2.1, SLR, future development, and other future conditions are currently accounted for in flood insurance rate-setting through an actuarial contingency loading. However, the contingency load is not rigorously developed, and there is no explicit allocation of the load that is specifically due to future conditions.

All NFIP policies have a 1-year policy term and, thus, the actuarial premium is based on the current risk and not the expected increases or decreases in risk. However, due to continually changing conditions, the data from flood hazard maps used to set the premium may be out of date soon after the analysis is completed.

Insurance premiums are designed to provide residents with a signal as to the risk they face. By providing residents in floodprone areas with information on the insurance premium that reflects their flood-related risk next year and how it is likely to change in future years, individuals may then recognize how hazardous the area is in which they are living or working. They may be more likely to adopt cost-effective mitigation

measures for reducing the damage to their property from future floods. Therefore, future conditions studies could provide a more accurate assessment of risks for years after the flood hazard analysis is conducted.

A method may need to be developed to estimate the risk between the time of the flood risk analysis and the future conditions period of time. For example, using the methodologies discussed in Section 5, a hazard analysis could be completed based on conditions today and future conditions expected in 2050. However, a method still needs to be developed to estimate the flood hazard just five years from now, so that risk-based premiums can be developed.

Equity and affordability are issues that are now being considered in determining how much a property owner will actually pay for flood insurance. Since a risk-based premium is an important source of information, there are ways to address affordability other than by subsidizing premiums. A subsidized premium implies that the property is safer than it actually is. Means-tested vouchers or mitigation funding through public sector grants or low interest loans are examples of measures that could be used to deal with affordability concerns.²⁰⁶

6.2 What is the “base” regulatory condition? Will future conditions information be used for regulatory purposes? If so, how?

The BW-12 mandate for this report directs the TMAC to outline the best available methodologies for considering the impacts of sea level rise and future development on flood risk, not to dictate how that information is used. For example, should the future conditions flood hazard information replace the existing conditions BFEs or should they be included in a non-regulatory product that communities can adopt as higher standards?

Currently, future conditions are not part of FEMA’s regulatory program, although some communities map future conditions for informational or local floodplain development purposes. If future conditions information becomes regulatory, additional guidance may need to be developed and existing guidance may need to be updated. In addition, the impact on the NFIP and the needed resources may need to be considered.

Non-regulatory products cannot be appealed. If future conditions information becomes regulatory, appeals may become more prevalent. An appeal period is available for all new or modified flood hazard information on a FIRM that is regulatory, including additions or modifications of the BFE, base flood depth, SFHA boundary or zone designation, or regulatory floodway. As discussed in Section 3, future conditions modeling introduces additional uncertainty to calculations and the potential for additional appeals should be considered.

If future conditions considerations become regulatory, this could also increase the number of Letters of Map Revision (LOMRs). Incorporating future conditions requires an approach that deals with future uncertainty, including future manmade actions and changing natural systems. As time passes, items that were estimated in the distant future become the short-term future or current conditions, which can be estimated better or defined. Therefore, the estimated parameters for future conditions may frequently change. This could result in significantly more LOMRs as over time the uncertain parameters are better known.

6.3 What is the impact to properties located in riverine and coastal environments if future conditions information become regulatory?

206 National Research Council, 2015

If future conditions become linked to mandatory insurance requirements, an analysis of the impact to property owners may need to be conducted. Issues of equity and affordability associated with insurance premiums need to be considered. This should not be addressed through subsidized insurance premiums; other measures can be used, such as means-tested vouchers or mitigation funding.

6.4 How will the rate of future change impact the implementation of future conditions products, tools, and information?

Before implementing a policy on future conditions, the date of the “future” may need to be defined, such as 2020, 2050, 2100, or perhaps a full build-out scenario. If future conditions information becomes a regulatory aspect of the NFIP, this needs to be defined nationwide. Some possible considerations for setting a nationwide “future” date is the average life of structures, expected rate of change, and increases in uncertainty for longer time periods. Impacts on property values may also need to be considered.

If future conditions are implemented as non-regulatory products and information, then the “future” date could be defined based on the community’s risk tolerance and their desired future planning horizons.

6.5 How will maintenance of future conditions data be performed?

After the initial future conditions studies are conducted, they will need to be periodically updated based on new information. This new information could include improvements to our current methodologies and technology for predicting climate change conditions. For example, in 2014, the U.S. Global Change Research Program released the Third NCA with climate change estimates. This report updated the 2009 NCA estimates and future updates are expected. Once a new NCA is issued, a statistical analysis for different regions of the Nation could be conducted to determine if new future conditions flood studies are warranted based on the new information in the NCA.

New information triggering the need for an updated future conditions study could also include new data regarding watershed land use or other changes in the watershed. If a community has a significant change to its zoning, comprehensive, or other land use plans, or if a community has incurred development that is significantly different than expected, it may require updates to its future conditions study.

6.6 What is the impact of future conditions on mitigation grants?

Use of future conditions data could have several impacts to the mitigation grant programs. For example, currently, many projects do not qualify for mitigation grants because they cannot meet the requirement that the benefit-cost ratio be equal to 1.0 or higher. If the increased risk from future conditions is considered, many more projects will meet the benefit-cost ratio requirement. It should be noted that FEMA’s benefit-cost software currently allows SLR to be considered in the benefit-cost analysis.

FEMA’s Hazard Mitigation Assistance Guidance may also need to be evaluated for impacts resulting from future conditions analysis. For example, the current guidance requires that elevating or retrofitting an existing structure must be done in accordance with ASCE 24-14 (BFE plus freeboard) or higher. FEMA may need to determine how the ASCE 24-14 requirements may relate to BFEs that include future conditions.

6.7 How should future conditions products, tools, and information be released to communities and the public?

Including future conditions in the NFIP may require an implementation plan. This plan may need to address how new studies are prioritized and how the new information is communicated to floodplain managers and the public.

6.8 Can future conditions data be used to improve the public's understanding of flood risk?

Changing the public's perception of safety will be an important component of the future conditions studies. Currently, members of the public may believe that they are not at risk of flooding if they are outside the SFHA. However, the current SFHAs do not consider the true hazards since they are based only on the conditions at the time of the study. Including future conditions in flood hazard identification and mapping will increase people's understanding of the real risk. However, if future conditions mapping is based on the 1-percent-annual-chance event, it will continue to demark a line that shows properties are either "in" or "out" of the floodplain.

Estimating future premiums based on estimates of future conditions risk could be a very useful tool to communicate to the public regarding the magnitude of expected increases or decreases in risk. Based on this, the public may better understand the importance of taking protective measures before the next disaster.

6.9 How should planned flood control structures be incorporated into future conditions hazard data and information?

The inclusion of the impact of planned flood control structures may need to be considered. In this report, it is recommended that the base condition be modeled without these impacts, but that a second scenario that includes the impacts of planned flood control structures and other man-made plans or impacts be an option for communities that wish to see the impacts of these structures on flood risk.

6.10 What are the implications of FFRMS?

As discussed in Section 2, FFRMS is mandatory for Federally-funded projects, including projects funded through FEMA's grant programs. The FFRMS provides three options for meeting the requirements, including:

- Use data and methods informed by best-available, actionable climate science (climate-informed science approach);
- Build the lowest floor two feet above the 100-year (1-percent-annual-chance) BFE for standard projects, and three feet above for critical buildings like hospitals and evacuation centers; or
- Build to the 500-year (0.2-percent-annual-chance) flood elevation.

Therefore, changes in future conditions mapping should be consistent with the options for meeting the FFRMS.

6.11 Should land development changes be separated from climate changes in future conditions data and information?

Future conditions changes to the floodplain can be the result of two types of changes: (1) those changes that are a result of actions within the watershed (e.g., changes in land use, filling in floodplains); and (2) those changes that are related to global climate change (e.g., SLR, rainfall pattern changes). Communities can make decisions that have a measurable effect on the first type of change, but not the second. Therefore, it may be beneficial to analyze and map these two types of future conditions changes separately. This distinction would allow communities and the public to better understand the root cause of the changes in risk over time.

6.12 How might floodplain management regulations and the CRS be modified to support future conditions?

The current CRS program allows communities to accrue points to improve their CRS ratings by implementing future conditions requirements. Therefore, communities that implement certain future

conditions programs can receive higher insurance discounts (see Section 2.2.1). This program could be updated to further encourage communities to implement additional future conditions requirements. This program may also need to be re-evaluated based on future conditions implementation.

The implications of future conditions risks on floodplain management may also need to be considered. There are existing examples of future conditions mapping being used as an effective floodplain management tool, such as in Charlotte-Mecklenburg, North Carolina. Instead of the current 1-percent-annual-chance floodplain, Charlotte-Mecklenburg manages to the “Community Floodplain,” which includes future “ultimate” land use conditions. The county has estimated that their future conditions floodplain mapping may help prevent \$16 million in future flood damage.²⁰⁷

However, potential negative implications to floodplain management for communities that are not proactive like Charlotte-Mecklenburg may also need to be considered. For example, No Adverse Impact floodplain management is an approach by which actions on any property are not allowed to adversely affect the property or rights of others. If a community uses future conditions mapping that shows an increased elevation due to actions in the watershed, it may be more challenging for some communities to prohibit some actions that increase the flood elevations.

²⁰⁷ Louisiana Resiliency Assistance Program, 2013.

7 Summary and Recommendations

1.1 Purpose

The focus of this report is to detail how future conditions flood hazards should be calculated. The TMAC recommends that all future conditions flood hazard information be non-regulatory for Federal purposes, but be created in such a manner that it can be adopted by local communities for local regulatory and decision-making uses. Communities should be allowed—and encouraged—to adopt the future conditions flood hazard products, tools, and information for local floodplain management purposes on the local level.

7.1 Importance for the Nation

The identification and broad availability of future conditions flood hazard and risk information is of utmost importance to our Nation's citizens and economy as development and population growth occur in areas that are at risk now, or will be in the future. Several recent directives, pieces of legislation, reports, and initiatives support this assertion:

- Since its inception in 1968, the National Flood Insurance Program has undergone numerous changes and reforms, including the option of using future conditions hydrology based on projected development as an informational layer on FIRMs in communities requesting that option in 2001. The 2012 NFIP Reform legislation provides the impetus for this report.
- Recent GAO reports, such as the 2014 report titled, *Better Management of Exposure to Potential Future Losses Is Needed for Federal Flood and Crop Insurance*,²⁰⁸ call for the need to take future risks into account.
- Signed by the President on March 30, 2011, Presidential Policy Directive 8 seeks to strengthen the Nation's security and resilience to manmade and natural disasters through preparedness by all levels of government, the private and nonprofit sectors, and individual citizens. The National Mitigation Framework includes climate adaptation as an important planning consideration.
- The new FFRMS, issued in January 2015, gives Federal agencies the flexibility to select one of three approaches for establishing the flood elevation and hazard area they use in siting, design, and construction. The approach options include using data and methods informed by the best-available, actionable climate science.

The planning, zoning, land use, and other development decisions made by communities today will impact the buildings and infrastructure that will be in existence for decades to come. The recommendations provided here support the assertion that, to become a more resilient Nation, elected officials, community planners, engineers, architects, emergency management officials, and decision-makers will need the tools necessary to plan, prepare for, and mitigate against future flood hazards.

7.2 Summary of Recommendations

The tables below show the seven primary Future Conditions recommendations from the TMAC as well as sub-recommendations that support the primary recommendations.

The sub-recommendations are numbered according to the section of this report in which they appear, and reflect the numerical order in which they appear in that section. For example, Sub-Recommendation 3-1 is the first sub-recommendation in Section 3, Sub-Recommendation 3-2 is the second, and so on. The sub-

²⁰⁸ GAO, 2014.

recommendations also include estimates of the amount of time required to achieve the recommended action. “Short-term” means up to 2 years to accomplish and “long-term” means greater than 2 years to achieve.

The TMAC believes that future conditions flood hazard products, tools, and information can be developed and provided to communities via policy change alone, and that regulatory or legislative changes are not necessary at this time. Though many of the recommendations and sub-recommendations outlined in this report are specific to FEMA, many of them should be undertaken with mapping partners and other relevant stakeholders, including the private sector.

Table 7-1: Recommendation 1 and Sub-Recommendations

Recommendation 1: Provide future conditions flood risk products, tools, and information for coastal, Great Lakes, and riverine areas. The projected future conditions should use standardized timeframes and methodologies wherever possible to encourage consistency and should be adapted as actionable science evolves.		
Sub-Recommendation		
	FEMA should use future risk assessments to take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates.	Short-term
	FEMA should define a future population metric that uses a standard future population database along with various budget scenarios for keeping the data current to predict the percent of the population covered at various points in the future.	Short-term
	FEMA should take into account future development (excluding proposed flood control structures for the base condition/scenario) for future conditions mapping. An additional scenario can be generated that does include future flood control structures.	Short-term
	FEMA should use population growth as an indicator of areas with increased potential flood risk.	Short-term
	FEMA should develop guidance for how local zoning and land use planning can be used to identify where and how land use will change in the future, and incorporate that into local hazard and risk modeling.	Short-term

Recommendation 1, continued		
Sub-Recommendation		Timing
4-11	FEMA should develop a policy and standards on how to consider and determine erosion zones that are outside of the SFHA as they ultimately affect flooding and environmental conditions within the SFHA.	Short-term
5-2	FEMA should use a scenario approach for future conditions flood hazards calculation and mapping that will allow users to evaluate the robustness of proposed solutions to a range of plausible future conditions including uncertain land use and climate change impacts.	Long-term

Table 7-2: Recommendation 2 and Sub-Recommendations

Recommendation 2: Identify and quantify accuracy and uncertainty of data and analyses used to produce future conditions flood risk products, tools, and information.		
Sub-Recommendation		Timing
	FEMA should use future risk assessments to take into account the likelihood of events occurring and their impacts, as well as the associated uncertainties surrounding these estimates.	Short-term
	FEMA should publish multiple future conditions flood elevation layers that incorporate uncertainty so as to provide a basis for building designs that lower flood risk.	Short-term

Table 7-3: Recommendation 3 and Sub-Recommendations

Recommendation 3: Provide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise. Major elements are:		
<ul style="list-style-type: none"> Provide guidance and standards for the development of future conditions coastal flood hazard and risk products. Incorporate local relative sea/lake level rise scenarios and long-term coastal erosion into coastal flood hazard analyses. Consider the range of potential future natural and manmade coastal changes, such as inundation and coastal erosion. 		
Sub-Recommendation		Timing
4-1	FEMA should use a scenario approach when considering shoreline location for the estimation of future conditions flood hazards. At least two scenarios should be evaluated: one in which the shoreline is held at its present location, and another in which the shoreline is eroded according to the best available shoreline erosion data.	Short-term
4-6	FEMA should develop guidance for incorporating future conditions into coastal inundation and wave analyses.	Short-term

Recommendation 3: Provide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise.

Major elements are:

- Provide guidance and standards for the development of future conditions coastal flood hazard and risk products.
- Incorporate local relative sea/lake level rise scenarios and long-term coastal erosion into coastal flood hazard analyses.
- Consider the range of potential future natural and manmade coastal changes, such as inundation and coastal erosion.

Sub-Recommendation

Timing

Recommendation 3, continued

Sub-Recommendation

Timing

4-8	FEMA should develop consistent methods and models for long-term coastal erosion hazard mapping.	Short-term
5-4	FEMA should use Parris, et. al., 2012, or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.	Short-term
5-5	FEMA should work with other Federal agencies (e.g., NOAA, USACE, USGS), the U.S. Global Change Research Program (USGCRP), and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parris, et al., 2012 scenarios, for the coastal regions of the United States out to the year 2100 that can be used for future coastal flood hazard estimation.	Short-term
5-7	FEMA should prepare map layers displaying the location and extent of areas subject to long-term erosion and make the information publicly available. Elements include: Establishing the minimum standards for long-term erosion mapping that will be used by FEMA that must be met by partners/communities if it is to be incorporated into the FEMA products. Working with Federal, State, and local stakeholders to develop these minimum standards via pilot studies. Securing funding that can support sustained long-term erosion monitoring and mapping by allowing for periodic updates.	Long-term
5-9	FEMA should support additional research to characterize how a changing climate will result in changes in Great Lakes and ocean wave conditions, especially along the Pacific Coast. The relative importance of waves on this coast makes this an important consideration.	Long-term
5-10	For the Great Lakes, the addition or subtraction of future lake level elevations associated with a changing climate is not recommended at this time due to current uncertainty in projections of future lake levels.	Short-term
5-11	FEMA should build upon the existing current conditions flood hazard analyses prepared by FEMA for the NFIP to determine future coastal flood hazards.	Short-term

Recommendation 3: Provide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise.

Major elements are:

- Provide guidance and standards for the development of future conditions coastal flood hazard and risk products.
- Incorporate local relative sea/lake level rise scenarios and long-term coastal erosion into coastal flood hazard analyses.
- Consider the range of potential future natural and manmade coastal changes, such as inundation and coastal erosion.

Sub-Recommendation		Timing
5-12	<p>FEMA should incorporate local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process in one of the following ways:</p> <p>Direct Analysis – Incorporate sea level rise directly into process modeling (ex. surge, wave setup, wave runup, overtopping, and erosion) for regions where additional sea level is determined to impact the BFE non-linearly (ex. 1FT SLR = 2FT or more BFE increase).</p> <p>Linear Superposition – Add sea level to the final calculated total water level and redefine BFE for regions where additional sea level is determined to impact the BFE linearly (ex. 1FT SLR = 1FT BFE increase).</p> <p>Wave effects should be calculated based on the higher Stillwater, including sea level rise.</p>	Short-term
5-13	<p>Maps displaying the location and extent of areas subject to long-term coastal erosion and future sea level rise scenarios should be advisory (non-regulatory) for Federal purposes. Individuals and jurisdictions can use the information for decision-making and regulatory purposes if they deem appropriate.</p>	Short-term

Table 7-4: Recommendation 4 and Sub-Recommendations

Recommendation 4: Provide future conditions flood risk products and information for riverine areas that include the impacts of: future development, land use change, erosion, and climate change, as actionable science becomes available. Major elements are:

- Provide guidance and standards for the development of future conditions riverine flood risk products.
- Future land use change impacts on hydrology and hydraulics can and should be modeled with land use plans and projections, using current science and build upon existing model study methods where data are available and possible.
- Future land use should assume built-out floodplain fringe and take into account the decrease of storage and increase in discharge.
- No actionable science exists at the current time to address climate change impacts to watershed hydrology and hydraulics. If undertaken, interim efforts to incorporate climate change impacts in flood risk products and information should be based on existing methods, informed by historical trends, and incorporate uncertainty based upon sensitivity analyses.

Where sufficient data and knowledge exist, incorporate future riverine erosion (channel migration) into flood risk products and information.

Sub-Recommendation		Timing
4-7	FEMA should evaluate previously-issued guidance for future conditions land use and hydrology to incorporate best practices and lessons learned from communities that have implemented the guidance since 2001.	Short-term
4-9	FEMA should determine long-term riverine erosion hazard areas for areas subject to high erosion and provided to the public in a digital layer.	Short-term
4-10	FEMA should utilize a national standard for riverine erosion zone delineations that reflects geographic variability.	Short-term
5-6	FEMA should take the impacts of future development and land use change on future conditions hydrology into account when computing future conditions for riverine areas.	Short-term
5-8	FEMA should implement riverine erosion hazard mapping (E Zones that define channel migration zones), leveraging existing data, models, and approaches that reflect site-specific processes and conditions.	Long-term

Recommendation 4, continued		
Sub-Recommendation		Timing
5-15	FEMA should use observed riverine trends to help estimate what future conditions might look like. In watersheds where floods of interest may decrease in magnitude and frequency then use existing riverine study results as the basis for flood hazard mapping. In watersheds where floods exhibit increase in magnitude or frequency then use best available science to determine future hydrology and flood hazards.	Short-term
5-16	FEMA should work with other Federal agencies via the Advisory Committee on Water Information's Subcommittee on Hydrology to produce a new method to estimate future riverine flood flow frequencies. This method should contain ways to consistently estimate future climate-impacted riverine floods and address the appropriate range of flood frequencies needed by the NFIP.	Long-term
5-17	FEMA should produce, and should encourage communities to adopt, future conditions products to reduce flood risk.	Short-term

Table 7-5: Recommendation 5 and Sub-Recommendation

Recommendation 5: Generate future conditions data and information such that it may frame and communicate flood risk messages to more accurately reflect the future hazard in ways that are meaningful to and understandable by stakeholders. This should enable users to make better-informed decisions about reducing future flood-related losses.		
Sub-Recommendation		Timing
3-3	FEMA should frame future risk messages for future conditions data and information such that individuals will pay attention to the future flood risk. Messages may be tailored to different stakeholders as a function of their needs and concerns.	Long-term

Table 7-6: Recommendation 6 and Sub-Recommendations

Recommendation 6: Perform demonstration projects to develop future conditions data for representative coastal and riverine areas across the nation to evaluate the costs and benefits of different methodologies or identify/address methodological gaps that affect the creation of future conditions data.		
Sub-Recommendation		Timing
3-1	FEMA should perform a study to quantify the accuracies, degree of precision, and uncertainties associated with respect to flood studies and mapping products for existing and future conditions. This should include the costs and benefits associated with any recommendation leading to additional requirements for creating flood related products.	Short-term

Recommendation 6: Perform demonstration projects to develop future conditions data for representative coastal and riverine areas across the nation to evaluate the costs and benefits of different methodologies or identify/address methodological gaps that affect the creation of future conditions data.		
5-3	FEMA should conduct future conditions mapping pilots to continue to refine a process and methods for mapping and calculating future flood hazards and capture and document best practices and lessons learned for each.	Short-term
5-14	FEMA should support research for future conditions coastal hazard mapping pilots and case studies using the latest published methods to determine the best means to balance the costs and benefits of increasing accuracy and decreasing uncertainty.	Short-term

Table 7-7: Recommendation 7 and Sub-Recommendations

Recommendation 7: Data and analysis used for future conditions flood risk information and products should be consistent with standardized data and analysis used to determine existing conditions flood risk, but also should include additional future conditions data, such as climate data, sea level rise information, long-term erosion data; and develop scenarios that consider land use plans, planned restoration projects, and planned civil works projects, as appropriate, that would impact future flood risk.		
Sub-Recommendation		Timing
	FEMA should support expanded research innovation for water data collection, for example using Doppler radar.	Short-term
	FEMA should use a scenario approach to evaluate the impacts of future flood control projects on future conditions flood hazards.	Short-term
	FEMA should support research on future conditions land use effects on future conditions hydrology and hydraulics.	Short-term
	FEMA should develop guidance for evaluating locally developed data from States and communities to determine if it is an improvement over similarly-available national datasets and could be used for future condition flood hazard analyses.	Short-term
	FEMA should develop better flood risk assessment tools to evaluate future risk, both population-driven and climate-driven. Improve integration of hazard and loss estimation models (such as Hazus) with land use planning software designed to analyze and visualize development alternatives, scenarios, and potential impacts to increase use in local land use planning.	Long-term
	Future flood hazard calculation and mapping methods and standards should be updated periodically as we learn more through observations and modeling of land surface and climate change, and as actionable science evolves.	Short-term

8 Glossary²⁰⁹

0.2-Percent-Annual-Chance Flood – The flood that has a 0.2-percent chance of being equaled or exceeded in any given year.

1-Percent-Annual-Chance Flood – The flood that has a 1-percent chance of being equaled or exceeded in any given year.

2-Percent-Annual-Chance Flood – The flood that has a 2-percent chance of being equaled or exceeded in any given year.

3D Elevation Program (3DEP) – The primary goal of 3DEP is to systematically collect enhanced elevation data in the form of high-quality light detection and ranging (LiDAR) data over the conterminous United States, Hawaii, and the U.S. territories.

Aleatory Uncertainty – Variability in the physical world; uncertainty arising from variations inherent in the behavior of natural phenomena that are viewed as random rather than systematic.

Approximate Study – A flood hazard study that results in the delineation of floodplain boundaries for the 1-percent-annual-chance (100-year) flood, but does not include the determination of BFEs or flood depths.

Base Flood – The flood that has a 1-percent chance of being equaled or exceeded in any given year.

Base Flood Elevation (BFE) – The elevation of a flood having a 1-percent chance of being equaled or exceeded in any given year.

Bayesian Network, The – Used to define relationships between driving forces, geologic constraints, and coastal response, which includes observations of local rates of relative sea level rise, wave height, tide range, geomorphology, coastal slope, and rate of shoreline change.

Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) – Legislation that was later revised by the *Homeowner Flood Insurance Affordability Act of 2014* requiring the Federal Emergency Management Agency and other agencies to make a number of changes to the way the National Flood Insurance Program is run. Key provisions of the legislation required the program to raise rates to reflect true flood risk and make the program more financially stable. The legislation also authorized the Technical Mapping Advisory Council to re-convene.

Climate-Informed Science Approach – The use of data and methods informed by best-available, actionable climate science.

Coastal Flooding – Flooding that occurs along the Great Lakes, the Atlantic and Pacific Oceans, and the Gulf of Mexico.

Coastal High Hazard Area – An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high-velocity wave actions from storms or seismic sources.

Coastal Vulnerability Index (CVI) Allows six physical variables to be related in a quantifiable manner, which yields numerical data that cannot be directly equated with particular physical effects, but can highlight those regions where the various effects of sea level rise may be the greatest.

²⁰⁹ Except for those definitions with specific references noted, all definitions provided below have been obtained from FEMA, other Federal agencies, or from the body of this report.

Code of Federal Regulations (CFR) – The codification of the general and permanent rules published in the Federal Register by the Executive Departments and agencies of the Federal Government. National Flood Insurance Program regulations are printed in Parts 59 through 77 of Title 44 of the CFR.

Community – Any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has the authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

Community Rating System (CRS) – A FEMA initiative, established under the National Flood Insurance Program, to recognize and reward communities that have implemented floodplain management measures beyond the minimum required by National Flood Insurance Program regulations. Under the CRS, those communities that choose to participate voluntarily may reduce the flood insurance premium rates for property owners in the community by taking these additional actions.

Conditional Letter of Map Revision (CLOMR) – The FEMA response to a community request for FEMA's comment on proposed alterations to the floodplain conditions within that community. The CLOMR describes the effect of the proposed project, if constructed as proposed, on the effective FIRM, FBFM, and/or FIS report. A CLOMR often contains detailed information on conditions that must be met by a requester before FEMA will issue a final determination regarding revising the FIRM, FBFM, and/or FIS report.

Cooperating Technical Partners (CTP) Program – A program to create partnerships between FEMA and participating National Flood Insurance Program communities, regional agencies, State agencies, and non-governmental organizations that have the interest and capability to become more active participants in the FEMA Flood Hazard Mapping Program.

Digital Elevation Model (DEM) – A gridded array of elevations.

Epistemic Uncertainty (Knowledge Uncertainty) – Uncertainty arising from imprecision in analysis methods and data. Arises from a lack of understanding of events and processes, or from a lack of data; such lack of knowledge is reducible with additional measurements, observations, and scientific analysis.

Executive Order 11988 – Requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Federal Advisory Committee Act (FACA) – A Federal law that governs the establishment and operation of advisory committees. It is implemented government-wide by the General Services Administration (GSA), which has issued regulations and guidance.

Flood – A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area or of 2 or more properties (at least 1 of which is the policyholder's property) from: (1) overflow of inland or tidal waters; or (2) unusual and rapid accumulation or runoff of surface waters from any source; or (3) mudflow; or (4) collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

Flood Boundary and Floodway Map (FBFM) – The floodplain management map issued by FEMA that depicts, based on detailed flood hazard analyses, the boundaries of the 1-percent-annual-chance (100-year) and the 0.2-percent-annual-chance (500-year) floodplains and, when appropriate, the regulatory floodway. The FBFM does not show flood insurance risk zones or BFEs.

Flood hazard – Flood conditions (e.g., depth, wind, velocity, duration, waves, erosion, and debris) that have the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss.²¹⁰

Flood Hazard Boundary Map (FHBM) – Official map of a community issued by FEMA, where the boundaries of the flood, mudflow, and related erosion areas having special hazards have been designated.

Flood risk – Expected flood losses, based on the likelihood and severity of flooding, the natural and manmade assets at risk, and the consequences to those assets.²¹¹

Freeboard Value Approach – The use of two feet above the 1-percent-annual-chance flood (also referred to as the base flood) as the elevation for standard projects and three feet above the 1-percent-annual-chance elevation for critical buildings, like hospitals and evacuation centers.

Frequency Curve – A graph showing the number of times per year on the average that floods of certain magnitudes are equaled or exceeded.

Flood Insurance Rate Map (FIRM) – The insurance and floodplain management map produced by FEMA that identifies, based on detailed or approximate analyses, the areas subject to flooding during a 1-percent-annual-chance (100-year) flood event in a community. Flood insurance risk zones, which are used to compute actuarial flood insurance rates, also are shown. In areas studied by detailed analyses, the FIRM shows BFEs to reflect the elevations of the 1-percent-annual-chance flood. For many communities, when detailed analyses are performed, the FIRM also may show areas inundated by 0.2-percent-annual-chance (500-year) flood and regulatory floodway areas.

Flood Insurance Study (FIS) – A Flood Insurance Survey (FIS) is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables.

Flood Profile – A graph showing the relationship of water-surface elevation to location, with the latter generally expressed as distance above the mouth for a stream of water flowing in an open channel.

Floodplain – Any land area that is susceptible to being inundated by water from any source.

Floodway – See Regulatory Floodway.

Freeboard – A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.

Future Conditions – For the purposes of this report, future conditions encompasses both natural changes (e.g., sea level rise, erosion, rainfall patterns) as well as human impacts (e.g., population changes, land use policies, development).

Geographic Information System (GIS) – A system of computer hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modeling, and display of spatially referenced data for solving complex planning and management problems.

Global sea level – The average height of all the world's oceans. Also sometimes referred to as global mean sea level (GMSL).

Hazard – An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, and other types of loss or harm.

²¹⁰ FEMA, 1997.

²¹¹ Schwab, et al., 1998.

Hazus – A nationally-applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses GIS technology to estimate physical, economic, and social impacts of disasters.

Hydraulic Analysis – An engineering analysis of a flooding source carried out to provide estimates of the elevations of floods of selected recurrence intervals.

Hydraulic Computer Model – A computer program that uses flood discharge values and floodplain characteristic data to simulate flow conditions and determine flood elevations.

Hydraulic Methodology – Analytical methodology used for assessing the movement and behavior of floodwaters and determining flood elevations and regulatory floodway data.

Hydrograph – A graph showing stage, flow, velocity, or other properties of water with respect to time.

Hydrologic Analysis – An engineering analysis of a flooding source carried out to establish peak flood discharges and their frequencies of occurrence.

Hydrology – The science encompassing the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground.

Letter of Map Revision (LOMR) – A letter issued by FEMA to revise the FIRM, FBFM, and/or FIS report for a community to change in BFEs, floodplain and floodway boundary delineations, and coastal high hazard areas.

Levee – A manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

Light Detection and Ranging (LIDAR) System – An airborne laser system, flown aboard rotary or fixed-wing aircraft, that is used to acquire x, y, and z coordinates of terrain and terrain features that are both manmade and naturally occurring. LIDAR systems consist of an airborne Global Positioning System with attendant base station(s), Inertial Measuring Unit, and light-emitting scanning laser.

Local Relative Sea Level (LRSL) – The local change in sea level relative to the elevation of the land at a specific point on the coast.

Long-Term Erosion – Erosion that occurs over a period of decades, and that can be projected into the future based on historical erosion trends and/or modeling.

Mitigation – A sustained action taken to reduce or eliminate long-term risk to people and property from flood hazards and their effects. Mitigation distinguishes actions that have a long-term impact from those more closely associated with preparedness for, immediate response to, and short-term recovery from specific events.

National Climate Assessment – Summarizes the impacts of climate change on the United States, now and in the future.

National Flood Hazard Layer (NFHL) – A digital database that contains flood hazard mapping data from FEMA's NFIP. The map data are derived from Flood Insurance Rate Map (FIRM) databases and Letters of Map Revision (LOMRs).

National Flood Insurance Program (NFIP) – Federal Program under which flood-prone areas are identified and flood insurance is made available to the owners of the property in participating communities.

National Hydrography Dataset (NHD) – The surface water component of The National Map that represents the drainage network with features like rivers, streams, canals, lakes, ponds, coastline, dams, and stream gages.

National Map, The – A collaborative effort of the United States Geological Survey (USGS) and other Federal, State, and local agencies to improve and deliver topographic information for the United States.

National Spatial Reference System (NSRS) – A consistent coordinate system that defined latitude, longitude, height, scale, gravity, and orientation throughout the United States. The National Oceanic and Atmospheric Administration's (NOAA's) National Geodetic Survey defines, maintains, and provides access to the NSRS.

Non-regulatory – Unlike regulatory flood hazard products (FIRM, FIS Report, FIRM Database), non-regulatory products are not intended to be used as the basis for official actions required under the National Flood Insurance Program, such as determining mandatory insurance purchase requirements for a property. Non-regulatory flood risk products work alongside regulatory products and can be adopted by local communities wishing to regulate floodplain development to a higher standard.

Non-stationarity – The assumption that data and processes will change over time.

North American Regional Climate Change Assessment Program (NARCCP) – An international program that serves the high resolution climate scenario needs of the United States, Canada, and northern Mexico, using regional climate model, coupled global climate model, and time-slice experiments.

North Atlantic Coast Comprehensive Study (NACCS) – A U.S. Army Corps of Engineers (USACE) study detailing the results of a 2-year study to address coastal storm and flood risk to vulnerable populations, property, ecosystems, and infrastructure affected by Hurricane Sandy in the United States' North Atlantic region.

Point – A level of spatial measurement that refers to an object that has no dimension.

Point Data – In a vector structure, the data that consist of a single, distinct X, Y coordinate. In a raster structure, the data that consist of single cells.

Regulatory Floodway – A floodplain management tool that is the regulatory area defined as the channel of a stream, plus any adjacent floodplain areas that must be kept free of encroachment so that the base flood discharge can be conveyed without increasing the BFEs more than a specified amount. The regulatory floodway is not an insurance rating factor.

Risk – The potential losses associated with a hazard, defined in terms of expected intensity and frequency of an event coupled with its exposure and consequences to the natural and built environments.²¹²

Riverine – For the purposes of this report, all inland or non-coastal flooding sources (e.g., alluvial fans, major rivers, tributaries, and rivers that are influenced by coastal effects as applicable).

Special Flood Hazard Area (SFHA) – The area delineated on a National Flood Insurance Program map as being subject to inundation by the base flood. SFHAs are determined using statistical analyses of records of riverflow, storm tides, and rainfall; information obtained through consultation with a community; floodplain topographic surveys; and hydrologic and hydraulic analyses.

Stationarity – The assumption that data and processes do not change over time.

Stillwater Flood Elevation (SWEL) – Projected elevation that flood waters would assume, referenced to National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or other datum, in the absence of waves resulting from wind or seismic effects.

²¹² Schwab, et al., 1998.

Structure – For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home. For flood insurance purposes, a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, as well as a manufactured home on a permanent foundation.

Technical Mapping Advisory Council (TMAC) – A Federal advisory committee established to review and make recommendations to the Federal Emergency Management Agency (FEMA) on matters related to the national flood mapping program.

Vertical Datum – The National Geodetic Vertical Datum of 1929 (NGVD 29) or North American Vertical Datum of 1988 (NAVD 88) for which the property elevations are referenced. If the datum being referenced is different than the datum used to produce the effective FIRM, provide the datum conversion.

Watershed – An area of land that drains into a single outlet and is separated from other drainage basins by a divide.

Zone A – The flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE – The flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH – The flood insurance rate zone that corresponds to the 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AR – The flood insurance rate zone used to depict areas protected from flood hazards by flood control structures, such as a levee, that are being restored. FEMA will consider using the Zone AR designation for a community if the flood protection system has been deemed restorable by a Federal agency in consultation with a local project sponsor; a minimum level of flood protection is still provided to the community by the system; and restoration of the flood protection system is scheduled to begin within a designated time period and in accordance with a progress plan negotiated between the community and FEMA. Mandatory purchase requirements for flood insurance will apply in Zone AR, but the rate will not exceed the rate for unnumbered A zones if the structure is built in compliance with Zone AR floodplain management regulations. For floodplain management in Zone AR areas, elevation is not required for improvements to existing structures. However, for new construction, the structure must be elevated (or floodproofed for non-residential structures) such that the lowest floor, including basement, is a maximum of 3 feet above the highest adjacent existing grade if the depth of the BFE does not exceed 5 feet at the proposed development site. For infill sites, rehabilitation of existing structures, or redevelopment of previously developed areas, there is a 3 foot elevation requirement regardless of the depth of the BFE at the project site. The Zone AR designation will be removed and the restored flood control system shown as providing protection from the 1-percent-annual chance flood on the NFIP map upon completion of the restoration project and submittal of all the necessary data to FEMA.

Zone AO – The flood insurance rate zone that corresponds to the 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses. The highest top of curb elevation adjacent to the lowest adjacent grade (LAG) must be submitted if the request lies within this zone.

Zone A99 – The flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone D – The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined but possible.

Zone E – An area of flood-related erosion hazards, defined by the National Flood Insurance Program, but as yet unused on Flood Insurance Rate Maps.

Zone V – The flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone VE, V1-30 – The flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone X (shaded), Zone B – The flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500- year floodplain, and areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from 100-year flood by levees. No BFEs or depths are shown within this zone.

Zone X (unshaded), Zone C – Areas determined to be outside the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains. Flood insurance is not Federally-mandated, but lenders can require the purchase of flood insurance in these areas. No minimum Federal floodplain management standards apply.

9 Acronyms and Abbreviations

1D	1 dimensional
3DEP	3 Dimensional Elevation Program
ADCIRC	Advanced Circulation and Storm Surge model
AR5	Fifth Assessment Report of the Intergovernmental Panel on Climate Change
BFE	Base Flood Elevation
BW-12	<i>Biggert-Waters Flood Insurance Reform Act of 2012</i>
CAZ	Coastal A Zone
CFM	Certified Floodplain Manager
CFR	Code of Federal Regulations
CLOMR	Conditional Letter of Map Revision
CMSWS	Charlotte-Mecklenburg Storm Water Services
CO ₂	Carbon Dioxide
CORS	Continuously Operating Reference Stations
CRS	Community Rating System
CTP	Cooperating Technical Partner
CVI	Coastal Vulnerability Index
DEM	Digital Elevation Model
DSWL	dynamic Stillwater level
EHA	erosion hazard area
ERF	erosion reference feature
FACA	Federal Advisory Committee Act
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHBM	Flood Hazard Boundary Map
FIMA	Federal Insurance and Mitigation Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GAO	Government Accountability Office
GCM	General circulation model
GIS	Geographic Information System
GISP	Geographic Information System Professional
GMSL	Global mean sea level
HFIAA	<i>Homeowner Flood Insurance Affordability Act of 2014</i>
HUCCO	Hydrologic Unit Code by County
IPCC	Intergovernmental Panel on Climate Change

LiDAR	Light Detection and Ranging
LiMWA	Limit of Moderate Wave Action
LOMR	Letter of Map Revision
LRSL	Local relative sea level
m	meters
mm	millimeters
NACCS	North Atlantic Coast Comprehensive Study
NAVD88	North American Vertical Datum of 1988
NCA	National Climate Assessment
Nexrad	Next Generation Radar
NFHL	National Flood Hazard Layer
NFIA	<i>National Flood Insurance Act of 1968</i>
NFIP	National Flood Insurance Program
NGVD29	National Geodetic Vertical Datum of 1929
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPCC	New York City Panel on Climate Change
NRC	National Research Council
NSRS	National Spatial Reference System
NWLON	National Water Level Observation Network
pCMZ	Planning-level channel migration zone
RCP	Representative concentration pathway
Risk MAP	Risk Mapping, Assessment, and Planning
SCRF	shoreline change reference features
SFHA	Special Flood Hazard Area
SLC	Sea Level Change
SLOSH	Sea, Lake, and Overland Surges from Hurricanes model
SLR	Sea Level Rise
SME	Subject Matter Expert
SWL	Stillwater level
TMAC	Technical Mapping Advisory Council
TWL	total water level
UDFCD	Urban Drainage and Flood Control District (Denver, Colorado)
USACE	U.S. Army Corps of Engineers
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey

VLM	Vertical land movement
WBD	Watershed Boundary Dataset
WSP 2207	U.S. Geological Survey Water-Supply Paper 2207

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10.1.1.1.1.1 TMAC Charter²¹³

Department of Homeland Security Federal Emergency Management Agency Technical Mapping Advisory Council

1. Committee's Official Designation:

Technical Mapping Advisory Council

2. Authority:

Pursuant to section 100215 of the *Biggert-Waters Flood Insurance Reform Act of 2012*, Public Law 112-141, 126 Stat. 924, 42 U.S.C. § 4101a ("the Act"), this charter establishes the Technical Mapping Advisory Council (TMAC or Council). This committee is established in accordance with and operates under the provisions of the *Federal Advisory Committee Act* (FACA) (Title 5, United States Code, Appendix).

3. Objectives and Scope of Activities:

The TMAC advises the Administrator of the Federal Emergency Management Agency (FEMA) on certain aspects of FEMA's flood Risk MAPping activities.

The TMAC recommends to the Administrator:

- A. How to improve in a cost-effective manner the:
 - 1. Accuracy, general quality, ease of use, and distribution and dissemination of flood insurance rate maps and risk data; and
 - 2. Performance metrics and milestones required to effectively and efficiently map flood risk areas in the U.S.
- B. Mapping standards and guidelines for:
 - 1. Flood Insurance Rate Maps (FIRMs); and
 - 2. Data accuracy, data quality, data currency, and data eligibility;
- C. How to maintain, on an ongoing basis, FIRMs and flood risk identification; and
- D. Procedures for delegating mapping activities to State and local mapping partners.

The TMAC recommends to the Administrator and other Federal agencies participating in the Council:

- A. Methods for improving interagency and intergovernmental coordination on flood mapping and flood risk determination; and
- B. A funding strategy to leverage and coordinate budgets and expenditures across Federal agencies.

The TMAC submits an annual report to the Administrator that contains a description of the activities of the Council, an evaluation of the status and performance of FIRMs and mapping activities to revise and update FIRMs as required by the Act, and a summary of the activities of the Council. In addition, the TMAC must prepare written recommendations in a future conditions risk assessment and modeling report and submit the recommendations to the Administrator.

²¹³ The TMAC Charter in Appendix A is the renewed charter, effective July 29, 2015. The original TMAC Charter was effective July 29, 2013.

Further, the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 requires additional flood mapping review requirements for the TMAC.

4. Description of Duties:

The duties of the TMAC are solely advisory in nature.

5. Official to Whom the Committee Reports:

The TMAC provides advice and recommendations to the Administrator of FEMA.

6. Support:

FEMA shall be responsible for providing financial and administrative support to the Council. Within FEMA, the Risk Analysis Division of the Federal Insurance and Mitigation Administration provides this support.

7. Estimated Annual Operating Costs and Staff Years:

The estimated annual operating cost associated with supporting TMAC's functions is estimated to be \$1,100,000 for FY2015 and \$800,000 for FY2016. This includes surge support for all direct and indirect expenses and 2.0 FTE of staff support. Adequate staffing within the annual operating cost estimate is required to support the TMAC.

8. Designated Federal Officer:

A full-time or permanent part-time employee of FEMA is appointed by the Administrator as the TMAC Designated Federal Officer (DFO). The DFO or an Alternate DFO approves or calls TMAC meetings, approves meeting agendas, attends all committee and subcommittee meetings, adjourns any meeting when the DFO determines adjournment to be in the public interest, and chairs meetings when requested in the absence of the Chair.

9. Estimated Number and Frequency of Meetings:

Meetings of the TMAC may be held with the approval of the DFO. The Council shall meet a minimum of two times each year at the request of the Chairperson or a majority of its members, and may take action by a vote of the majority of the members.

Council meetings are open to the public unless a determination is made by the appropriate DHS official in accordance with DHS policy and directives that the meeting should be closed in accordance with Title 5, United States Code, subsection (c) of section 552b.

10. Duration:

Continuing

11. Termination:

This charter is in effect for two years from the date it is filed with Congress unless sooner terminated. The charter may be renewed at the end of this two-year period in accordance with section 14 of FACA.

12. Member Composition:

Members of the Council are defined by Section 100215(b)(1), and include four designated members and sixteen appointed members.

The four designated members of the Council serve as Regular Government Employees and consist of:

- The FEMA Administrator or the designee thereof;
- The Secretary of the Interior or the designee thereof;
- The Secretary of Agriculture or the designee thereof; and
- The Under Secretary of Commerce for Oceans and Atmosphere or the designee thereof.

The sixteen additional members of the Council are appointed by the Administrator or designee. These members are appointed based on their demonstrated knowledge and competence regarding surveying, cartography, remote sensing, geographic information systems, or the technical aspects of preparing and using FIRMs.

To the maximum extent practicable, the membership of the Council will have a balance of Federal, State, local, tribal and private members, and include geographic diversity including representation from areas with coastline on the Gulf of Mexico and other States containing areas identified by the Administrator as at high risk for flooding or as areas having special flood hazard areas.

These members are selected from among the following professional associations or organizations:

- a. One member of a recognized professional surveying association or organization;
- b. One member of a recognized professional mapping association or organization;
- c. One member of a recognized professional engineering association or organization;
- d. One member of a recognized professional association or organization representing flood hazard determination firms;
- e. One representative of the United States Geological Survey;
- f. One representative of a recognized professional association or organization representing State geographic information;
- g. One representative of State national flood insurance coordination offices;
- h. One representative of the Corps of Engineers;
- i. One member of a recognized regional flood and storm water management organization;
- j. Two representatives of different State government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce FIRMs;
- k. Two representatives of different local government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce flood insurance maps;
- l. One member of a recognized floodplain management association or organization;
- m. One member of a recognized risk management association or organization; and
- n. One State mitigation officer.

The non-Federal members in a., b., c., d., i., l., m., and n. serve as Special Government Employees as defined in Title 18, United States Code, section 202(a). The members in e., and h., serve as Regular Government Employees. The non-Federal members in f., g., j., and k. serve as representatives of their respective associations or organizations and are not Special Government Employees as defined in Title 18 of United States Code, section 202(a).

The sixteen appointed members serve terms of office of two years. However, up to half (eight) of those initially appointed to the Council may serve one-year terms to allow for staggered turnover. Appointments may be renewed by the FEMA Administrator for an additional one- or two-year period. A member appointed to fill an unexpired term shall serve the remainder of that term and may be reappointed for an additional one- or two-year term. The Administrator has the

authority to extend reappoints for an additional one- or two-year period as deemed necessary. In the event the Council terminates, all appointments to the Council will terminate.

13. Officers:

The Council membership shall elect any one member to serve as Chairperson of the Council. The Chairperson shall preside over Council meetings in addition to specific responsibilities authorized under the Act.

14. Subcommittees:

The DFO may establish subcommittees for any purpose consistent with this charter. Such subcommittees may not work independently of the chartered committee and must present their work to the TMAC for full deliberation and discussion. Subcommittees have no authority to make decisions on behalf of the TMAC and may not report directly to the Federal government or any other entity.

15. Recordkeeping:

The records of the TMAC, formally and informally established subcommittees, or other subgroups of the Council, shall be maintained and handled in accordance with General Records Schedule 26, Item 2 or other approved agency records disposition schedule.

16. Filing Date:

July 20, 2015

Department Approval Date

July 29, 2015

CMS Consultation Date

July 29, 2015

Date Filed with Congress

10.1.1.1.1.2 FEMA TMAC Bylaws²¹⁴

04/29/15

**Federal Emergency Management Agency
Technical Mapping Advisory Council
Bylaws****ARTICLE I AUTHORITY**

As required by the *Biggert-Waters Flood Insurance Reform Act of 2012* (BW-12), codified at 42 United States Code Section 4101a, the Federal Emergency Management Agency (FEMA) Technical Mapping Advisory Council (TMAC) is established. The TMAC shall operate in accordance with the provisions of the *Federal Advisory Committee Act* (FACA), as amended (Title 5, U.S.C., Appendix).

ARTICLE II PURPOSE

The TMAC provides advice and recommendations to the Administrator of FEMA to improve the preparation of flood insurance rate maps (FIRM). Among its specified statutory responsibilities, TMAC will examine performance metrics, standards and guidelines, map maintenance, delegation of mapping activities to State and local mapping partners, interagency coordination and leveraging, and other requirements mandated by the authorizing BW-12 legislation. In addition, TMAC provides advice and recommendations to the FEMA Administrator on future risks from climate change, rising sea levels, and FIRM development, as mandated by BW-12. Further, the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 requires additional flood mapping review requirements for the TMAC.

ARTICLE III MEMBERSHIP AND MEMBER RESPONSIBILITIES**Section 1. Composition.**

Members of the Council include designated members and additional members appointed by the FEMA Administrator or his designee. See 42 U.S.C. § 4101a.

The designated members of the Council are:

- The FEMA Administrator or the designee thereof;
- The Secretary of the Interior or the designee thereof;
- The Secretary of Agriculture or the designee thereof; and,
- The Under Secretary of Commerce for Oceans and Atmosphere or the designee thereof.

The appointed members may be selected from among the following professional associations or organizations:

²¹⁴ The FEMA TMAC Bylaws in Appendix B are the updated bylaws, effective April 29, 2015. The original FEMA TMAC Bylaws were effective July 29, 2013.

- A member of a recognized professional surveying association or organization;
- A member of a recognized professional mapping association or organization;
- A member of a recognized professional engineering association or organization;
- A member of a recognized professional association or organization representing flood hazard determination firms;
- A representative of the United States Geological Survey;
- A representative of a recognized professional association or organization representing State geographic information;
- A representative of State national flood insurance coordination offices;
- A representative of the Corps of Engineers;
- A member of a recognized regional flood and storm water management organization;
- Two representatives of different State government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce FIRMs;
- Two representatives of different local government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce flood insurance maps;
- A member of a recognized floodplain management association or organization;
- A member of a recognized risk management association or organization;
- A State mitigation officer.

Subject Matter Experts/Technical Advisors: The TMAC may hear from subject matter experts/technical advisors (“SMEs”) who will be asked to provide specialized information or assistance as appropriate and approved by the Designated Federal Officer (DFO). Individual TMAC members may request SMEs, by expertise or skillset, to appear before the TMAC, as needed. Member requests will be made to the Chair for consideration and consultation with the TMAC Designated Federal Officer (DFO). FEMA will not compensate SMEs for their services but they may be reimbursed for travel and lodging expenses.

Section 2. Appointment.

With the exception of the Secretary of the Interior, Secretary of Agriculture, and Under Secretary of Commerce for Oceans and Atmosphere, members of TMAC are appointed by and serve at the pleasure of the FEMA Administrator in an advisory role. Membership is voluntary and members are not compensated for their services. Appointments are personal to the member and cannot be transferred to another individual. Members may not designate someone to attend in their stead, participate in discussions, or vote. In compliance with FACA, members, while engaged in the performance of their duties away from their home or regular

places of business, may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code.

Section 3. Terms of Office.

Members of the TMAC may serve terms of office of two years; however, up to half of those initially appointed TMAC members may be appointed to serve one-year terms to allow for staggered turnover. The FEMA Administrator or his designee may reappoint serving members for additional terms. When the TMAC terminates, all appointments to the TMAC shall terminate.

Section 4. Certification of Non-Lobbyist Status.

All members of the TMAC must annually self-certify that they are not registered lobbyists under the *Lobbying Disclosure Act*, Title 2 U.S.C., Section 1603, and must advise the Department of Homeland Security (DHS) through the Federal Emergency Management Agency if they register as a lobbyist while serving on the TMAC. Members who register as a lobbyist after their appointment or re-appointment will be replaced on the Council.

Section 5. Members' Responsibilities.

Because the TMAC's membership is constructed to balance as many perspectives on floodplain mapping and future risk assessment as possible, member attendance and participation at meetings is vital to the TMAC's mission. Members are expected to personally attend and participate in Council, subcommittee meetings, and conference calls. Members will also be expected to provide written input to any final reports or deliverables.

The DFO or Chair may recommend to the FEMA Administrator that any appointed member unable to fulfill their responsibility be replaced on the Council or subcommittee. Members of the TMAC may be recommended for removal for reasons such as, but not limited to:

- a) Missing two consecutive meetings, including teleconference calls;
- b) Registering as a lobbyist after appointment; or,
- c) Engaging in activities that are illegal or violate the restrictions on members' activities as outlined below.

Section 6. Restriction on Members' Activities.

- a) Members may not use their access to the Federal Government as a member of this Council for the purpose of soliciting business or otherwise seeking economic advantage for themselves or their companies. Members may not use any non-public information obtained in the course of their duties as a

- member for personal gain or for that of their company or employer.
Members must hold any non-public information in confidence.
- b) The Council as a whole may advise FEMA on legislation or recommend legislative action. In their capacities as members of the TMAC, individual members may not petition or lobby Congress for or against particular legislation or encourage others to do so.
 - c) Members of the TMAC are advisors to the agency and have no authority to speak for the Council, FEMA, or for the Department outside the Council structure.
 - d) Members may not testify before Congress in their capacity as a member of the TMAC. If requested to testify before Congress, members of the TMAC:
 - 1. Cannot represent or speak for the Council, DHS, any agency, or the Administration in their testimony;
 - 2. Cannot provide information or comment on Council recommendations that are not yet publicly available;
 - 3. May state they are a member of the Council; and,
 - 4. May speak to their personal observations as to their service on the Council.
 - e) If speaking outside the Council structure at other forums or meetings, the restrictions in Section (d) also apply.

ARTICLE IV OFFICIALS

Section 1. TMAC Leadership.

TMAC members will elect a Chair through a nomination and formal vote. (The FEMA Administrator, or his designee, shall serve in this capacity until a Chair is elected.) The Chair will be responsible for appointing one or more Vice Chairs. The Chair and Vice Chairs will serve for either a one or two year term, based on their initial appointment. Appointments may be renewed for an additional one-year term. No Chair or Vice Chair shall serve longer than three years. The Chair will select chairs for any subcommittee established. Only voting members can serve as subcommittee chairs.

Chair Responsibilities:

- a. Appoints officers to assist in carrying out the duties of the TMAC;
- b. Works with the DFO to develop meeting agendas;
- c. Sets and maintains a schedule for TMAC activities (e.g., report development);
- d. Works with the TMAC membership to develop the draft annual report;
- e. Signs the final reports addressed to the FEMA Administrator;

- f. Coordinates with the DFO to form subcommittees with assigned areas of consideration;
- g. Selects subcommittee chairs and vice chairs;
- h. Resolves member conflicts.

Vice Chair Responsibilities:

- a. Works with subcommittee chairs to ensure work is being completed;
- b. Coordinates member engagement;
- c. Assists Chair in conducting review of meeting minutes and recommendation reports;
- d. Elevates any unresolved issues to the Chair;
- e. Serves as Chair in absence of the Chair.

Subcommittee Chair Responsibilities:

- a. Works with the DFO to develop subcommittee meeting agendas;
- b. Facilitates subcommittee discussions;
- c. Reports to the Chair and Vice Chair; and
- d. Reports out subcommittee work at quarterly TMAC meetings.

Section 2. Designated Federal Officer.

The DFO serves as FEMA's agent for all matters related to the TMAC and is appointed by the FEMA Administrator. In accordance with the provisions of the FACA, the DFO must:

- a. Approve or call meetings of the Council and its subcommittees;
- b. Approve agendas for Council and subcommittee meetings;
- c. Attend all meetings;
- d. Adjourn meetings when such adjournment is in the public interest; and,
- e. Chair meetings of the Council when directed to do so by the FEMA Administrator.

In addition, the DFO is responsible for assuring administrative support functions are performed, including the following:

- a. Notifying members of the time and place of each meeting;
- b. Tracking all recommendations of the Council;
- c. Maintaining the record of members' attendance;
- d. Preparing the minutes of all meetings of the Council's deliberations, including subcommittee and working group activities;
- e. Attending to official correspondence;

- f. Maintaining official records and filing all papers and submissions prepared for or by the Council, including those items generated by subcommittees and working groups;
- g. Reviewing and updating information on Council activities in the Shared Management System (i.e., FACA database) on a monthly basis;
- h. Acting as the Council's agent to collect, validate and pay all vouchers for pre-approved expenditures; and
- i. Preparing and handling all reports, including the annual report as required by FACA.

ARTICLE V MEETING PROCEDURES

Section 1. Meeting Schedule and Call of Meetings.

TMAC will meet in plenary sessions approximately once or twice per quarter, with additional virtual meetings as needed, at the discretion of the DFO. The Council may hold hearings, receive evidence and assistance, provide information, and conduct research, as it considers appropriate, subject to resources being made available. With respect to the meetings, it is anticipated that some may be held via teleconference, with public call-in lines. TMAC meetings will be open to the public unless a determination is made by the appropriate FEMA official that the meeting should be closed in accordance with subsection (c) of section 552b of title 5, U.S.C.

Section 2. Agenda.

Meeting agendas are developed by the DFO in coordination with the TMAC chair. In accordance with the responsibilities under FACA, the DFO approves the agenda for all Council and subcommittee meetings, distributes the agenda to members prior to the meeting, and publishes the agenda in the Federal Register.

FEMA will publish the meeting notice and agenda in the Federal Register at least 15 calendar days prior to each TMAC meeting or official public conference call. Once published in the Federal Register, the agenda items cannot be changed prior to or during a meeting.

Section 3. Quorum.

A quorum of the TMAC is the presence of fifty percent plus one of the Council members currently appointed. In the event a quorum is not present, the TMAC may conduct business that does not require a vote or decision among members. Votes will be deferred until such time as a quorum is present.

Section 4. Voting Procedures.

When a decision or recommendation of the TMAC is required, the Chair will request a motion for a vote. A motion is considered to have been adopted if agreed to by a simple majority of a quorum of TMAC members. Members vote on draft reports and recommendations in open meetings through a resolution recorded in the meeting minutes. Only members present at the meeting—either in person or by teleconference—may vote on an item under consideration. No proxy votes or votes by email will be allowed.

Section 5. Minutes.

The DFO will prepare the minutes of each meeting and distribute copies to each Council member. Minutes of open meetings will be available to the public on the TMAC website at <http://www.fema.gov/TMAC>. The minutes will include a record of:

- a. The time, date, and place of the meeting;
- b. A list of all attendees including Council members, staff, agency employees and members of the public who presented or oral or written statements;
- c. An accurate description of each matter discussed and the resolution, if any, made by the Council;
- d. Copies of reports or other documents received, issued, or approved by the Council; and
- e. An accurate description of public participation, including oral and written statements provided.

The DFO ensures that the Chair certifies the minutes within 90 calendar days of the meeting to which they relate and prior to the next TMAC meeting.

Minutes of closed meetings will also be available to the public upon request subject to the withholding of matters about which public disclosure would be harmful to the interests of the Government, industry, or others, and which are exempt from disclosure under the *Freedom of Information Act* (FOIA) (5 U.S.C., section 552).

Section 6. Open Meetings.

TMAC meetings shall be open and announced to the public in a notice published in the Federal Register at least fifteen calendar days before the meeting. Members of the public may attend any meeting or portion of a meeting that is not closed to the public and, at the determination of the Chair and DFO, may offer oral comment at such meeting. Meetings will include a period for oral comments unless it is clearly inappropriate to do so. Members of the public may submit written statements to the TMAC at any time. All materials provided to the Council shall be available to the public when they are provided to the members.

Such materials, including any submissions by members of the public, are part of the meeting record.

Section 7. Closed Meetings.

All or parts of TMAC meetings may be closed in limited circumstances and in accordance with applicable law. No meeting may be partially or fully closed unless the component head issues a written determination that there is justification for closure under the provisions of subsection (c) of 5 United States Code 552b, the *Government in the Sunshine Act*. Where the DFO has determined in advance that discussions during a Council meeting will involve matters about which public disclosure would be harmful to the interests of the government, industry, or others, an advance notice of a closed meeting, citing the applicable exemptions of the *Government in the Sunshine Act*, will be published in the Federal Register.

The notice may announce the closing of all or just part of a meeting. If, during the course of an open meeting, matters inappropriate for public disclosure arise during discussions, the DFO or Chair will order such discussion to cease and will schedule it for a future meeting of the Council that will be approved for closure. No meeting or portion of a meeting may be closed without prior approval and notice published in the Federal Register at least 15 calendar days in advance. Closed meetings can only be attended by DFO, Council members, and necessary agency staff members. Presenters must leave immediately after giving their presentations and answering any questions.

Section 8. Other Meetings, No Public Notice Required.

Public notice is not required for meetings of administrative or preparatory work. Administrative work is a meeting of two or more TMAC or subcommittee members convened solely to discuss administrative matters or to receive administrative information from a Federal officer or agency. Preparatory work is a meeting of two or more TMAC or subcommittee members convened solely to gather information, conduct research, or analyze relevant issues and facts in preparation for a TMAC meeting or to draft position papers for consideration by the TMAC.

ARTICLE VI EXPENSES AND REIMBURSEMENTS

Expenses related to the operation of the TMAC will be paid by the Federal Insurance and Mitigation Administration. Expenditures of any kind must be approved in advance by the DFO. All such expense reports will be sent to the DFO for action and reimbursement. The DFO will be responsible for handling the payment of expenses. Members are responsible for submitting expense reports by the deadlines set by the DFO or they may not be reimbursed. The DFO will be responsible for developing the procedures for expense reimbursement.

ARTICLE VII ADMINISTRATION

The Federal Insurance and Mitigation Administration shall be responsible for providing financial and administrative support to the TMAC subject to the availability of appropriations.

ARTICLE VIII SUBCOMMITTEES

Section 1. Establishment of subcommittees.

The DFO may establish standing subcommittees with an overarching mission to work on specific focus areas and provide advice to the TMAC on a continuing basis. The DFO may also establish ad-hoc subcommittees to work and report on specific focus areas. The number, designation, mission, scope, and membership of subcommittees are determined by the DFO in consultation with the Chair and Vice Chairs. The Chair may also request of the DFO to establish (or reorganize) a subcommittee. The creation and operation of the subcommittees must be approved by the DFO on behalf of FEMA.

Subcommittee Members: TMAC subcommittees may consist of TMAC members and non-TMAC members as limited below. TMAC members will be named to serve on a specific subcommittee and may contribute to others as requested. It is mandatory that each TMAC member participate on at least one subcommittee and be a full and active participant in subcommittee deliberations.

Subcommittees will not function independently of the TMAC or provide advice or recommendations directly to FEMA. Subcommittees (standing and ad-hoc) must present all advice, recommendations, and reports to the full TMAC during a public meeting or teleconference for discussion, deliberation, and final approval. Each Subcommittee must be comprised of a majority of TMAC members.

In general, the requirements of FACA do not apply to subcommittees of advisory committees that report a parent advisory committee and not directly to a Federal officer or agency. However, minutes must be maintained for the public record and the DFO and/or ADFO must participate in all subcommittee proceedings.

Section 2. Membership.

Subcommittee membership should be balanced in relation to the subcommittee's mission and focus areas. The DFO and the Chair, with input from Council members, identify and determine the membership for the subcommittee, including a chair (and vice chair if deemed necessary). As noted above, each Subcommittee must be comprised of a majority of TMAC members.

Subcommittee chairs may request the DFO to invite non-TMAC individuals to serve on the subcommittee, as necessary. Only TMAC members may serve as the chair or vice chair of a subcommittee (standing or ad-hoc). The subcommittee

chair can also advise the DFO that briefings from external subject matter experts are needed to provide pertinent and vital information not available among the current TMAC membership or from Federal staff. All such requests shall be made to the DFO who will facilitate the process to obtain subject matter expertise.

Section 3 Subcommittee Quorum

A Subcommittee quorum consists of: (1) the presence (either in person or by teleconference) of fifty percent plus one of TMAC members currently appointed to the Subcommittee; and (2) TMAC members make up more than half of the Subcommittee members present. In the event a Subcommittee quorum is not present, the Subcommittee may conduct business that does not require a vote or decision among members. Votes will be deferred until such time as a quorum is present.

Section 4 Subcommittee Voting Procedures

When a decision or recommendation of the Subcommittee is required, and a Subcommittee Quorum as defined above is present, the Subcommittee Chair will request a motion for a vote. A motion is considered to have been adopted if agreed to by a simple majority of the TMAC Subcommittee members present. Members vote on draft reports and recommendations that will be presented to the full TMAC. Only members present at the meeting—either in person or by teleconference—may vote on an item under consideration. No proxy votes or votes by email will be allowed.

Section 5. Focus Areas

Focus Areas are identified areas of consideration for the Council to review, either via subcommittee or by the TMAC through discussion as an entire body. The DFO will determine focus areas in consultation with the TMAC Chair. The DFO will then work with the Chair and Vice Chair to identify whether the focus area should be assigned to a standing subcommittee, an ad hoc subcommittee; or submitted to the TMAC for discussion and review.

Section 6. Workload and meetings.

Subcommittees may have more than one focus area to address. Subcommittee chairs will recommend the appropriate number of conference calls necessary to address focus areas, working in coordination with the DFO.

The subcommittee chair determines what materials are needed to prepare a response and develop a report to the TMAC. The DFO will supply the requested materials to the TMAC subcommittee upon request and resource availability.

ARTICLE IX RECOMMENDATIONS AND REPORTING

P.L. 112-141 directs TMAC to submit an annual report to the Administrator that contains a description of the activities of the Council; an evaluation of the status and performance of flood insurance rate maps and mapping activities to revise and update flood insurance rate maps; and a summary of recommendations made by the Council to the Administrator.

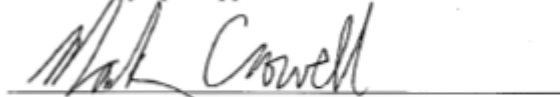
Once the TMAC achieves consensus on a report and recommendations, the TMAC Chair is responsible for providing a final version of the report to the FEMA Administrator. The final report and any accompanying memoranda will be posted on the TMAC website.

ARTICLE X RECORDKEEPING

The DFO maintains all records of the advisory Council in accordance with FACA and FEMA policies and procedures. All documents, reports, or other materials presented to, or prepared by or for the Council, constitute official government records and are available to the public upon request.

ARTICLE XI BYLAWS APPROVAL AND AMENDMENTS

The DFO may amend these bylaws at any time, and the amendments shall become effective immediately upon approval.



Mark Crowell
Designated Federal Officer

Date approved: 4/29/15

10.1.1.1.1.3 2014–2015 TMAC Meetings

Table C-1: 2014–2015 TMAC Meetings

Meeting Date	Location	Business Purpose
September 10, 2014	Virtual (closed to the public)	The TMAC conducted an administrative meeting to kick off future efforts by informing the TMAC members of requirements under authorizing legislation, member roles and responsibilities, legal and ethical statutes governing member activities, and next steps for the first in-person meeting.
September 30-October 1, 2014	USGS, Reston, Virginia	The TMAC voted, elected, and announced their Chair, Mr. John Dorman. TMAC members also discussed legislative requirements and received subject matter expert (SME) briefings that helped establish the TMAC's baseline understanding of the current status of the mapping program.
December 4-5, 2014	FEMA, Arlington, Virginia	The TMAC deliberated and voted upon its vision, mission and guiding principles and received SME briefings such as overall flood management process and components, data acquisition, maintenance, and dissemination, and future conditions risk to insurance rating.
March 10-11, 2015	USGS, Reston, Virginia	The TMAC deliberated and voted upon topics to be included in the 2015 Annual Report and the Future Conditions Report. TMAC members also received SME briefings such as how FEMA uses flood risk to calculate insurance ratings, floodplain management and the Flood Insurance Advocate, and State and local cooperating technical partner methods.
May 12-13, 2015	USGS, Reston, Virginia	The TMAC deliberated and voted to adopt outlines/table of contents for the 2015 Annual Report and the Future Conditions Report.
June 23-24, 2015	NOAA, Silver Spring, Maryland	The TMAC deliberated and voted upon the annotated outlines for the 2015 Annual Report and the Future Conditions Report. TMAC members also received SME briefings such as progress on the FEMA Flood Insurance Reform Flood Mapping Integrated Project Team and a tribal perspective.
August 4-5, 2015	USGS, Reston, Virginia	The TMAC deliberated on draft recommendations and narratives for potential infusion in the 2015 Annual Report and the Future Conditions Report.
September 9, 2015	Virtual	The TMAC reviewed, commented, and deliberated on draft recommendations and narratives for incorporation into the 2015 Annual Report and the Future Conditions Report.
September 29, 2015	Virtual	The TMAC reviewed, commented, and deliberated draft recommendations and narratives for incorporation into the 2015 Annual Report and the Future Conditions Report.

Meeting Date	Location	Business Purpose
October 20-21, 2015	USGS, Reston, Virginia	The TMAC reviewed, commented, and deliberated draft recommendations and narratives for incorporation into the 2015 Annual Report and the Future Conditions Report.

10.1.1.1.1.4 Future Conditions Subcommittee Meetings

Table D-1: Future Conditions Subcommittee Meetings

Meeting Date	Business Purpose
January 20, 2015	To discuss the legislative background, schedules, and requirements of the future conditions report
February 13, 2015	To determine the SME briefings required and schedule
February 27, 2015	To receive SME briefings on the United States Army Corps of Engineers' (USACE) Perspective, guidance, and policies on SLR (sea level rise) and how they inform USACE's approaches and activities; proof on concept studies of SLR and floodplain mapping, and; the goals of the FEMA West Coast SLR pilot study.
March 10-11, 2015	To review the table of contents and assignments
March 20, 2015	To receive SME briefings on the effects of climate change on riverine hydrology
March 26, 2015	To review the table of contents and assignments
April 3, 2015	To receive SME briefings on the uncertainties and risks of regional sea-level change
April 6, 2015	To discuss draft report outline
April 23, 2015	To review feedback on the TOC
May 28, 2015	To provide an update on progress and recent changes
August 19, 2015	To discuss the subcommittee's draft recommendations
August 24, 2015	To discuss the subcommittee's draft recommendations
September 28, 2015	To discuss the draft report

10.1.1.1.1.5 Subject Matter Expert Presentations

Table E-1: Subject-Matter Expert Presentations

Date	Presenter	Presented to	Title
September 30, 2014	Mr. David Bascom Program Specialist, Risk Analysis Division, FEMA	TMAC	TMAC Priorities, Duties, and Reports
September 30, 2014	Mr. Joshua Smith Program Specialist, Business Analysis Branch, FEMA Ms. Kelly Bronowicz Program Specialist, Data and Dissemination Management Branch, FEMA Mr. Luis Rodriguez, P.E. Branch Chief, Engineering Management Branch, Federal Insurance and Mitigation Administration, FEMA	TMAC	Performance Metrics and Milestones Required to Effectively and Efficiently Map Flood Risk Areas
September 30, 2014	Mr. Michael Godesky Physical Scientist, FEMA	TMAC	FIRM Accuracy, Quality, Ease of Use, Distribution, and Dissemination
September 30, 2014	Mr. Paul Rooney Mapping Technology Specialist, FEMA	TMAC	Data Accuracy, Data Quality, Data Currency, and Data Eligibility
October 1, 2014	Mr. Mark Crowell Physical Scientist, FEMA Mr. Andy Neal Actuary, Risk Insurance Division, FEMA Ms. Rachel Sears Senior Policy Advisor, FEMA	TMAC	Future Conditions Risk Assessment and Modeling

Date	Presenter	Presented to	Title
October 1, 2014	Mr. Rick Sacbibit, P.E. Program Specialist, FEMA	TMAC	Maintaining, on an Ongoing Basis, Flood Insurance Rate Maps and Flood Risk Identification
October 1, 2014	Ms. Laura Algeo, P.E., CFM Senior Civil Engineer, FEMA Region IV	TMAC	Delegating Mapping Activities to State and Local Mapping Partners
December 4, 2014	Mr. Andy Read, CFM, EIT Program Specialist, FEMA	TMAC	Risk MAP: Flood Map Production
December 4, 2014	Ms. Vicki Lukas Chief, Topographic Data Services, USGS	TMAC	Data Acquisitions; Maintenance and Dissemination
December 4, 2014	Mr. Amar Nayegandhi, CP, CMS (RS), GISP Director of Remote Sensing, Dewberry	TMAC	Data Acquisitions; Maintenance and Dissemination
December 4, 2014	Mr. Jerad Bales Chief Scientist for Water, USGS	TMAC	Information for Understanding Current and Future Streamflow Conditions
December 4, 2014	Mr. Douglas Marcy Coastal Hazards Specialist, National Oceanic and Atmospheric Administration Mr. Steve Gill Chief Scientist, Center for Operational Products and Services, NOAA Mr. Adam Parris Division Chief, Climate Assessment and Services Division, NOAA	TMAC	NOAA Sea Level Change Measurement and Future Sea Level Rise Scenarios

Date	Presenter	Presented to	Title
December 4, 2014	Mr. Paul Kovacs Executive Director, Institute for Catastrophic Loss Reduction, Western University	TMAC	Risk to Insurance Rating
December 4, 2014	Mr. Richard Fogleman Technical Director, Geographic Information Systems, AECOM	TMAC	Database, Mapping, and Digital Display
December 4, 2014	Mr. Eric Berman, GISP Hazus Program Manager, FEMA	TMAC	Risk Assessment and Mapping
December 4, 2014	Mr. David Key, PE, CFM Director, Water Resources, GIS and Applications ESP Associates, P.A.	TMAC	Risk Assessment Processes
December 4, 2014	Ms. Tucker Mahoney Coastal Program Specialist, FEMA	TMAC	Key Decision Points
December 5, 2014	Dr. Ty Wamsley Division Chief, Flood & Storm Protection Division, US Army Engineer Research & Development Center, Coastal & Hydraulics Laboratory, ERDC	TMAC	USACE R&D: Development of Tools for the Future of Flood Inundation Prediction
December 5, 2014	Ms. Erin Cobb, CFM Program Specialist, FEMA	TMAC	Current and Future Possibilities: Delegation
December 5, 2014	Mr. Chad Berginnis Executive Director, Association of State Floodplain Managers (ASFPM)	TMAC	Current and Future Possibilities: Delegation

Date	Presenter	Presented to	Title
December 5, 2014	Ms. Sally Ann McConkey, P.E., CFM, D. WRE Illinois State Water Survey Prairie Research Institute, University of Illinois	TMAC	Examples of Next Generation Flood Risk Management
December 5, 2014	Ms. Carrie Grassi Deputy Director for Planning, New York City Mayor's Office of Recovery and Resiliency	TMAC	New York City Resiliency Briefing
December 5, 2014	Mr. Ken Ashe, P.E., PMP, CFM Assistant Director, North Carolina Floodplain Mapping Program	TMAC	Examples of Next Generation Flood Risk Management
February 27, 2015	Mr. Ed Curtis, P.E., CFM FEMA Region IX Mr. Darryl Hatheway, CFM Baker AECOM	Future Conditions Subcommittee	FEMA West Coast Sea Level Rise Pilot Study
February 27, 2015	Ms. Heidi Moritz, P.E. Coastal Engineer, Climate Preparedness and Resilience Community of Practice, USACE	Future Conditions Subcommittee	Tiered Approach to the Assessment of Sea Level Change at USACE Projects and the Development of Adaptation Measures for the Future
February 27, 2015	Dr. Brian K. Batten, CFM Senior Coastal Scientist/ Project Manager, Coastal and Resiliency Services, Dewberry	Future Conditions Subcommittee	Case Studies of SLR and Floodplain Mapping
March 3, 2015	Mr. Jonathan Westcott, P.E. Coastal Hazards Specialist, Federal Emergency Management Agency	Flood Hazard Subcommittee Operations, Coordination and Leveraging Subcommittee	NFIP Coastal Analyses and Mapping Overview for the TMAC Subcommittee Meeting

Date	Presenter	Presented to	Title
March 10, 2015	Mr. Andy Neal Actuary, Risk Insurance Division, FEMA	TMAC	Flood Risk to Insurance Rating
March 10, 2015	Mr. David Stearrett Interim Flood Insurance Advocate, FEMA	TMAC	Floodplain Management and the Federal Flood Risk Management Standard
March 10, 2015	Mr. Michael Talbott, P.E., D.WRE Executive Director, Harris County Flood Control District	TMAC	Cooperating Technical Partners (CTP) Presentation
March 10, 2015	Ms. Leslie Durham, P.E. Floodplain Management Branch Chief, Office of Water Resources, Alabama Department of Economic and Community Affairs	TMAC	National Flood Mapping Program: A State CTP Perspective
March 10, 2015	Mr. David Mallory, P.E., CFM Program Manager, Floodplain Management Program, Urban Drainage and Flood Control District, Denver, CO	TMAC	Cooperating Technical Partnership Presentation, UDFCD
March 20, 2015	Dr. Timothy Cohn Hydrologist, USGS Office of Surface Water	Future Conditions Subcommittee	Effects of Climate Change on Riverine Hydrology
March 20, 2015	Dr. Martyn Clark Scientist III, Hydrometeorological Applications Program at the National Center for Atmospheric Research (NCAR)	Future Conditions Subcommittee	Effects of Climate Change on Riverine Hydrology

Date	Presenter	Presented to	Title
March 26, 2015	Dr. Philip Orton Research Assistant Professor, Stevens Institute of Technology	Future Conditions Subcommittee	Hydrodynamic Modeling of Future Coastal Flood Hazards for New York City
April 3, 2015	Dr. Robert Kopp Earth System Science & Policy Research Group, Rutgers University	Future Conditions Subcommittee	Uncertainties and risks of regional sea-level change
April 8, 2015	Mr. Stephen R. Kalaf, CFM Special Mapping and Quality Services Department Manager, Dewberry LLC	Annual Report Subcommittee	Quality Management in Risk MAP
April 27, 2015	Mr. Michael Bremer, CFM NFDA Director, Technical Mapping Committee Chair, Director of Operations CoreLogic Flood Services	Annual Report Subcommittee	Use of FEMA Flood Map Data to Make Flood Determinations
April 27, 2015	Mr. Jason Stoker Physical Scientist and Elevation Products and Services Manager, USGS National Geospatial Program	Annual Report Subcommittee	LIDAR Technology
May 12, 2015	Mr. Paul Rooney Program Specialist, FEMA	TMAC	Database-Driven/ All Digital Display – Status/ Transition
May 12, 2015	Mr. Michael Bremer, CFM NFDA Director, Technical Mapping Committee Chair, Director of Operations CoreLogic Flood Services	TMAC	Lending and Insurance Perspective

Date	Presenter	Presented to	Title
May 13, 2015	Mr. Michael DePue, P.E., CFM Principal Technical Professional, STARR II, Atkins Global	TMAC	Map Generation: Workflow Process
June 23, 2015	Ms. March Runner Tribal Administrator, Louden Tribal Council	TMAC	Tribal Perspective
June 23, 2015	Mr. David Bascom Program Specialist, FEMA Mr. Paul Rooney Program Specialist, FEMA	TMAC	FEMA Flood Insurance Reform Flood Mapping Program Integrated Project Team Progress

APPENDIX L. FEMA Report to Congress on the Technical Mapping Advisory Council's Recommendations from 2015 (June 2017)



FEMA Report to Congress on the Technical Mapping Advisory Council's Recommendations from 2015

June 9, 2017



Homeland
Security

FEMA

Message from the Acting Administrator

I am pleased to present the “Report to Congress on the Technical Mapping Advisory Council’s Recommendations from 2015.”

The Federal Emergency Management Agency (FEMA) prepared this document pursuant to section 215 of the Biggert-Waters Flood Insurance Reform Act of 2012 codified at 42 U.S.C § 4101a.

Pursuant to congressional requirements, this report is being provided to the following Members of Congress:

- The Honorable Michael Crapo, Chairman, Committee on Banking, Housing, and Urban Affairs, United States Senate
- The Honorable Sherrod Brown, Ranking Member, Committee on Banking, Housing, and Urban Affairs, United States Senate
- The Honorable Jeb Hensarling, Chairman, Committee on Financial Services, United States House of Representatives
- The Honorable Maxine Waters, Ranking Member, Committee on Financial Services, United States House of Representatives

Inquiries relating to this report may be directed to the FEMA Congressional Affairs Division at (202) 646-4500.

Sincerely



Robert J. Fenton
Acting Administrator



Executive Summary

On July 6, 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act (BW-12), authorizing the National Flood Insurance Program (NFIP) for five years and enacting substantial reforms and defining new legislative requirements for a national flood mapping program. Additional legislation, passed on March 21, 2014, known as the Homeowner Flood Insurance Affordability Act (HFIAA), repealed and modified certain provisions of BW-12 and made additional changes to the NFIP. Collectively, these Acts authorize a national flood mapping program with several major expansions in scope and enhancements to community engagement and risk communications. The mapping program is implemented in coordination with the Technical Mapping Advisory Council (TMAC), a Federal advisory committee comprised of representatives of federal, state, local, and private industry as well as tribal and other subject matter experts. The TMAC was established by BW-12, and in accordance with the provisions of the Federal Advisory Committee Act (FACA), 5 U.S.C. App. (92).

Congress directed the TMAC to develop recommendations for the FEMA Administrator regarding FEMA's flood mapping program, to ensure that Flood Insurance Rate Maps (FIRMs) reflect the best available science and are based on the best available methodologies for considering the impact of future development on flood risk.

BW-12 requires the FEMA Administrator, on an annual basis, to report to Congress and the Office of Management and Budget (OMB) on (1) the recommendations made by the TMAC, (2) actions taken by FEMA to address such recommendations to improve flood insurance rate maps and flood risk data; and (3) any recommendations made by the TMAC that have been deferred or not acted upon, together with an explanatory statement. See 42 U.S.C. 4101a (l). This report is intended to address this requirement.

The TMAC was responsible for delivering two reports to the FEMA Administrator in 2015: a TMAC 2015 Annual Report and a TMAC 2015 Future Conditions Risk Assessment and Modeling Report. The TMAC issued their first set of recommendations via Interim Reports to FEMA in November 2015. In January 2016, TMAC delivered full reports to FEMA, which provided greater context for the recommendations. The TMAC's reports are available to the public on FEMA's website: www.fema.gov/tmac.

Upon receipt of the original recommendations, representatives from offices spanning FEMA's Federal Insurance and Mitigation Administration (FIMA) convened for a full-day work session to begin evaluation of the recommendations and identify themes. Over the next several months, the organization engaged staff from FEMA headquarters and regions, flood mapping program providers, and industry partners for feedback and collaboration on the TMAC's recommendations.

As the initial review was underway, FIMA's Risk Management Directorate (RMD) established a transparent and repeatable framework for evaluating and responding to TMAC's recommendations on an annual basis. The framework aligns TMAC recommendations to the RMD's organizational

structure, and includes a process for accountability, detailed evaluation, reporting and progress documentation, as well as prioritization and sequencing where applicable. The RMD designed the framework with a focus on long-range planning, integration, and collaboration, as many of the TMAC's recommendations are far-reaching and will require internal coordination across Divisions and programs, as well as external coordination with other federal agencies (OFA), state and local governments and Cooperating Technical Partners (CTPs)¹.

Types of Recommendations

The RMD categorized the TMAC's 2015 Annual Report (AR) and Future Conditions (FC) recommendations as follows:

1. Standard Operations – These are recommendations that RMD identified as addressable through current operations or established initiatives. Generally, once initiated, these recommendations are addressable in the near term.
2. Transformative, Science Available – These recommendations cannot be addressed through existing processes or efforts, though the technology and science to implement the recommendation exists. FEMA will prioritize resources and continue to invest in the data and technology needed to implement these recommendations, based upon fund availability. Generally, once initiated, these recommendations are addressable in the medium term.
3. Transformative, Certain Critical Aspects of Science Not Yet Available – These recommendations will require the generation of new science or data to implement. FEMA will prioritize resources and begin strategically investing in the resources needed to implement these recommendations based upon fund availability. Generally, given the resource-intensive nature of these recommendations, FEMA expects they will be implemented in the long term.

2015 TMAC Recommendations and FEMA's Strategy for Implementation

FEMA fundamentally agrees with all of the 2015 TMAC recommendations. The recommendations vary significantly in estimated level of effort and required resources for implementation. Some recommendations offer suggested improvements and refinements to our current operations, while others represent transformational changes for the program. FEMA's strategy for implementation is dependent on budget, priorities and sequencing contingencies, and in some cases, further clarification from the TMAC. FEMA summarizes the implementation approach as follows:

1. Leverage established program initiatives or FEMA's guidance and standards (G&S) maintenance update, to achieve a consistent, routine approach to maintaining and enhancing mapping policies, for recommendations that suggest refinements to current operations or products.

¹ A list of current CTPs may be found at this website, under 'Information by State': <https://www.fema.gov/cooperating-technical-partners-program/cooperating-technical-partners-program-0>

2. Engage internal and external stakeholders and partners for recommendations that are transformative, as FEMA continues to plan and determine the appropriate sequence and alignment of program changes in support of transformation.
3. Continue to make strategic investments (e.g., in future conditions pilots, technical research, enhanced flood models) and leverage partnerships (such as for high resolution topography, in coordination with the United States Geological Survey (USGS) 3D Elevation Program (USGS 3DEP)), while engaging in strategic, long-term planning to lay the foundation for transformative new mapping policies, products and regulations.

Current Progress and Path Ahead

As of December 2016, FEMA has implemented four of the 29 TMAC' 2015 Recommendations and initiated progress on an additional 18. See the table titled "TMAC Recommendations Reference Guide" in the appendix for additional implementation details.

Addressing the TMAC recommendations has been and will continue to be one of the top priorities for the national flood mapping program. In Fiscal Year 2016 (FY16), FEMA aligned investments with the insights gained from TMAC's 2015 reports and ongoing work. With the additional resources provided by Congress in FY16, FEMA acquired an additional 67,000 stream miles of new, validated, updated engineering; invested in an additional 70,000 square miles of high-resolution topographic coverage; completed large-scale automated engineering for 45,000 stream miles; modernized over 40 counties to a geospatial format; and assessed more than 250,000 expiring or unknown stream miles. These investments continue to lay the foundation for evolving and transforming the mapping program, in accordance with the TMAC's recommendations.

FEMA maintains G&S to support the mapping program. Standards are required elements of a project that support the vision, goals and objectives of the mapping program. Guidance is composed of the recommended methodologies to meet the standards. FEMA is using the semi-annual G&S maintenance update to implement TMAC recommendations whenever possible. For example, FEMA addressed four of the TMAC's 2015 Annual Report recommendations in the November 2016 G&S cycle. The recommendations implemented were:

1. Annual Report recommendation 4 (AR4), which calls for ensuring geospatial data complies with national standards,
2. AR5, which calls for ensuring accuracy of topographic data,
3. AR6, which recommends FEMA periodically review and consider use of publically available models, and
4. AR12, which calls for FEMA to consider cost impacts during G&S updates.

An additional set of recommendations are scheduled for implementation in the November 2017 G&S cycle.

Over the last few years, FEMA has worked diligently to enhance the CTP program within the flood mapping program. FEMA is leveraging newly established coordination mechanisms, such as the CTP Collaboration Center and the CTP Community of Practice (CoP), to address the TMAC's CTP-related recommendations. CTP program enhancements address many of the TMAC's

recommendations. For example, AR19, which calls for FEMA to develop strategies to incentivize CTP participation, will continue to enhance and leverage the existing CTPs and Community Rating System (CRS) programs to promote and increase participation. To implement AR20, which recommends FEMA establish a suite of performance measures for CTPs, FEMA has established a CTP Working Group that analyzed the program's structure and function, resulting in program measures, costs and benefits, and a clearer path forward.

To support a meaningful transformation, FEMA will begin implementation in Fiscal Year 2017 (FY17) of AR2, which calls for a national five-year operations plan. To support flexibility and variance at the regional level while providing consistency at the national level, FEMA regions are developing five-year plans that will inform the development of the national five-year plan. The national five-year operations plan will become a rolling plan that will help FEMA bridge operations from the current status to the desired endpoint as we transform the program. The development of a national five year-operations plan supports and is informed by the implementation of AR3, which calls for the development of program goals and metrics that will help drive investments and behaviors needed to transform the delivery of the flood mapping program. The TMAC recommendations complement and inform emerging efforts established by FEMA, such as an ongoing initiative to redesign risk rating for the NFIP. FEMA considers a new approach to insurance rating and underwriting crucial for the program and has already started identifying the technical considerations for implementation. FEMA's ongoing initiative to analyze technologies, data sources and trends for flood risk quantification will continue in conjunction with the assessment and planning for AR10, which calls for FEMA to transition from the 1 percent annual chance flood as the basis for insurance rating to a structure specific flood frequency determination. The long-term goal is the development of a redesigned risk rating system for the NFIP.

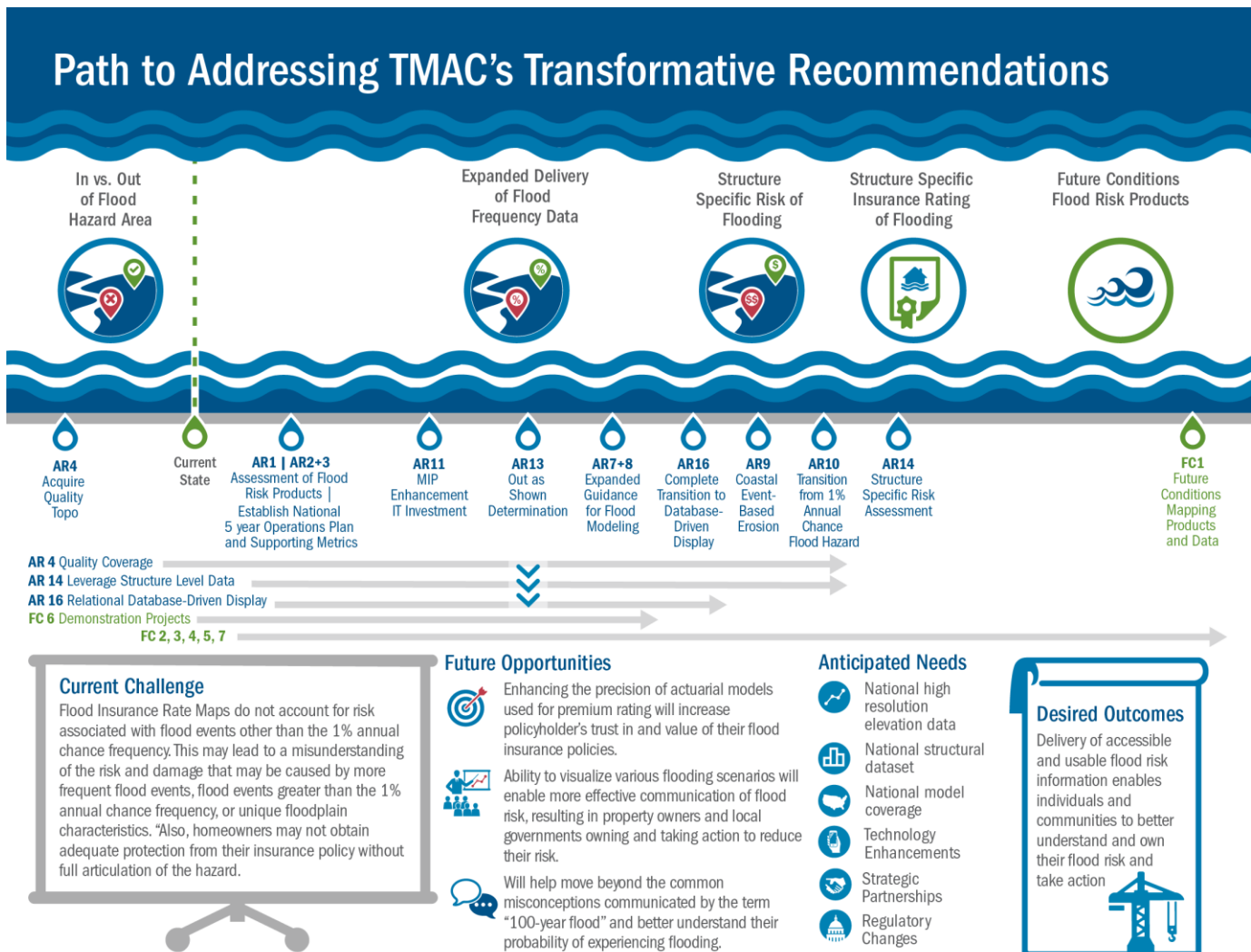
FEMA will continue to invest in more robust modeling that can provide flood risk information for various scenarios in addition to the base flood elevation, one key component in moving toward a redesigned risk rating for the NFIP. FEMA is also making strategic information technology (IT) investments and changes to improve access to and ease of use of the mapping products, as recommended by AR 11 (Update MIP for User-Friendliness) and AR16 (Transition to Digital Display). These investments also ensure that enhancements of FEMA mapping products are interoperable with flood insurance rating mechanisms, mitigation planning initiatives and floodplain management, as called for in AR18 (USGS Streamflow Data), AR5 (Vertical/Horizontal Data Accuracy) and required by AR14 (Structure-Specific Risk Assessments).

FEMA is also laying the foundation for a holistic approach to addressing future conditions mapping and the FC recommendations provided by the TMAC. The Agency is taking care to identify and complement the related efforts of other agencies or stakeholder groups, to avoid redundant or conflicting information. FEMA plans to leverage the completion of pilot studies, per TMAC's FC Recommendation 6, as a way to address many of the issues raised in many of the recommendations and sub-recommendations set forth in the Future Conditions report in addition to Future Conditions initiatives within the Risk Management Directorate. Addressing the research, development, program planning and implementation questions through a series of demonstration projects will lead to an efficient and effective strategy to provide future conditions flood risk products, tools and

information. FEMA recognizes the importance of understanding stakeholder needs, and will leverage research to inform the development of future conditions flood risk products, tools, and information. The TMAC was clear in its FC recommendations to FEMA that future conditions should not appear on the regulatory Flood Insurance Rate Maps (FIRM) at this time. FEMA has been conducting sea level rise pilot studies and is working to identify the specific remaining research gaps to inform the design of additional future conditions demonstration and pilot projects that will address those gaps and inform how FEMA establishes and resources future conditions mapping initiatives.

Program Transformation

The graphic below depicts the transformation of the flood mapping program including the anticipated sequencing of key TMAC recommendations towards the transition from the 1 percent annual chance flood hazard to structure specific flood risk as the basis for insurance ratings.





FEMA Report to Congress on the Technical Mapping Advisory Council's Recommendations from 2015

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I. Legislative Requirement

This document responds to the legislative requirements set forth in the Biggert-Waters Flood Insurance Reform Act of 2012, which states:

The Administrator, on an annual basis, shall report to the Committee on Banking, Housing, and Urban Affairs of the Senate, the Committee on Financial Services of the House of Representatives, and the Office of Management and Budget on the—(1) recommendations made by the Council; (2) actions taken by the Federal Emergency Management Agency to address such recommendations to improve flood insurance rate maps and flood risk data; and (3) any recommendations made by the Council that have been deferred or not acted upon, together with an explanatory statement.

II. Recommendations from the 2015 Annual Report

Annual Report Recommendation 1 (AR1):

FEMA should establish and implement a process to assess the present and anticipated flood hazard and flood risk products to meet the needs of the various users. As part of this process, FEMA should routinely:

- a) Conduct a systematic evaluation of current regulatory and non-regulatory products (data, maps, reports, etc.) to determine if these products are valued by users, eliminating products which do not cost-effectively meet needs;
- b) Consider user requirements prior to any updates or changes to data format, applications, standards, products, or practices are implemented;
- c) Proactively seek to provide authoritative, easy to access and use, timely, and informative products and tools; and,
- d) Consider future flood hazards and flood risk.

FEMA Response: FEMA concurs with this recommendation. Through established initiatives, FEMA is currently addressing certain aspects of AR1. A FEMA Integrated Project Team (IPT) is currently conducting a research effort to improve understanding of how internal and external stakeholders use current FEMA flood risk products. The research will inform potential improvements to enhance access and usability of the products. FEMA's Risk Management Directorate is leading an additional research to evaluate effectiveness of the flood risk products. FEMA and flood mapping partners will leverage the findings of these two research efforts to inform a broad-scale initiative to increase use of the flood risk products to plan and implement mitigation action.

Enhancements to products and outreach will be coordinated in conjunction with FEMA's Guidance and Standards Steering Committee (GSSC), which manages the Risk Management Directorate's (RMD) semi-annual Guidance and Standards (G&S) maintenance update, to ensure product changes are accounted for and consistent across the program, in consideration of user requirements. Implementation will require coordination and integration with the Risk Assessment Program and ongoing regional mapping efforts focused on providing authoritative and informative products and tools.

Responses to the Future Conditions Report recommendations capture the consideration of future flood hazards and flood risks.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years for full implementation excluding consideration for future flood hazards and flood risks. This will coincide with implementation of Future Conditions Recommendation 1 (FC1), which is projected to be a long-term effort.

Annual Report Recommendation 2 (AR2):

FEMA should develop a national five-year flood hazard and risk assessment plan and prioritization process that aligns with program goals and metrics (see Recommendation 3). This should incorporate a rolling five-year plan to include the establishment and maintenance of new and existing studies and assessments in addition to a long-term plan to address the unmapped areas. Mapping and assessment priorities should be updated annually with input from stakeholders (e.g., Multi-Year Hazard Identification Plan). The plan should be published and available to stakeholders.

FEMA Response: FEMA concurs with this recommendation. To support a meaningful transformation of the flood mapping program, in Fiscal Year 2017 (FY17) we will begin development of a national five-year operations plan. The national five-year operations plan will be informed by regional five-year plans to support appropriate flexibility and variance at the regional level while providing consistency at the national level. This five year plan will become a rolling plan that will help us bridge operations from our current status to where we want to go as we transform the program. The development of a five-year operations plan will be supported by the implementation of AR3, which calls for the development of program goals and metrics that will help drive investments and behaviors needed to transform the delivery of our flood mapping program.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years to develop an ongoing implementation plan.

Annual Report Recommendation 3 (AR3):

FEMA should develop National Flood Hazard and Risk Assessment Program goals that include well-defined and easily quantifiable performance metrics. Specifically, the program goals should include metrics for the following:

- a) Maintaining an inventory of valid (verified), expiring, unverified and unknown flood hazard miles;
- b) Addressing the non-modernized areas of the Nation and unstudied flood hazard miles;
- c) Conducting flood risk analysis and assessments on the built environment; and,
- d) Counting population having defined floodplains using a stream level performance indicator for a better representation of study coverage.

FEMA Response: FEMA concurs with this recommendation. During FY17, we will begin development of a national five-year operations plan, consistent with the Technical Mapping Advisory Council's (TMAC) AR2. As part of the efforts to develop national and regional five-year operations plans, we will review existing program goals and metrics and revise and develop appropriate goals and metrics to help drive investments and behaviors needed to transform the delivery of the flood mapping program.

FEMA is already addressing the first required measure, “a) Maintaining an inventory of valid (verified), expiring, unverified and unknown flood hazard miles” as FEMA has New, Validated and Updated Engineering (NVUE) data for riverine studies and will report NVUE for coastal studies in the future. FEMA recognizes that although it has NVUE, it does not have a sufficient mechanism for tracking unstudied miles, or miles existing only on paper maps. FEMA will establish a measure that is easy to understand and track for the unmodernized and unstudied miles. FEMA will begin the effort in FY17 that will inform performance measures in FY18.

With respect to the final sub-recommendation, FEMA agrees that developing a metric related to the population that has a defined floodplain would be useful. To fully address this recommendation, research and coordination will be needed to develop a useful measure.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years for full implementation.

Annual Report Recommendation 4 (AR4):

FEMA should work with Federal, State, local, and tribal partners to ensure topographic, geodetic, water-level, and bathymetry data for the flood mapping program are collected and maintained to federal standards. Future FEMA topographic and bathymetric Light Detection and Ranging (LiDAR) acquisition should be consistent with USGS 3DEP and Interagency Working Group on Ocean and Coastal Mapping standards, and all geospatial data for the flood mapping program should be referenced to current national datums and the National Spatial Reference System (NSRS). Water level gage datums for active gages should be referenced to current national datums and the NSRS, and to the extent practical, datums for inactive gages should be converted to meet these standards.

FEMA Response: FEMA concurs with this recommendation. FEMA has standards in place requiring all elevation data to comply with interagency standards, and requiring the use of current national datums. FEMA will continue to work through a variety of interagency working groups to support this recommendation.

Recommendation Type: Standard Operations

Anticipated Timing: Implemented

Annual Report Recommendation 5 (AR5):

FEMA should document the horizontal and vertical accuracy of topographic data input to flood study models and the horizontal and vertical accuracy of topographic data used to delineate the boundaries of the flood themes. These data should be readily available to users, and clearly reported with products.

FEMA Response: FEMA concurs with this recommendation. FEMA has developed changes to the documentation requirements for flood risk projects to include specific reporting requirements for the horizontal and vertical accuracy of elevation data used. FEMA implemented these

requirements in the November 2016 G&S maintenance update. Because of the long timelines for flood risk projects, the results will begin to appear on completed flood mapping projects over the next few years.

Recommendation Type: Standard Operations

Anticipated Timing: Implemented

Annual Report Recommendation 6 (AR6):

FEMA should periodically review and consider use of new publicly available statistical models, such as the proposed Bulletin 17C, for flood-frequency determinations.

FEMA Response: FEMA concurs with this recommendation. FEMA leveraged the existing Engineering & Mapping Community of Practice (CoP), a group of FEMA staff and mapping partners that supports ongoing professional learning and sharing of information, to review and consider use of new statistical models. Per the established process, the GSSC reviewed and supported changes or updates to guidance and resulting from acceptance and use of new statistical models in the November 2016 G&S maintenance update. This will be an ongoing activity, and FEMA intends to track, identify and course correct if appropriate, for any potential impacts to ongoing studies and Coordinated Needs Management Strategy (CNMS) validation due to adoption of new modeling methods.

Recommendation Type: Standard Operations

Anticipated Timing: Implemented

Annual Report Recommendation 7 (AR7):

FEMA should develop guidelines, standards, and best practices for selection and use of riverine and coastal models appropriate for certain geographic, hydrologic, and hydraulic conditions.

Riverine:

- a) Provide guidance on when appropriate models would be 1-D vs 2-D, or steady state vs unsteady state;
- b) Support comparative analyses of the models and dissemination of appropriate parameter ranges; and,
- c) Develop quality assurance protocols.

Coastal:

- a) Provide guidance on when appropriate models would be 1-D vs 2-D;
- b) Support comparative analyses of the models and dissemination of appropriate parameter ranges; and,
- c) Develop quality assurance protocols.

FEMA Response: FEMA concurs that it is possible to provide best practices, and potentially guidance, for model selection and use for riverine and coastal flood risk studies. Model use in FEMA's flood hazard studies is governed by 44 Code of Federal Regulations (CFR) 65.6(a)(6) which, in summary, states that for a model to be used, it must have been reviewed and accepted by another governmental agency for flood modeling purposes; it must be well-documented; and it must be available to FEMA and all present and future parties.

FEMA has begun to leverage the existing CoPs (Coastal and Engineering & Mapping) and the subject matter expertise of key external stakeholders such as National Association of Flood and Stormwater Management Agencies (NAFSMA) and Association of State Floodplain Managers (ASFPM) to explore, identify and inventory best practices used by mapping partners, Other Federal Agencies (OFAs), states and local communities. FEMA has learned that overly prescriptive G&S on model selection leads to a loss of innovation and lower quality flood risk information. Additionally, such prescriptive guidance is difficult to maintain accurately as the state of the science evolves. Cognizant of these challenges, FEMA will endeavor to continue to review and highlight additional best practices with regards to model use and selection, while still encouraging study-specific decisions to be made regarding the most appropriate model.

For riverine studies, to accommodate advances in 2D modeling for steady and unsteady state, updates may be required to the Flood Insurance Rate Maps (FIRMs) database, the National Flood Hazard Layer (NFHL) and associated tools and the specifications of Flood Insurance Studies (FIS). As not all current G&S align directly with the outputs from 2D modeling, it is anticipated there would be a learning curve associated with these changes, and implementation could impact engineering and mapping processes. Combined with the recommended disclosure of which models are in use, it is expected that initial implementation of this recommendation could negatively affect study schedules. An outreach strategy to communicate changes, updates and timelines needs to be developed.

Per FEMA's established process, the GSSC will review and support all G&S updates. The November 2016 G&S maintenance cycle resulted in an update to the relevant hydraulics guidance documents. This includes updated information on model selection criteria for 1-D and 2-D model selection. Additional review of best practices and use of 2-D modeling is underway and additional updates to the guidance will occur in the coming year.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 8 (AR8):

FEMA should develop standards, guidelines, and best practices related to coastal 2-D storm surge modeling in order to expand the utility of the data and more efficiently perform coastal flood studies.

FEMA Response: FEMA concurs with the recommendation that guidelines and best practices for coastal 2-D storm surge modeling be developed for coastal flood studies to expand the utility

of the data and more efficiently perform the studies. In fact, FEMA has already begun to take steps to address this recommendation. Coastal Water Levels guidance, released in May 2016, focuses specifically on storm surge modeling, including the statistical treatment of tides in these models. FEMA has existing related guidance and best practices in place and will continue to improve these resources. FEMA is actively prioritizing its effort to address identified needs in coastal 2-D storm surge modeling and in improving study efficiency and data utility.

FEMA acknowledges that to expand the utility, more of the valuable coastal data needs to be readily available. A permanent solution to store, search and disseminate the inventory of coastal data will take several years to implement. Innovation will be necessary to develop a less complex solution. This will be coordinated through FEMA's plan to address Annual Report Recommendation 16 (AR16).

Recommendation Type: Transformative; Science Available

Anticipated Timing: 3 – 5 years

Annual Report Recommendation 9 (AR9):

FEMA should review and update existing coastal event-based erosion methods for open coasts, and develop erosion methods for other coastal geomorphic settings.

FEMA Response: FEMA agrees with this recommendation. We recognize that erosion in all coastal geomorphic settings is important and that FEMA's regulations and standards are in need of an update to reflect present-day knowledge on the subject. This recommendation will require a significant level of effort as coastal research and federal rulemaking may be required for full implementation.

In recent years, FEMA has partnered with the United States Army Corps of Engineers (USACE) to improve an event-based erosion model, CSHORE, for application on the Great Lakes. FEMA incorporated CSHORE into guidance and documentation is available through regional study reports. However, significant research investment to advance the state of the science, and its application on a national scale will be necessary to address this recommendation. FEMA will continue evaluating alternative methodologies and available data, which will require investment in research and testing as well as engagement across federal partners.

Implementation measures may include modifying 44 CFR Section 65.11.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 5+ years

Annual Report Recommendation 10 (AR10):

FEMA should transition from identifying the 1-percent-annual-chance floodplain and associated base flood elevation as the basis for insurance rating purposes to a structure-specific flood frequency determination and associated flood elevations.

FEMA Response: FEMA concurs with this recommendation and considers the transition to a new approach crucial for the program. This recommendation will require an entirely new approach to insurance rating and underwriting, including new regulatory hazard and risk products and potential impacts on floodplain management standards. There are many technical considerations for implementation requirements, including: (1) appropriate modeling for full probabilistic view of hazard (selected return periods or other solution); (2) whether current methodology is appropriate for biased or higher probability events; and (3) what consideration must be given to levees, dams, tsunamis, etc., for lower probability events that are not currently reflected in the model. Significant outreach to OFAs, academia and private sector resources will be required to develop and test alternative approaches in implementing this recommendation.

FEMA is currently assessing this recommendation in conjunction with an ongoing initiative to analyze technologies, data sources and trends for flood risk quantification toward a long-term goal of developing a redesigned risk rating system for the program. FEMA also kicked off an Integrated Project Team (IPT) in May 2016 to research how to approach implementation of this recommendation. In 2016, FEMA scoped the effort, defined components, and began acquiring data and define resource requirements for 2017 and 2018. In 2017, FEMA will develop and test alternatives through pilot studies, which will incur significant technical costs. In 2018, FEMA plans to select a flood risk rating approach and begin implementation. FEMA is looking at how this recommendation might also address Government Accountability Office (GAO) recommendations and align with the National Academy of Sciences recommendations regarding levees, rating and mapping.

Recommendation Type: Transformative; Science Available

Anticipated Timing: 5+ years

Annual Report Recommendation 11 (AR11):

FEMA should modify the current workflow production process and supporting management system, Mapping Information Platform, to reduce unnecessary delays created by redundant tasks and inflexibility of the system. The process and system are not currently designed to properly manage non-regulatory products or products that do not fit predefined footprints. FEMA should modify the system to enable flexibility in project scope and size, such as the choice of watershed size, not limiting projects to only the hydrologic unit code 8 (HUC8).

FEMA Response: FEMA concurs with this recommendation. FEMA previously recognized the need to update the Mapping Information Platform (MIP), and efforts are already underway. In June 2016, the flood mapping program's Customer and Data Services (CDS) team announced the kick-off of the new MIP studies redesign effort. The MIP is the primary database of all mapping information for the mapping program. Of the three main parts of the MIP: Revisions, Amendments and Studies, the Studies workflow is the part being revised at this time. FEMA acknowledges that the rigid structure of the existing MIP Studies workflow is too inflexible for the evolving needs of the mapping program, and the program needs a more flexible system.

The update will replace the current MIP Studies workflow and allow for the tracking of a wider range of study information. The transition from rigid workflow to a more fluid, iterative process will allow MIP tasks to be completed based on community needs. FEMA subject matter experts (SME) and the Information Technology Risk MAP Systems Team (FIRSTeam) are collaborating with CDS to identify and define solution requirements to ensure success in the long term. The goal is to release the update in 2017.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 12 (AR12):

FEMA, in its update of guidance and standards, should determine the cost impact when new requirements are introduced and provide guidance to consistently address the cost impact to all partners.

FEMA Response: FEMA concurs with this recommendation. Since FEMA formalized the standards for flood risk analysis and mapping as a FEMA policy in 2013, the program costs for implementing new requirements and the possible impacts of implementation of new requirements on ongoing work are formally considered as part of the decision making process. FEMA defines the implementation of new requirements to avoid cost or scope impacts on existing agreements. FEMA has enhanced the documentation of this analysis during the standards process, adding additional language to the policy to clarify the approach to implementation of new requirements on existing agreements and will include more detail on the implementation approach for new standards during the public review of future updates.

Recommendation Type: Standard Operations

Anticipated Timing: Implemented

Annual Report Recommendation 13 (AR13):

FEMA should develop guidelines and procedures to integrate a mass LiDAR-based Letter of Map Amendment (LOMA) process into the National Flood Hazard and Risk Assessment Program. As part of this process, FEMA should also evaluate the feasibility of using parcel and building footprint data to identify eligible “out as shown” structures as an optional deliverable during the flood mapping process.

FEMA Response: FEMA concurs with this recommendation and has taken steps to begin implementing this recommendation. The impacts of this recommendation are far reaching. The creation of new LOMA or study deliverables impacts MT-1 processes, regulatory map production, standard mapping operations, data collection and dissemination, communications and outreach and existing policies and procedures. Additionally, implementation of the recommendation will impact and increase IT, production and standard operations costs, but it is possible that MT-2 costs may be lowered. However, FEMA expects there would be long-term cost savings for MT-1s after an initial increase in costs. There is a potential for implementation

of this recommendation to slow down studies, but add efficiency to LOMA processing; improving credibility and supporting FIMA Customer Experience and Office of the Flood Insurance Advocate efforts. The implementation of this recommendation may have linkage to BW-12 notification requirements, and FEMA will explore this further.

To implement this recommendation, FEMA will establish an IPT and may conduct additional pilot studies to inform program and policy updates needed to support this recommendation. No statutory or regulatory changes are required, and some existing data can be leveraged in support, including: parcel, building footprint, automated engineering data and base flood elevation (BFE) layers. FEMA will need externally sourced parcel data, although complete high resolution topography coverage is not yet available, FEMA is currently collecting available data. FEMA will need to acquire and process data from and in coordination with state and local entities. In evaluating the feasibility of using parcel and building footprint data for identifying eligible “out as shown” structures, requirements for safeguarding personally identifiable information (PII) must be addressed.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 14 (AR14):

FEMA, and its mapping partners including the private sector, should transition to a flood risk assessment focus that is structure specific. Where data is available, FEMA and its partners should contribute information and expertise consistent with their interests, capabilities, and resources toward this new focus.

- a) A necessary prerequisite for accurate flood risk assessments is detailed flood hazard identification, which must also be performed to advance mitigation strategies and support loss estimations for insurance rating purposes.
- b) FEMA should initiate dialogue with risk assessment stakeholders to identify potential structure-specific risk assessment products, displays, standards, and data management protocols that meet user needs.
- c) FEMA and its partners should develop guidelines, best practices, and approaches to implementing structure-specific risk assessments.

FEMA Response: FEMA concurs with this recommendation. Similar to AR10, this recommendation has a structure specific focus. This recommendation will also require an entirely new approach to insurance rating and underwriting, with potential impacts on floodplain management standards. This recommendation expands FEMA’s role beyond current location-based hazard products to structure-specific risk products. Risk assessments move beyond hazard data and will require a technical approach to vulnerability and consequence. FEMA must consider the appropriate role for the Agency, communities, property owners and other

stakeholders as well as the spectrum of providing hazard data, risk framework, components of risk assessment or the entire risk assessment.

FEMA will take the same approach as AR10, aligning the assessment and implementation with the ongoing initiative to redesign the FEMA risk rating system and the IPT established in May 2016. The timeline will be concurrent with AR10, with scoping efforts, data acquisition and defined resource requirements occurring in 2016, development and testing of alternatives occurring in 2017, and selection of the approach and beginning of implementation occurring in 2018. FEMA anticipates that implementation will require significant outreach with OFAs, academia and private sector resources.

Recommendation Type: Transformative; Science Available

Anticipated Timing: 3 – 5 years

Annual Report Recommendation 15 (AR15):

FEMA should leverage opportunities to frame and communicate messages to stakeholders in communities so they understand the importance of addressing the flood risk today and consider long-term resilience strategies. Messages should be complemented by economic incentives such as low-interest loans and mitigation grants that lead community leaders and individuals to undertake cost-effective risk reduction measures.

FEMA Response: FEMA fundamentally agrees with this recommendation and has taken steps to address and advance flood risk communication and encourage risk reduction and long-term resilience strategies. In support of this, FEMA will continue to implement its National Outreach Strategy. The strategy aims to create an environment where communities can understand their risks and the importance of addressing them; are more willing to engage with FEMA to analyze their risks; and are better positioned to take action to increase their community's resilience.

To this end, FEMA has formed a Resilient Nation Partnership Network to activate a national conversation around the importance of resilience and to help foster mitigation action at the community level. The Resilient Nation Partnership consists of organizations and individuals united by a common goal, to inform and educate communities across the country about resilience and motivate them to take action to protect their communities from the loss of life, property and prosperity as a result of natural disasters.

FEMA has also established the Risk Mapping, Assessment, and Planning (MAP) Mitigation Action CoP, a group of problem solvers that promote risk reduction actions. This group has nationwide representation, including FEMA headquarters and regional staff and their CTPs and private sector expert support.

FEMA will continue to leverage *Ready*, a national public service campaign designed to educate and empower Americans to prepare for and respond to emergencies including natural and man-made disasters. Launched in 2003, the goal of this campaign is to get the public involved and increase the level of basic preparedness across the nation. Partnerships with a wide variety of

public and private organizations support the campaign. FEMA distributes *Ready* campaign messages via television, radio, print, and outdoor and web public service announcements (PSAs).

Expanding mitigation and resilience through opportunities to leverage grants, loans and rebates and other incentives will require collaboration between FEMA, the private sector and OFAs. Providing further incentives through Hazard Mitigation Assistance (HMA) grants would likely require funding and authorization. FEMA does not offer disaster loan programs but will look to existing federal programs, such as those with the Small Business Administration and Housing and Urban Development and explore opportunities to facilitate, communicate, and promote related loan options to communities.

FEMA will continue to evaluate opportunities to further implement AR15.

Recommendation Type: Standard Operations

Anticipated Timing: Implementation ongoing

Annual Report Recommendation 16 (AR16):

FEMA should transition from the current panel-based cartographic limitations of managing paper maps and studies to manage National Flood Insurance Program (NFIP) data to a database-derived, digital-display environment that are fully georeferenced and relational, enabling a single digital authoritative source of information and database-driven displays. Towards this transition, FEMA should:

- a) Prepare a multi-year transition plan to strategically transition all current cartographic and/or scanned image data to a fully georeferenced, enterprise relational database.
- b) Update required information for map revisions (MT-2 application forms) and Letter of Map Changes (LOMCs) applications to ensure accurate geospatial references, sufficient data to populate databases, and linkages to existing effective data.
- c) Adopt progressive data management approaches to disseminate information collected and produced during the study and revision process, including LOMCs.
- d) Ensure that the data management approach described in (c) is sufficiently flexible to allow efficient integration, upload, and dissemination of NFIP and stakeholder data (e.g., mitigation and insurance data that are created and maintained by OFA), and serve as the foundation for creating all digital display and mapping products.
- e) Provide a mechanism for communities to readily upload jurisdictional boundary data, consistent with requirements to participate in the NFIP, as revised, allowing other stakeholders access.

FEMA Response: FEMA concurs with this recommendation although implementation will require significant investments in IT updates and in hydrologic and hydraulic (H&H) study updates, as well as ongoing and new investment in staffing resources to plan and oversee implementation. FEMA will conduct research to understand the needs and potential impacts to

states and local municipalities including data capture requirements and standards for stakeholder data sharing. FEMA will use this research to inform the development of a strategy for how to transition from existing paper inventories to a database-derived digital display environment. Updates will be required to multiple platforms including the Flood Risk Study Engineering Library (FRSEL), the Map Service Center (MSC), and the National Flood Hazard Layer (NFHL) viewer. MT-2 application forms, used for Conditional Letters of Map Revisions (CLOMRs) and Letters of Map Revisions (LOMRs), will also require updating. Enhanced integration among platforms will be required, such as the integration of the FRSEL data geospatially into the newly updated NFHL viewer and the MSC updates to feature the NFHL over legacy maps.

Recommendation Type: Transformative; Science Available

Anticipating Timing: 3 – 5 years

Annual Report Recommendation 17 (AR17):

FEMA should consider National Academy of Public Administration (NAPA) recommendations on agency cooperation and federation (6, 7, 8, 9, 13 and 15) and use them to develop more detailed interagency and intergovernmental recommendations on data and program-related activities that can be more effectively leveraged in support of flood mapping.

FEMA Response: FEMA concurs with this recommendation and anticipates that implementation of this recommendation will require devoted resources including geospatial and flood engineering staff to support the identification and prioritization of interagency coordination opportunities, to understand the structure and operations of OFA committees and working groups, and to inform the development of an interagency engagement approach that aligns with partner agencies.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 18 (AR18):

FEMA should work with federal, state, local, and tribal agencies, particularly the U.S. Geological Survey (USGS) and the National Ocean Service, to ensure the availability of the accurate water level and streamflow data needed to map flood hazards. Additionally, FEMA should collaborate with USGS to enhance the National Hydrography Dataset to better meet the scale and resolution needed to support local floodplain mapping while ensuring a consistent national drainage network.

FEMA Response: FEMA concurs with this recommendation. FEMA plans to coordinate through existing relationships, such as the Integrated Water Resources Science and Services (IWRSS) consortium among the United States Army Corps of Engineers', National Oceanic and Atmospheric Administration (NOAA), USGS, and FEMA, to identify and prioritize data needs, define expectations and desired outcomes and, in collaboration with OFAs, offer support and

input to the development of an approach to provide streamlined data from flood studies to update the National Hydrography Dataset and the NOAA National Water Model.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 19 (AR19):

FEMA should develop and implement a suite of strategies to incentivize communities, non-government organizations and private sector stakeholders to increase partnering and subsequent contributions for flood hazard and risk updates and maintenance.

FEMA Response: FEMA concurs with this recommendation and will continue to enhance and leverage the existing CTPs and Community Rating System (CRS) programs to address this recommendation. The CTP program establishes partnerships between FEMA and participating NFIP communities, regional and state agencies, tribes and universities to increase participation in the flood hazard mapping program. The CTP program, established in 1999, is means of extending limited mapping funding and increasing local involvement in the creation of (Flood Insurance Rate Maps (FIRMs) and Digital Flood Insurance Rate Maps (DFIRMs). The objectives of the program are to maintain consistent national standards while enabling a tailored, local focus by involving local communities to provide training and technical assistance, and leveraging valuable local experience, knowledge, and data to facilitate floodplain management and maintenance.

In 2015, the CTP program underwent a series of enhancements, including the establishment of the CTP Collaboration Center, an online Microsoft SharePoint portal for information-sharing and discussion and the release of a training-focus CTP webinar series. Additionally, FEMA launched a CTP CoP to serve as a feedback mechanism and forum for information sharing, collaboration and training for CTP stakeholders and developed a draft system with the intent to categorize, define and offer targeted incentives for CTP partners. The program is using performance measures to evaluate partners and identify areas of opportunity and improvement. FEMA will use the performance measures outcomes to inform the award of FY17 CTP grants. While the CTP program is not currently designed for non-governmental private sector partners, innovation of the program to develop methods to incentivize the CTPs to increase those partnerships through their coordination efforts is required. At present, FEMA is standing up two initiatives to highlight high-performing CTPs in the field of innovative partnership and to share best practices and lessons learned between CTPs. Additional initiatives will be planned for FY18 and beyond.

CRS, established in 1990, is a voluntary program offered to NFIP-participating communities. It rewards floodplain management activities exceeding the minimum NFIP standards with discounted flood insurance rates that reflect the reduced flood risk resulting from the communities' mitigation actions. The CRS already incentivizes NFIP participating communities for doing flood hazard data development; FEMA will continue to look for additional possible integration points.

While both programs are inherently incentive-based, FEMA will continue to identify opportunities to develop and implement innovative strategies that entice participation and high-performance in both programs.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 20 (AR20):

FEMA should work with CTPs to develop a suite of measures that communicate project management success, competencies, and capabilities of CTPs. Where CTPs demonstrate appropriate levels of competencies, capabilities and strong past performance, FEMA should further entrust additional hazard identification and risk assessment responsibilities to CTPs.

FEMA Response: FEMA concurs with this recommendation and is already addressing most aspects. In 2015, FEMA established a CTP Working Group comprised of FEMA leadership from headquarters and the regions to analyze the program’s structure and function. As a result of a thorough evaluation of program measures, costs and benefits, and CTPs’ functions across the regions, the CTP Program has a clearer path forward. The group conducted additional evaluation via a CTP Program Feedback Survey distributed to both internal and external program stakeholders. Results of the survey, captured in the CTP Program Feedback Survey Report, indicate that both FEMA and CTPs want to bring innovation to the program through new technologies, funding flexibility, improved collaboration and information sharing and enhanced training opportunities to increase stakeholder efficiencies and knowledge.

The Feedback Survey Report includes recommendations that outline innovative ways to make the program more robust and more sustainable, as well as “Next Steps,” an aggressive, yet achievable list of initiatives, many of which have already been initiated and will be strategically executed through a National Five-Year Operations Plan. A few examples of these initiatives include the CTP CoP, the CTP Collaboration Center and the training webinar series. FEMA also developed an outreach strategy to generate awareness and increase transparency of the CTP Program through monthly email communication updates and quarterly calls with CTP stakeholders.

FEMA incorporated the program performance measures informed by the 2015 CTP Program Feedback Survey to the FY2016 Notice of Funding Opportunity (NOFO) for CTP grants. The measures will be evaluated and possibly refined on an annual basis for future NOFOs, and to account for flexibility that reflects variability in CTP competency, capability and function for different types of CTPs within the program. To better capture CTP performance and value, FEMA is exploring standard guidance for regions entering Risk MAP data into systems of record.

FEMA acknowledges that the TMAC’s Annual Report indicates a desire for more consistent funding awareness for CTPs. FEMA funds the CTP program through annual appropriations and

seeks to leverage CTP's own efforts and capabilities. To encourage CTP applicants, FEMA will investigate other opportunities and recognize CTP efforts.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 21 (AR21):

To ensure strong collaboration, communication, and coordination between FEMA and its CTP mapping partners, FEMA should establish a National Flood Hazard and Risk Management Coordination Committee. The role of the committee should be focused around the ongoing implementation of the five-year Flood Hazard Mapping and Risk Assessment Plan. FEMA should add other members to the committee that have a direct bearing on the implementation of the plan.

FEMA Response: FEMA is exploring existing venues to accommodate this coordination committee; however, it would be premature to establish such a committee before FEMA implements the five-year flood hazard mapping and risk assessment plan, consistent with AR2, which is a focus for FEMA in 2017.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

Annual Report Recommendation 22 (AR22):

FEMA should define the financial requirements to implement the TMAC's recommendations and to maintain its investment in the flood study inventory.

FEMA Response: FEMA concurs with this recommendation. Defining budgetary requirements is part of the program planning process and FEMA will factor the estimated costs of implementation of TMAC recommendations to the prioritization, sequencing and investments decisions in support of implementation planning, consistent with the overall federal budget process.

Recommendation Type: Standard Operations

Anticipated Timing: 1 – 3 years

III. Recommendations from the 2015 Future Conditions Risk Assessment and Modeling Report

The TMAC's recommendations from the Future Conditions Risk Assessment and Modeling Report are far reaching. They will push the state of the science, and the state of FEMA's capabilities, to new heights. While FEMA agrees with the TMAC that the recommendations would result in improved service of the NFIP communities, the resources required for full implementation will be substantial. To give these recommendations the full weight of the consideration that they are due, FEMA will continue working with the TMAC in 2017 to better understand and refine these recommendations. In addition, FEMA will continue laying the groundwork for such a substantial undertaking through collaboration with internal and external partners.

Future Conditions Recommendation 1 (FC1):

Provide future conditions flood risk products, tools and information for coastal, Great Lakes and riverine areas. The projected future conditions should use standardized timeframes and methodologies wherever possible to encourage consistency and should be adapted as actionable science evolves.

FEMA Response: FEMA agrees that distribution of future conditions flood risk products, tools and information for coastal, Great Lakes and riverine environments could provide value to communities. FC1 is the most substantial of the FC recommendations, and all subsequent FC recommendations support the implementation of FC1. By requesting that FEMA add future conditions assessments, modeling and mapping, the TMAC is requesting that FEMA drive and push both the state of the science and the state of application of the science on a broad scale.

Implementation of FC1 will require significant resources and will require a comprehensive and well-planned approach. Addressing this recommendation will require a substantial investment by FEMA in active fields of research, which FEMA has not historically done on this scale. It will also require a lengthy amount of time, as credibly changing the state of the science cannot be done overnight. While FEMA will look to leverage all of the available existing science, applying it on the scale and to the level of accuracy recommended by the TMAC will require much further investment. FEMA will not pursue piecemeal implementation of the associated recommendations. Rather, a focus on implementing FC6 (performing demonstration projects) will be a way to plan for and, over time, develop a program that will accomplish the goals identified by the TMAC in FC1. In summary, prioritizing and implementing FC6 addresses FC Recommendations 2 through 7 and leads to the implementation of FC1.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Future Conditions Recommendation 2 (FC2):

Identify and quantify accuracy and uncertainty of data and analyses used to produce future conditions flood risk products, tools, and information.

FEMA Response: While FEMA concurs with this recommendation, identifying and quantifying uncertainty in the production of future flood risk information is a significant undertaking. Simply producing the future conditions information will push the state of the science; to accomplish this recommendation, FEMA will need close coordination with OFAs and research scientists in this field. Implementation of this recommendation can begin once appropriate methodologies to credibly accomplish FC1 have been identified.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Future Conditions Recommendation 3 (FC3):

Provide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise. Major elements are:

- Provide G&S for the development of future conditions coastal flood hazard and risk products.
- Incorporate local relative sea/lake level rise scenarios and long-term coastal erosion into coastal flood hazard analyses.
- Consider the range of potential future natural and manmade coastal changes, such as inundation and coastal erosion.

FEMA Response: FEMA agrees that coastal and Great Lakes communities would likely be interested in this information, where similar products have not already been developed and distributed through Risk MAP or are not available through OFAs or the private the sector. FEMA has begun partially or wholly addressing some of the sub-recommendations contained in FC3. For example, FEMA is currently performing three sea level rise (SLR) pilots that involve coordination with OFAs and include community consultation. The SLR pilots build upon existing conditions analyses, use global mean sea level scenarios and use a simple impact viewer tool to determine future flood hazard estimates.

In addition, FEMA recently compiled a summary of existing sea level rise and shoreline change studies in an effort to understand the state of the science and its potential implications on flood hazards identification. FEMA-sponsored sea level rise studies were reviewed as well as numerous studies conducted by other federal, state, and local agencies and private organizations. The summary is intended to inform future FEMA studies, suggest where there are opportunities to leverage existing data, and to support the advancement of recommendations made by the TMAC.

FEMA is planning for the initiation of additional SLR pilots in 2018, which build on the lessons learned to date. These pilots, per FC6, will allow FEMA to identify and address methodological

gaps, and to test the state of science (especially as relates to including long-term erosion with sea level rise) and demonstrate to stakeholders the type of information that may be delivered to them.

At present, FEMA provides the Increased Flooding Scenarios flood risk product to many communities. This product, which is a form of the linear superposition approach to SLR assessment, identifies areas that are likely to flood if the flood is larger than with a 1 percent annual chance flood. FEMA works with the communities to select up to three scenarios for this product that would be the most useful to the community and their hazard mitigation and resilience planning efforts.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Future Conditions Recommendation 4 (FC4):

Provide future conditions flood risk products and information for riverine areas that include the impacts of: future development, land use change, erosion, and climate change, as actionable science becomes available. Major elements are:

- Provide G&S for the development of future conditions riverine flood risk products.
- Future land use change impacts on hydrology and hydraulics can and should be modeled with land use plans and projections, using current science and build upon existing model study methods where data are available and possible.
- Future land use should assume built-out floodplain fringe and take into account the decrease of storage and increase in discharge.
- No actionable science exists at the current time to address climate change impacts to watershed hydrology and hydraulics. If undertaken, interim efforts to incorporate climate change impacts in flood risk products and information should be based on existing methods, informed by historical trends, and incorporate uncertainty based upon sensitivity analyses.

Where sufficient data and knowledge exist, incorporate future riverine erosion (channel migration) into flood risk products and information.

FEMA Response: FEMA agrees with this recommendation and concurs that there is a need for such products, which will grow as actionable science for these purposes becomes available. To date, FEMA has already, or is currently, addressing several of the sub-recommendations of FC4. In 2001, FEMA issued a rule titled “Changes to General Provisions and Communities Eligible for the Sale of Insurance Required to Include Future-Conditions Flood Hazard Information on Flood Maps.” 66 FR 59166 (Nov. 27, 2001). This rule allows communities to use future conditions hydrology resulting from land use development, for mapping purposes (FC sub-recommendation 5-6). With regards to encouraging communities to adopt future conditions

products (FC sub-recommendation 5-17), FEMA encourages communities to address future conditions by offering incentives via the CRS program.

FEMA will look for opportunities to leverage knowledge gained during the development of the Federal Flood Risk Management Standard (FFRMS) to inform future conditions product development and delivery. To further address FC4, FEMA will look to leverage existing case studies from states such as Indiana, Vermont, and Washington that have examined long-term riverine erosion to identify how these states were able to assess and provide this information to their communities.

As TMAC articulates in their recommendations, FC4 will push the state of the science. FEMA will require time, money and dedicated staff resources to implement this recommendation fully in riverine environments.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Future Conditions Recommendation 5 (FC5):

Generate future conditions data and information such that it may frame and communicate flood risk messages to more accurately reflect the future hazard in ways that are meaningful to and understandable by stakeholders. This should enable users to make better-informed decisions about reducing future flood-related losses.

FEMA Response: FEMA concurs with this recommendation and will leverage ongoing risk communication efforts to inform a communications strategy that will address future conditions and meaningfully communicate future flood hazards.

Upon finalization of a future conditions strategy informed by the other TMAC recommendations, FEMA will need to develop an outreach and communications strategy for communicating future conditions flood risk that is applicable at the national, regional, and local levels. Each community will have varied, unique needs and it is important that FEMA understand these during community engagement. Implementing the strategy would potentially include new messaging, visuals and infographics, as well as related documentation and communication tools. FEMA will also need to evaluate the effectiveness of communicating risk through flood risk products and other tools in different and more consumable formats (e.g., probability). Additionally, FEMA will reach out to OFAs involved in the future conditions space, such as National Oceanic and Atmospheric Administration (NOAA) and USGS, to leverage what they have already developed through outreach and messaging of future flood risk. Finally, in 2017 FEMA is initiating an analysis of existing sea level rise communication efforts already underway by OFAs, state agencies and private organizations to inform the strategy to address this recommendation.

Additional resource investments will be required to add data storage capacity; to develop scenario-based analyses to understand the impacts of future conditions flooding and of different

decisions for the future; to produce materials and develop products for web-based communication; and to fund comprehensive research and testing to ensure that messages about future flood risks are meaningful and understandable by stakeholders. Close coordination with the Office of Management and Budget and the Department of Homeland Security (DHS) will be required during this engagement.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Future Conditions Recommendation 6 (FC6):

Perform demonstration projects to develop future conditions data for representative coastal and riverine areas across the nation to evaluate the costs and benefits of different methodologies or identify/address methodological gaps that affect the creation of future conditions data.

FEMA Response: FEMA concurs with this recommendation and envisions that implementation of FC6 can be performed in a way that it addresses the majority of the other recommendations and sub-recommendations found in the Future Conditions Risk Assessment and Modeling Report. FEMA will leverage results from previous FEMA-initiated sea level rise and future conditions demonstration projects to address and inform the other FC recommendations. However, to address the significant breadth and depth of the research needed to implement FC1, a more robust research and demonstration project effort will be needed. This effort will require integrated planning and consideration, taking into account FEMA's priorities, the state of the science and research needs, as well as possible partnerships with OFA. The near-term steps for implementing FC6 include:

1. Developing a framework for the research and demonstration projects including defining goals and objectives, scope, required resources, and timelines.
2. Identifying priorities and sequencing of demonstration projects (e.g. focusing on sea level rise prior to river or inland future conditions, etc.).
3. Identifying opportunities for engaging and/or partnering with OFA, industry associations, and local communities.
4. Determine staff, budget and contracting requirements.

The level of effort to implement FC6 will be substantial.

Recommendation Type: Transformative; Science Available

Anticipated Timing: 3 – 5 years

Future Conditions Recommendation 7 (FC7):

Data and analysis used for future conditions flood risk information and products should be consistent with standardized data and analysis used to determine existing conditions flood risk, but also should include additional future conditions data, such as climate data, sea level rise

information, long-term erosion data; and develop scenarios that consider land use plans, planned restoration projects, and planned civil works projects, as appropriate, that would impact future flood risk.

FEMA Response: FEMA concurs with this recommendation and will look to collaborate with OFAs, perhaps via the Advisory Committee on Water Information (ACWI), to support research efforts for new methods of incorporating future conditions data to future conditions mapping and products. For coastal studies, FEMA already has a strong partnership with NOAA, USACE and the US Global Change Research Program, which can be leveraged to develop the standardized data, analysis and products described. Because other recommendations provided by TMAC may fundamentally shift how FEMA performs flood risk studies in the future, it is important that studies of future flood conditions are performed in a manner that is consistent with, or complementary to, on-going evolutions in FEMA's study methods.

Recommendation Type: Transformative; Certain Critical Aspects of Science Not Yet Available

Anticipated Timing: 10+ years

Appendix A. TMAC Recommendations Reference Guide

FEMA developed the table below to act as a convenient, truncated reference guide for how each Annual Report (AR) and Future Conditions Report (FC) recommendation has been categorized as well as a brief summary of the proposed implementation actions. The Reference Guide is subject to change.

Rec. #	Rec Description	Status	Rec. Category	Strategy	Implementation Action
Annual Report (AR)					
AR 1	Assess present and anticipated user needs for products	Initiated	Standard Operations	Guidance & Standards (G&S)	Flood Risk Products Integrated Project Team is evaluating user needs and assessing value/use of current product offerings.
AR 2	Develop national five-year plan and prioritization process	Initiated	Standard Operations	Program planning	In FY17, FEMA regions and headquarters will begin developing five-year plans that will have a rolling implementation.
AR 3	Develop national program goals that include well defined and easily quantifiable metrics	Initiated	Standard Operations	Program planning	As part of the five-year planning in FY17, FEMA is revising/developing program goals and metrics.
AR 4	Ensure geospatial data complies with national standards	Implemented	Standard Operations	Guidance & Standards (G&S)	Addressed any specific concerns/issues in the November 2016 G&S maintenance update.
AR 5	Ensure accuracy of topographical data	Implemented	Standard Operations	Guidance & Standards (G&S)	Coordinated with the Regulatory Products Team to determine where the information should be reported and how to revise the data capture requirements. Addressed in the November 2016 G&S maintenance update.
AR 6	Periodically review and consider use of publicly available models	Implemented	Standard Operations	Guidance & Standards (G&S)	Addressed in the November 2016 G&S update although this will be an ongoing activity. FEMA will track, identify and course correct for any potential impacts to ongoing studies and CNMS validation due to adoption of new modeling methods.
AR 7	Develop guidelines, standards, best practices for selection and use of models	Initiated	Standard Operations	Guidance & Standards (G&S)	Leveraging existing Community of Practices (CoPs) and other subject-matter experts (SMEs) to identify and inventory best practices. Partially addressed in the November 2016 G&S maintenance update.
AR 8	Coastal 2-D Storm Surge modeling guidance	Initiated	Transformative; Science Available	Research, planning and investments	Existing best practices will be captured and cataloged, and new guidance may be developed as the topics in the Coastal Technical Risk Register are addressed.

Rec. #	Rec Description	Status	Rec. Category	Strategy	Implementation Action
AR 9	Coastal event erosion methods	Not yet Initiated	Transformative; Science Not Yet Available	Research, planning, rulemaking	Coastal research will be required. FEMA will continue evaluating new methodologies for event-based erosion
AR 10	Transition from 1% to Structure specific flood frequencies	Initiated	Transformative; Science Available	Investments, research, planning, rulemaking	FEMA will continue research in support of implementation of this recommendation. Requires national high res topo, structural elevation data, and models.
AR 11	Modify production processes and Mapping Information Platform (MIP)	Initiated	Standard Operations	Guidance & Standards (G&S)	Mapping Information Platform (MIP) Redesign is already underway. FEMA is collaborating with Customer and Data Services (CDS) to define solution requirements and goal is to release update via the November 2017 G&S maintenance update.
AR 12	Consider cost impacts during G&S updates	Implemented	Standard Operations	Guidance & Standards (G&S)	Costs are already factored into G&S but the process has been formalized by the Nov 2016 G&S maintenance update.
AR 13	Mass Lidar LOMA process	Initiated	Standard Operations	Research planning and Guidance & Standards (G&S)	Pilot studies will inform development of G&S, to be implemented in the November 2017 maintenance update.
AR 14	Structure specific flood risk assessment focus	Initiated	Transformative; Science Not Yet Available	Investments, research, planning, rulemaking	Require an entirely new approach to insurance rating and underwriting. Requires national high resolution topography, structural elevation data, and models. Planning (scoping, data acquisition, defining resource requirements) is underway.
AR 15	Enhanced communication of flood risk to stakeholders	Initiated	Standard Operations	Guidance & Standards (G&S)	Leveraging Community Engagement and Risk Communication (CERC) and the Mitigation Action Community of Practice to address this via the November 2017 G&S maintenance cycle.
AR 16	Transition to database derived digital display environment	Initiated	Transformative; Science Available	Investments, research, & planning	Planning (scoping, data acquisition, defining resource requirements) is underway. Will require significant investment and updates to multiple platforms and processes.
AR 17	Consider National Academy of Public Administration (NAPA) recommendations	Initiated	Standard Operations	Research, planning	Staff will support identification and prioritization of interagency coordination opportunities to inform the development of an interagency engagement approach that aligns with partner agencies.
AR 18	Ensure accurate water level and streamflow data	Initiated	Standard Operations	Research and Guidance & Standards (G&S)	Research is underway to identify and prioritize data needs and define expectations in collaboration with Other Federal Agencies (OFAs). Will be

Rec. #	Rec Description	Status	Rec. Category	Strategy	Implementation Action
					addressed in November 2017 G&S maintenance update.
AR 19	Incentives to increase partnering	Initiated	Standard Operations	Cooperating Technical Partner program enhancements	Enhancements to the Cooperating Technical Partner (CTP) program address this recommendation and FEMA will continue to look for opportunities for improvements.
AR 20	Suite of measures for Cooperating Technical Partners	Initiated	Standard Operations	Cooperating Technical Partner program enhancements	Enhancements to the Cooperating Technical Partner (CTP) program address this recommendation and FEMA will continue to look for opportunities for improvements.
AR 21	Establish National Flood Hazard Risk Management Coordination Committee	Initiated	Standard Operations	Cooperating Technical Partner program enhancements	Exploring whether the existing Cooperating Technical Partner (CTP) Community of Practice and its charter could achieve this recommendation.
AR 22	Define financial requirements to implement the Technical Mapping Advisory Council's (TMAC) recommendations	Initiated	Standard Operations	Program planning	In support of implementation AR2 and other recommendations that require investment/devoted resources, FEMA is developing pricing estimates for all of the recommendations.
Future Conditions (FC) Recommendations					
FC 1	Provide future conditions flood risk products, tools, and information for coastal, Great Lakes, and riverine areas	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning and Guidance & Standards (G&S)	Will be informed by implementation of FC6.
FC 2	Identify and quantify accuracy and uncertainty of data and analyses	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning, and investments	Will be informed by implementation of FC6.
FC 3	Incorporate effects of long-term erosion and sea/lake level rise in future conditions products/info	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning, and investments	Will be informed by implementation of FC6.
FC 4	Incorporate future development, land use change, erosion, and climate change to future conditions products/info	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning, and investments	Will be informed by implementation of FC6.

Rec. #	Rec Description	Status	Rec. Category	Strategy	Implementation Action
FC 5	Frame future conditions data/info/messaging to inform stakeholders of risk and inform mitigation action	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning and Guidance & Standards (G&S)	Will be informed by implementation of FC6.
FC 6	Perform demonstration projects to develop future conditions data	Initiated	Transformative; Science Available	Research and planning	Conducting sea level rise (SLR) pilots and demonstration projects and will leverage the information gained to inform additional pilots as well as the implementation of the other FC recommendations.
FC 7	Future conditions data should be consistent with standardized data and analysis	Not Yet Initiated	Transformative; Certain Critical Aspects of Science Not Yet Available	Research, planning and Guidance & Standards (G&S)	Will be informed by implementation of FC6.

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Acronyms

AIR	American Institutes for Research
ANPRM	Advanced Notice of Proposed Rulemaking
ASP	Audubon Society of Portland
BAS	Best Available Science
BW-12	Biggert Waters Flood Insurance Reform Act of 2012
CAP-SSSE	Community Assistance Program-State Support Services Element
CAV	Community Assistance Visit
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
CNMS	Coordinated Needs Management Strategy
CoP	Community of Practice
CRS	Community Rating System
CTP	Cooperating Technical Partner
DFIRM	Digital Flood Insurance Rate Map
DOI	Department of the Interior
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
FFRMS	Federal Flood Risk Management Standard
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FTE	Full Time Equivalent
GAO	Government Accountability Office
GHG	Greenhouse Gas
HCP	Habitat Conservation Plan
HFIAA	Homeowner Flood Insurance Affordability Act of 2014
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision Based On Fill
NAS	National Academies of Science
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NPEIS	National Programmatic Environmental Impact Statement
NPRM	Notice of Proposed Rulemaking
OIRA	Office of Information and Regulatory Affairs
OMB	Office of Management and Budget
PEIS	Programmatic Environmental Impact Statement
SFHA	Special Flood Hazard Area
SLR	Sea Level Rise
TFIA	The Flood Insurance Agency
TMAC	Technical Mapping Advisory Council
USACE	United States Army Corps of Engineers

USFWS

U.S. Fish and Wildlife Service

I. FEMA's Legal Authorities

Four commenters (Center for Biological Diversity, American Rivers, Association of State Floodplain Managers, National Wildlife Federation) commented on the Federal Emergency Management Agency's (FEMA's) statements about its legal authorities to make program changes to the National Flood Insurance Program (NFIP) and specifically its authorities to place restrictions and/or prohibitions on floodplain development. Specifically, one or a number of the commenters provided comments on the following issues:

- Whether Congress, through the National Flood Insurance Act (NFIA), intended the restriction of floodplain development to be a purpose of the NFIP.
- Whether FEMA can impose land use restrictions and/or prohibitions on private floodplain development pursuant to the spending clause of the U.S. Constitution and its statutory authorities under the NFIA.
- Whether FEMA "allows" floodplain development to occur.
- Whether FEMA already prohibits floodplain development and/or places significant restriction on floodplain development.
- Whether FEMA can influence floodplain development through existing statutory and regulatory authority.
- Whether FEMA's lack of legal authority prevents the agency from regulating floodplain development to mitigate the negative impacts to the environment.

I.1 Whether Congress, through the NFIA, intended the restriction of floodplain development to be a purpose of the NFIP.

Two commenters suggest that the general purpose statements found in Section 1302 of the NFIA indicate an intent by Congress to make restriction of floodplain development a central purpose of the NFIP.

The primary purpose and objective of the NFIP is to provide flood insurance.

It is therefore the purpose of this title to (1) authorize a flood insurance program by means of which flood insurance, over a period of time, can be made available on a nationwide basis through the cooperative efforts of the Federal Government and the private insurance industry, and (2) provide flexibility in the program such that flood insurance may be based on workable methods of pooling risks, minimizing costs, and distributing burdens equitably among those who will be protected by flood insurance and the general public.

42 United States Code (U.S.C.) § 4001(d). Accordingly, the NFIP is first and foremost a program for the provision of flood insurance.¹

¹ It is worthy of note that while a large majority of the NFIA is devoted to a discussion of FEMA's responsibilities related to the provision of flood insurance, only one section concerns the minimum floodplain management criteria.

Congress also provided for the development of a floodplain management program that would encourage participating communities to reduce their flood risk and, therefore, reduce the financial losses of those structures insured by the program and benefit the flood insurance fund.

The Congress further finds that (1) a program of flood insurance can promote the public interest by providing appropriate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood losses; and (2) the objectives of a flood insurance program should be integrally related to a unified national program for flood plain management ... (42 U.S.C. § 4001(c)).

Therefore, a secondary purpose of the NFIP is to undertake a unified program for floodplain management with the purpose of encouraging sound land use practices related to the minimization of damages caused by flood losses. *Id.*; *see also*, 42 U.S.C. § 4001(e).

In support of the flood insurance and floodplain management aspects of the program, the NFIP was also established for the purpose of providing flood hazard maps.

(b) The purpose of this Act, therefore, is to –

...

(1) Provide for the expeditious identification of, and the dissemination of information concerning, flood-prone areas. (42 U.S.C. § 4002(b)(2))

Up-to-date flood hazard information and maps are needed to support the purchase and rating of flood insurance, enable community-based floodplain management, and increase the Nation's flood hazard awareness.

These are the central purposes of the NFIP. However, other related purposes of the NFIP cited in the NFIA, and referenced by these commenters in their comments, include:

(1) encourag[ing] State and local governments to make appropriate land use adjustments to constrict the development of land which is exposed to flood damage and minimize damage caused by flood losses, (2) guid[ing] the development of proposed future construction, where practicable, away from locations which are threatened by flood hazards. (42 U.S.C. § 4001(e))

These ancillary purposes are, however, qualified in very important ways. FEMA is not directed to require State and local governments to constrict the development of land exposed to flood damage, but to "encourage" them to do so.² Similarly, the purpose of "guid[ing] development of proposed future construction away from locations that are threatened by

² This language in 42 U.S.C. § 4001(e)(1) is similar to the language in 42 U.S.C. § 4001(c)(1), which states that "a program of flood insurance can promote the public interest by providing appropriate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood loss...". Notably, the language in this clause is also heavily qualified through the use of the word "encourage."

flood hazards is constrained by the limits of practicability (i.e., "where practicable") (42 U.S.C. § 4001(e)(2)).

As such, while the ancillary purpose language of the NFIA certainly indicates an intent by Congress to *encourage*, through the mechanism of the NFIP, State and local communities to guide the development of new construction away from flood hazard areas, this is not intended as a central purpose of the NFIP. Moreover, the broad, highly qualified purpose language in 42 U.S.C. § 4001(e) cannot be read as providing any general or specific authority to the NFIP to restrict floodplain development, but only for the NFIP to encourage States and communities to do so.

FEMA acknowledges that the Draft National Programmatic Environmental Impact Statement (NPEIS) lacked clarity on the purposes of the NFIP. As such, FEMA has added a new Section 1.1.1, entitled "Purpose of the NFIP," to the Final NPEIS to provide clarity this point.

I.2 Whether FEMA can impose land use restrictions and/or prohibitions pursuant to the spending clause of the U.S. Constitution and its statutory authorities under the NFIA.

One commenter suggested that FEMA could impose land use restrictions and/or prohibitions as a valid exercise of its spending power pursuant to the U.S. Constitution. This commenter argued that such an exercise of power pursuant to the NFIP would satisfy the requirements of the four-part test established in South Dakota v. Dole, 483 U.S. 203 (1987). Two commenters argued that the NFIP has sufficient legal authority under Section 1361 of the NFIA to impose substantial restrictions and/or prohibitions on floodplain development.

When implemented as Congress intended, the NFIP is a constitutional exercise of the Tax and Spend, or, General Welfare Clause of the Constitution, Article I, Section 8, Clause 1.

Incident to this same clause of the Constitution, Congress may also attach conditions on the receipt of Federal funds, and has repeatedly employed the power "to further broad policy objectives by conditioning receipt of Federal moneys upon compliance by the recipient with Federal statutory and administrative directives." South Dakota v. Dole, 483 U.S. 203 (1987), citing Fullilove v. Klutznick, 448 U.S. 448, 474 (1980). See Lau v. Nichols, 414 U.S. 563, 569 (1974); Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275, 295 (1958); Oklahoma v. Civil Service Comm'n, 330 U.S. 127, 143-144 (1947); Steward Machine Co. v. Davis, 301 U.S. 548 (1937). In United States v. Butler, 297 U.S. 1, 66 (1936), the Supreme Court determined that "the power of Congress to authorize expenditure of public moneys for public purposes is not limited by the direct grants of legislative power found in the Constitution." Thus, objectives not thought to be within Article I's "enumerated legislative fields," *id.*, at 65, may nevertheless be attained through the use of the spending power and the conditional grant of Federal funds. One commenter argues that this spending power provides the legal authority pursuant to which the NFIP is authorized to place prescriptive and restrictive land use requirements on communities as a condition of participation in the program.

A. Limitations on Congress's Exercise of the Spending Power

However, the spending power is not unlimited. Instead, it is subject to several general restrictions, which were articulated by the Supreme Court in South Dakota v. Dole:

- (1) The exercise of the spending power must be in pursuit of "the general welfare;"
- (2) Congress must unambiguously state the conditions of the States' receipt of Federal funds in the statutory language so that States can exercise their choice to accept the Federal funds, cognizant of the consequences of their participation;
- (3) Any associated conditions or requirements must be related "to the Federal interest in particular national projects or programs;" and,
- (4) There is no independent bar in other Federal laws to the conditional grant of Federal funds.

South Dakota v. Dole, 483 U.S. 203, 207-208 (1987).

1. Restrictions to Use of Spending Power - Must Promote General Welfare

As the language of Article 1, Section 8 of the Constitution makes clear, Congress's exercise of its spending power must be in pursuit of "the general welfare." See Dole, 483 U.S. 207 (1987); United States v. Butler, 297 U.S. 1, 65 (1936). In considering whether a particular expenditure is intended to serve general public purposes, courts should defer substantially to the judgment of Congress. Id.

As a general matter, the NFIP floodplain management criteria are clearly intended to serve the general public purpose by reducing the risk of flood to people and property. However, to the extent that some have asserted that the spending power provides FEMA with the constitutional authority to set a wide range of requirements on the states and communities through its floodplain management criteria, then each individual floodplain management criterion must likewise be examined to ensure that it also promotes the general welfare.

2. Restrictions to Use of Spending Power - Must be Unambiguously Stated in Statute

The Supreme Court has required that if Congress desires to condition the States' receipt of Federal funds, it "must do so unambiguously ..., enabl[ing] the States to exercise their choice knowingly, cognizant of the consequences of their participation." Pennhurst State School and Hospital v. Halderman, 451 U.S. 1, 17 (1981); Edelman v. Jordan, 415 U.S. 651 (1974). In Pennhurst, the Court addressed Congress' power to legislate pursuant to the spending authority. The Court noted that it has long held that Congress may, through legislation, set the terms on which it shall disburse Federal money to the States. Id. However, the Court also held that:

[L]egislation enacted pursuant to the spending power is much in the nature of a contract: in return for Federal funds, the States agree to comply with Federally imposed conditions. **The legitimacy of Congress' power to legislate under the spending power thus rests on whether the State voluntarily and knowingly**

accepts the terms of the "contract." See Steward Machine Co. v. Davis, 301 U.S. 548, 585-598 (1937); Harris v. McRae, 448 U.S. 297 (1980). There can, of course, be no knowing acceptance if a State is unaware of the conditions or is unable to ascertain what is expected of it. Accordingly, **if Congress intends to impose a condition on the grant of Federal moneys, it must do so unambiguously.** See 13 Cf. Employees v. Department of Public Health and Welfare, 411 U.S. 279, 285 (1973); Edelman v. Jordan, 415 U.S. 651 (1974). By insisting that Congress speak with a clear voice, we enable the States to exercise their choice knowingly, cognizant of the consequences of their participation.

Id. (emphasis added).

Importantly, the Court stated that **"the case for inferring intent is at its weakest where ... the rights asserted impose affirmative obligations on the States to fund certain services**, since we may assume that Congress will not implicitly attempt to stated massive financial obligations on the States." Id. at 16-17 (emphasis added).

This is the most significant limitation on the exercise of Congress's spending powers in the context of the NFIP. The language of the NFIA makes it clear that Congress intended to condition a community's participation in the NFIP on the adoption and enforcement of land use ordinances that are consistent with certain minimum floodplain management criteria.³ In electing to participate in the NFIP, the States must be able to exercise that choice knowingly, cognizant of the consequences of their participation. There is no unambiguous language in the NFIA stating that, as a condition of participating in the NFIP, the community effectively cedes their land use authority to FEMA, thereby allowing FEMA to impose virtual prohibitions on development, restrict use and subdivision of land within the community, and place any prescriptive requirement on the communities that it sees fit as long as it can be loosely tied to one of the stated purposes of the statute. The conditions identified in the NFIA all relate to measures intended to minimize the risk of flood and damage from flood, and this limitation effectively establishes Jersey barriers preventing FEMA from broadly usurping local land use authorities.

Had Congress intended FEMA, through the NFIP, to establish prescriptive requirements and regulations as a condition of the program, it would have explicitly and unambiguously stated this in the statute as it did in other places throughout NFIA (such as 42 U.S.C. § 4104(c)).⁴ However, the general authority to develop minimum floodplain management criteria is not unfettered, but rather is limited by the language of the statute in several significant ways. Under 42 U.S.C. § 4102, FEMA has the authority "to develop comprehensive criteria designed to

³ 42 U.S.C. § 4022(a)(1) states that no new flood insurance coverage shall be made available in any states or areas (or subdivisions thereof) "unless an appropriate body shall have adopted adequate land use and control measures (with effective enforcement provisions) which the [Administrator] finds are consistent with the [minimum floodplain management criteria]."

⁴ Notably, in statutory provisions actually involving the provision of Federal funds to the states, Congress is very clear as to the conditions under which the grants is provided (e.g., planning requirements at 42 U.S.C. § 4104(c)(b) and list of eligible activities at 42 U.S.C. § 4104(c)(c)).

encourage, where *necessary*, the adoption of adequate State and local measures which, to the *maximum extent feasible*, will----

- (1) constrict the development of land which is exposed to flood damage *where appropriate*,
- (2) guide the development of proposed construction away from locations which are threatened by flood hazards,
- (3) assist in reducing damage caused by floods, and
- (4) otherwise improve the long-range land management and use of flood-prone areas... (42 U.S.C. § 4102(c) (emphasis added))."

In interpreting the NFIA, FEMA must give consideration to the limiting language. Most importantly, the general authority to develop criteria is limited to developing criteria that are "necessary" for the accomplishment of the above-stated purposes. Inherent in the term "necessary" is the concept that there must be a strong connection between what the agency does by way of regulation (in this case, the development of the criteria) and what the agency permissibly seeks to achieve with that regulation (in this case, the four purposes laid out in 42 U.S.C. § 4102).

Criteria that reduce a structure's flood risk, such as elevation and floodproofing requirements, are clearly consistent with the statutory purpose of reducing flood risk to reduce flood losses and necessary to achieve that objective (based on studies and investigations undertaken by FEMA and others). However, FEMA would not have the authority to implement criteria that generally restrict floodplain development unless it could show that such criteria are necessary to the achievement of the four objectives laid out in 42 U.S.C. § 4102. This connection would have to be more specific than just a general showing that if no structures were built in the floodplain in the first place, there would be no flood losses, and therefore the flood insurance program would benefit. While blanket prohibitions, such as a prohibition on all development or certain types of development, may incidentally further the goals laid out in 42 U.S.C. § 4102(c), they do not meet the standard of "necessary" because such a regulation is not necessary to achieve these ends.

Further, the NFIA also contains feasibility and practicability limitations on the development of the minimum floodplain management criteria. One of the general purposes of the statute, which is reiterated in the objectives at 42 U.S.C. § 4102, is to guide the development of proposed future construction away from locations that are threatened by flood hazards (42 U.S.C. § 4001(e)(2), 42 U.S.C. § 4102(c)(2)). However, the statute makes it clear, in 42 U.S.C. § 4001(e)(2), that this general purpose is constrained by the limits of practicability (i.e., "where practicable"). 42 U.S.C. § 4102 also employs the language of feasibility (e.g., "to the maximum extent feasible").

This provides further evidence that FEMA's authority to develop criteria is not unambiguously unconstrained. FEMA must consider the practicability and feasibility of the criteria it develops to achieve the statutorily prescribed goals. Although FEMA develops the criteria, the participating communities actually implement the criteria. Therefore, any determinations of the practicability and feasibility of the minimum criteria must also be made in the context of the community's implementation of the criteria.

The language "where practicable" and "to the maximum extent feasible" reflects a recognition that there are limits on the communities' ability to implement and enforce the standards that FEMA promulgates. For FEMA to impose a requirement on the communities pursuant to 42 U.S.C. § 4102, it has to make a determination that such requirement is practicable and feasible. If the criteria exceed what the communities are reasonably capable of doing, in terms of economics, technological capability, etc., then they are not practicable or feasible.

In addition, FEMA must consider the use of the word "encourage" in 42 U.S.C. § 4102(c) (also in general statutory purpose statements at 42 U.S.C. 4001(c)(1) and 42 U.S.C. § 4001(e)). The criteria FEMA develops are designed to "encourage" the communities to accomplish the four goals stated above. Encouragement is not the same as an outright prohibition or restriction. The use of the word "encourage" multiple times throughout the statute in reference to the minimum floodplain management criteria does not suggest an intent to impose prescriptive land use requirements as a condition of participation in the program. This language makes it clear that the minimum floodplain management criteria are not a set of prescriptive land use requirements or conditions, but a set of floodplain management-related performance standards that the communities use as guideposts in developing consistent land use regulations.⁵

The construct described above does not constitute an unambiguous statement of an intent to impose prescriptive land use requirements as a condition of participation in the program. Furthermore, the community's local ordinances must only be consistent with, not the same as, FEMA's floodplain management criteria. Read as a whole, this suggests that the minimum floodplain management criteria are not a set of prescriptive land use requirements or conditions, but, rather, are more appropriately implemented as a set of floodplain management-related performance standards that the communities use as guideposts in developing consistent land use ordinances.⁶

If the language of the NFIA were interpreted to mean that, as a condition of the participation in the program, FEMA had the right to place any condition on the participating communities that is arguably tied to floodplain management, this would not only deprive the communities of their land use authority in the floodplain, but it would potentially place a substantial amount of new requirements on the community. As the Supreme Court stated in Pennhurst, the rule of statutory construction that Congress must express clearly its intent to impose conditions on the grant of

⁵ Moreover, if the minimum criteria are too draconian and difficult to implement, the communities will not be encouraged to implement better land use and floodplain management practices. Rather, they will be encouraged to leave the program as the benefits of the program will no longer exceed the costs. FEMA must also develop its criteria with the objective of encouraging the communities to adopt higher land use and floodplain management practices, rather than creating a program that is so punitive or difficult to implement that the community decides, or is compelled to, exit the program.

⁶ Notably, although some minimum floodplain management criteria utilize the word "prohibit" (e.g., § 60.3(d)(3)'s requirement to "prohibit all encroachments..."), this word was utilized for the purposes of clarity to the participating communities. A careful reading of the regulations reveals that these criteria are actually performance standards (e.g., "prohibit all encroachments...unless it has been demonstrated ... that the proposed encroachment will not result in any increase in flood levels..."). As such, FEMA is not exceeding its legal authority by placing an outright prohibition on development.

Federal funds "applies with greatest force where a State's potential obligations under the Act are largely indeterminate." Pennhurst, 451 U.S. 24. As a matter of law, Congress cannot utilize its spending power to create unknown, unknowable, and as yet to be determined future obligations on the part of States as condition of the receipt of Federal funds. "Although Congress' power to legislate under the spending power is broad, it does not include the power to surprise participating States with post acceptance or "retroactive" conditions. Id. at 25. Likewise, the Federal agency implementing the statute cannot "surprise" the states with post-acceptance or retroactive conditions that are not clearly and unambiguously stated in the Act itself.

3. Restrictions to Use of Spending Power - Must Be Related to the Federal Interest in NFIP.

The Supreme Court has also held that conditions on Federal grants must be related "to the Federal interest in particular national projects or programs." South Dakota v. Dole, 483 U.S. 207-208 (1987), citing Massachusetts v. United States, 435 U.S. 444 (1978); see also Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275, 295 (1958), ("The Federal Government may establish and impose reasonable conditions relevant to Federal interest in the project and to the over-all objectives thereof").

Even where Congress has unambiguously stated the conditions of participation in the NFIP in statute, those conditions must still be related to the Federal interest in a particular program. The primary purpose and objective of the NFIP is to provide flood insurance.

It is therefore the purpose of this title to (1) authorize a flood insurance program by means of which flood insurance, over a period of time, can be made available on a nationwide basis through the cooperative efforts of the Federal Government and the private insurance industry, and (2) provide flexibility in the program such that flood insurance may be based on workable methods of pooling risks, minimizing costs, and distributing burdens equitably among those who will be protected by flood insurance and the general public. (42 U.S.C. § 4001(d))

Even if, for example, Congress were to unambiguously state in statute that, as a condition of participation in the NFIP, the communities must prohibit all floodplain development except for habitat restoration projects and levee repairs, this would still be an invalid exercise of the constitutional power to tax and spend. The program conditions must be related to the Federal interest they are intended to serve. As stated above, the purpose of the program is to provide flood insurance to structures that are at risk of flooding. If Congress had intended to establish a program to prohibit all or most future floodplain development, there would be no need to provide for a flood insurance program for structures located in the floodplain. Because a condition to prohibit all, or almost all, floodplain development in participating communities is not reasonably related to the Federal interest in establishing a program to make flood insurance available to structures in floodprone areas, this would be an invalid use of the constitutional authority to tax and spend.

4. Restrictions to Use of Spending Power – No Independent Bar

The Supreme Court has also held that other constitutional provisions may provide an independent bar to the conditional grant of Federal funds. See Lawrence County v. Lead-Deadwood School Dist., 469 U.S. 256, 269-270 (1985); Buckley v. Valeo, 424 U.S. 1, 91 (1976); King v. Smith, 392 U.S. 309, 333, n. 34 (1968).

Congress has wide latitude to attach conditions to the receipt of Federal assistance to further its policy objectives, South Dakota v. Dole, 483 U.S. 206 (1987), but may not "induce" the recipient "to engage in activities that would themselves be unconstitutional," *id.*, at 210; see also, United States v. American Library Ass'n, 539 U.S. 194 (2003). So, for example, if Congress placed a condition on a community's participation in the program requiring it to prohibit all, or almost all, floodplain development in large areas of the community, this would likely be an invalid exercise of the spending power because the condition would compel the community to engage in an unconstitutional taking of property in violation of the Taking Clause of the Fifth Amendment to the Constitution, as incorporated against the States by the Fourteenth Amendment. Regulatory actions will generally be deemed *per se* takings for Fifth Amendment purposes where regulations completely deprive an owner of "all economically beneficial use" of her property. See Lucas v. South Carolina Coastal Council, 505 U.S. 1003 (1992).

The NFIP, when operating precisely as intended by Congress, results in no unconstitutional taking of plaintiffs' property, regardless of State law. See Texas Landowners Rights Association v. Harris, 453 F.Supp. 1025, 1032-33 (D.D.C. 1978). However, if the NFIP were improperly expanded to place prescriptive land use requirements and severe restrictions on floodplain development, that could constitute a taking and, as such, would provide an independent bar to the constitutional use of the spending power to impose such requirements.

I.3 Whether FEMA "allows" private floodplain development to occur.

One commenter suggested that FEMA allows floodplain development to occur. Floodplain development is not authorized, funded, or carried out by FEMA (except with respect to certain grant programs outside the scope of this evaluation). FEMA has no land use authority. As stated in Section 1.3.1 of the NPEIS, the power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

Unlike certain Federal agencies, such as the United States Army Corps of Engineers (USACE), FEMA does not control whether development is or is not allowed within its area of regulatory jurisdiction. The State and communities retain the land use authority to determine what private floodplain development may, or may not, be carried out in the community and what requirements or restrictions, if any, should be placed on such private development. FEMA's only authority is to place such certain flood risk reduction-related conditions on how development in the floodplain is carried out in communities participating in the NFIP.

I.4 Whether FEMA already prohibits floodplain development and/or places significant restrictions on floodplain development.

One commenter expressed the belief that FEMA already prohibits development and/or places significant restrictions on floodplain development. FEMA sets certain nationally applicable minimum floodplain management criteria related to reducing flood hazard risk in floodplain areas for all NFIP participating communities. The communities must incorporate these minimum floodplain management criteria into community ordinances and regulations as a condition of participation in the NFIP. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. FEMA cannot require the communities to prohibit development. FEMA can only place certain floodplain risk reduction-related conditions on how that development will be carried out.

As noted in Section 1.3.1.2 of the NPEIS, although some minimum floodplain management criteria do utilize the word "prohibit" (e.g., 44 Code of Federal Regulations [C.F.R.] § 60.3(d)(3)'s requirement to "prohibit all encroachments..."), this word was utilized for the purposes of clarity to the participating communities. A careful reading of the regulations reveals that these criteria are actually performance standards. For example, one of the commenters provided the example of 44 C.F.R. § 60.3(d)(3)'s requirement to prohibit all encroachments in the floodway that cause a rise in flood heights. This requirement is not actually a prohibition on development in the floodway, but a requirement that the community to ensure that development is done in such a manner that it does not result in an increase in flood heights. There are a number of ways to meet this performance standard including, but not limited to: (a) reducing the size of the proposed development; (b) demolishing existing development; (c) not developing; or (d) providing compensatory storage. Because FEMA has no land use authority, FEMA does not dictate how the performance standard is met.

Another commenter points to FEMA's minimum floodplain management criterion at 44 C.F.R. § 60.3(e)(7), which requires that before any man-made alteration of mangroves or sand dunes takes place, the community or project proponent must undertake an analysis to demonstrate that the proposed development activities would not increase potential flood damage. Again, this is not a prohibition on development in mangroves or sand dunes, but a requirement that development in those areas be carried out in such as a manner as to not increase flood damage.

I.5 Whether FEMA can influence floodplain development through existing statutory and regulatory authority.

Two commenters suggested that FEMA has the authority to influence floodplain development through its statutory and regulatory authority. FEMA agrees, and this agreement is reflected in the NPEIS. As FEMA states in Section 1.3.1 of the NPEIS:

The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. FEMA has no land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States,⁷ and the States delegate this power down to their respective political subdivisions. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides.

FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

As stated in Section 1.3.1 of the Final NPEIS, FEMA's role under the NFIP is limited to enrolling communities in the NFIP, setting the minimum floodplain management criteria, providing programmatic monitoring and oversight, and providing technical assistance to ensure that communities are complying with the NFIP program requirements, and enforcing the program requirements when there are issues of programmatic non-compliance by a participating community. See National Wildlife Federation v. FEMA, 2014 U.S. Dist. LEXIS 151386 (W.D. Wa. 2014).

As explained in Section 2.3.2.1 of the Final NPEIS, these limitations on FEMA's legal authorities mean that FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of floodplain development that are allowed in the floodplain, the amount of development that is allowed in the floodplain, the uses of land that are allowed in the floodplain, or any other general land use restriction that is under State or local land use authority.

What FEMA can do, however, is establish certain flood risk-reduction related requirements as to how that floodplain development may be carried out, and these requirements apply to all new and substantially improved floodplain development in NFIP participating communities. For

⁷ Under the Tenth Amendment to the Constitution, "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people." This Amendment has been held to be the source of authority for the States' to establish and enforce laws protecting the welfare, safety, and health of the public (i.e., the "police power").

example, FEMA has established a minimum floodplain management criterion requiring that all new and substantially improved structures in the floodway be built in such a manner so as not to cause a rise in flood levels (44 C.F.R. § 60.3(d)(3)). These minimum requirements can influence floodplain development by encouraging communities, and those in them, to build smarter and safer to minimize flood risk and the associated financial and personal costs of floods. In Sections 3.1.16 and 4.3.2.2 of the NPEIS, FEMA acknowledges its influence on land use from the implementation of the floodplain management criteria, flood hazard mapping, and the Community Rating System (CRS).

I.6 Whether FEMA's lack of legal authority prevents the agency from regulating floodplain development to mitigate the negative impacts to the environment.

Three commenters noted that FEMA's lack of legal authority does not prevent the agency from regulating floodplain development to mitigate the negative impacts to the environment, including impacts to endangered species, from such development. FEMA agrees, and this agreement is reflected in the NPEIS. Under Alternative 3, which FEMA agrees it has legal authority to implement with changes to its regulations in 44 C.F.R. Part 60, FEMA would have utilized its statutory and regulatory authority to require communities to ensure that the adverse impacts of private floodplain development to threatened and endangered species, and their habitat, are mitigated. FEMA did not move forward with this alternative due to the lack of concurrence from the Services after approximately five years of working with them to move the draft rule forward (see response to Comment IV.2 for more detail). But for the Services' lack of concurrence, Alternative 3 would have been the preferred alternative. However, as explained in the response to Comment IV.2, FEMA continues to work with the Services to find ways it can utilize its authorities to enact programs for the conservation of species, and FEMA hopes that future environmental documents will reflect the successful culmination of these efforts.

II. Whether the NFIP facilitates, encourages, incentivizes, allows, and/or influences floodplain development.

Nine commenters (Center for Biological Diversity, American Rivers, National Wildlife Federation, Audubon Society of Portland, Vermont Agency of Natural Resources, Nicollet Island Coalition, Water Protection Network) suggested that the NFIP facilitates, encourages, incentivizes, allows, and/or influences floodplain development. Specific comments provided on this issue include:

- Whether FEMA "allows" landowners to remove their flood-prone lands from SFHAs by filling in the floodplain.
- Whether FEMA incentivizes the construction of levees.
- FEMA fails to prohibit development and/or place significant restrictions on development (CBD)
- Whether the availability of flood insurance is determining factor in development of flood-prone Areas.
- Whether artificially low flood insurance rates act as a subsidy to encourage unsustainable development in high risk areas and ecologically sensitive areas.

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- Whether FEMA influences floodplain development and/or community land use.

II.1 Whether FEMA "allows" landowners to remove their flood-prone lands from SFHAs by filling in the floodplain.

Four commenters expressed the belief that FEMA allows landowners to remove their flood-prone land from SFHAs by filling in the floodplain. These commenters appear to be referring to FEMA's Letter of Map Revision (LOMR) process. FEMA is required by statute to revise and update flood hazard maps (a) upon a determination that such revision or updates are necessary or (b) upon request from any State or community if accompanied by technical data sufficient to justify the requested change (42 U.S.C. § 4101(f)). To assess flood hazards in a community, FEMA conducts Flood Insurance Studies (FISs) and publishes FIS reports that describe the flood hazards for the community. FEMA uses the information developed in the FIS to prepare Flood Insurance Rate Maps (FIRMs).

As discussed in Section 1.3.2.4 of the NPEIS, a LOMR is FEMA's non-discretionary modification to an effective Flood Insurance Rate Map (FIRM). LOMRs are generally issued to update hydrologic or hydraulic characteristics of a flooding source that result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). When data that meets the requirements of 44 C.F.R. Part 65 is submitted to FEMA, FEMA is required by statute to update the flood hazard information to reflect the updated conditions, whether due to natural or man-made changes to the terrain, hydrology, or hydraulics (42 U.S.C. § 4101(f)). The specific LOMR being referred to in these comments is the Letter of Map Revision Based on Fill (LOMR-F). A LOMR-F may be issued when a property is located or will be located in an SFHA and property owners or project proponents choose to elevate the grade of the land on their properties through the placement of fill in order to elevate the grade of the land above the projected 1-percent-annual-chance flood elevation (also known as the 100-year floodplain or the BFE). This would elevate the land outside the SFHA and, thus, out of the area of flood hazard associated with the 1-percent-annual-chance flood. This is an effective method of reducing the risk of flood damage to property and protecting against loss of life in the event of a flood.

The regulatory jurisdiction of the NFIP is limited to the SFHA. Only properties within the 100-year floodplain are subject to the NFIP's regulatory jurisdiction. Once a property owner takes sufficient action to reduce his or her risk so that the property is no longer subject to the 100-year flood, that property is no longer in the 100-year floodplain and, as such, no longer subject to the NFIP's regulatory jurisdiction. The LOMR-F is essentially an acknowledgment of the fact that the property in question is no longer within the 100-year floodplain and, thus, no longer under the regulatory jurisdiction of the NFIP.

To ensure that the LOMR-F process is not circumventing the local permitting process, community review and acknowledgement of all LOMR-F applications is required prior to FEMA's issuance of a LOMR-F determination. This community acknowledgement is to ensure the community affirms that the development is in compliance with the community's local ordinances that must meet, but may exceed, NFIP minimum standards.

As an initial matter, FEMA would like to make it clear that it does not "allow" private floodplain development to occur. Floodplain development is not authorized, funded, or carried out by FEMA (except with respect to certain grant programs outside the scope of this evaluation). FEMA has no land use authority. As stated in Section 1.3.1 of the NPEIS, the power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of floodplain development that are allowed in the floodplain, the amount of development that is allowed in the floodplain, the uses of land that are allowed in the floodplain, or any other general land use restriction that is under State or local land use authority.

Furthermore, FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources. FEMA is also not authorized by statute to act as a permitting authority. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and floodplain development permitting process.

Moreover, the fact that FEMA does not do more to prohibit and/or significantly restrict development does not mean that FEMA is "allowing" such development to occur. Unlike certain Federal agencies, such as the USACE, FEMA does not control whether development is or is not allowed within its area of regulatory jurisdiction. The State and communities retain the land use authority to determine what private floodplain development may, or may not, be carried out in the community and what requirements or restrictions, if any, should be placed on such private development. As explained above and in the response to Comment II.3, FEMA has no legal authority to prohibit and/or significantly restrict development. Nor does FEMA have the authority to authorize or permit such development. All of these authorities reside with the State and the local communities. FEMA's only authority is to set certain minimum flood risk reduction-related criteria on how development in the floodplain is carried out for communities participating in the NFIP to adopt into their local ordinances and to monitor a community's programmatic compliance to ensure these criteria are being implemented and carried out.

In fact, FEMA does not even know that private floodplain development has taken place unless FEMA staff review the associated permit during a Community Assistance Visit (CAV) or the project proponent submits a Letter of Map Change (LOMC) request to have the any associated changes in the flood risk reflected from the private development reflected on the FIRM.

However, by the time either of these two processes take place, the development has already taken place.

In addition to stating that the NFIP "allows" floodplain development, these commenters also suggest that the LOMR-F process incentivizes the placement of fill. In the nearly 50 years since the establishment of the NFIP, there have not been any studies or hard data produced establishing a linkage between the NFIP's LOMR-F process and floodplain development. Nevertheless, four commenters perceive, despite the lack of any supporting studies or data, that the NFIP encourages the placement of fill for the purpose of having the property removed from the SFHA and the requirements attendant to properties in the SFHA. Although a few commenters pointed to statements made in Biological Opinions issued by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (collectively, the "Services") or commentary provided by one Federal court, these statements lack any support in actual studies or hard data and solely reflect the perceptions of those providing the statements.

As discussed in Section 2.3.3 of the NPEIS, recognizing that this perception exist, FEMA has proposed changes, pursuant to Alternative 2 of the NPEIS (the Preferred Alternative), to require NFIP participating communities to demonstrate ESA compliance with respect to the private floodplain development in the community. FEMA will then request this documentation prior to issuing a LOMR-F determination. Because, as stated above, FEMA does not permit, authorize, or allow floodplain development to occur, it has no duty to ensure ESA compliance has been obtained for those actions because this should be the responsibility of the local permitting authority. However, although FEMA has no role in obtaining ESA compliance for private development, FEMA can take actions to ensure that the project proponents' ESA compliance is properly demonstrated/documented prior to issuing LOMR determinations. Leveraging the current process that requires communities to review LOMR requests and submit them on behalf of the project proponent, FEMA will require documentation that the project complied with the at the time the development was permitted by the community.

Currently, FEMA's minimum floodplain management criteria at 44 C.F.R. § 60.3(a)(2) requires communities to, for all floodplain development permits, "review [the] proposed development to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law..." Under Alternative 2 of the NPEIS, the Preferred Alternative, FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, the community must obtain and maintain documentation of compliance with the ESA for the proposed floodplain development. Furthermore, FEMA will require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought has complied with the ESA outside of the FEMA LOMR process, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). As discussed above, FEMA has always required compliance with the ESA as a

condition of the community's issuance of a floodplain development permit. This proposed clarification would simply add a documentation requirement that would assist FEMA and the NFIP-participating communities in documenting this compliance.

II.2 Whether FEMA incentivizes the construction of levees.

Three commenters commented that FEMA incentivizes the construction of levees. As stated in Section 1.3.2.10 of the NPEIS, FEMA does not certify, design, construct, permit, or otherwise approve levees, levee systems, or floodwalls. However, FEMA has regulatory requirements (44 C.F.R. § 65.10) that must be met before any levee, levee system, or floodwall can be depicted on a FIRM as reducing the risk of the 1-percent-annual-chance flood, also referred to as the BFE. While there are no immediate consequences to the determination that a levee system meets levee accreditation requirements described in 44 C.F.R. § 65.10, generally the community will request that FEMA issue a LOMR to revise the flood hazards shown on the effective FIRM, as appropriate, to identify the area landward of the levee as outside the SFHA.

As discussed in Section 1.3.2.4 of the NPEIS, a LOMR is FEMA's non-discretionary modification to an effective FIRM. LOMRs are generally issued to update hydrologic or hydraulic characteristics of a flooding source that result in the modification of the existing regulatory floodway, the effective BFEs, or the SFHA.

The regulatory jurisdiction of the NFIP is limited to the SFHA. Only properties within the 100-year floodplain are subject to the NFIP's regulatory jurisdiction. Once a community or property owner takes sufficient actions, such as the construction of a levee, to reduce the risk so that properties are no longer subject to the 100-year flood, those properties are no longer in the 100-year floodplain and, as such, no longer subject to the NFIP's regulatory jurisdiction. LOMRs and LOMR-Fs are an acknowledgment of the fact that the flood hazard information for the subject areas and/or properties in question have changed. In situations where technical data is submitted to justify a reduction in the SFHA, the subject areas and/or properties would no longer be within the 100-year floodplain and no longer under the regulatory jurisdiction of the NFIP.

In the nearly 50 years since the establishment of the NFIP, there have not been any studies or hard data produced establishing a linkage between the NFIP's levee accreditation process and floodplain development. Nevertheless, three commenters perceive, despite the lack of any supporting studies or data, that the NFIP encourages the construction of levees for the purpose of having the property removed from the SFHA and the requirements attendant to properties in the SFHA.

As discussed in Section 2.3.3 of the NPEIS, recognizing that this perception exists, FEMA has proposed changes, pursuant to Alternative 2 of the NPEIS (the Preferred Alternative), to demonstrate ESA compliance with respect to the private floodplain development associated with a LOMR request. Because, as stated above, FEMA does not permit, authorize, or allow the construction of levees; therefore, FEMA has no duty to secure ESA compliance for those actions. However, FEMA can take actions to ensure that the project proponents' ESA compliance is properly demonstrated/documented.

Currently, FEMA's minimum floodplain management criteria at 44 C.F.R. § 60.3(a)(2) requires communities to, for all floodplain development permits, "review [the] proposed development to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law..." Under Alternative 2 of the NPEIS, the Preferred Alternative, FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, the community must obtain and maintain documentation of compliance with the ESA for the proposed floodplain development. Furthermore, FEMA will require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain, including levees. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought has complied with the ESA outside of the FEMA LOMR process, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). As discussed above, FEMA has always required compliance with the ESA as a condition of the community's issuance of a floodplain development permit. This proposed clarification would simply add a documentation requirement that would assist FEMA and the NFIP-participating communities in documenting this compliance for permitted development. Notably, the LOMR documentation requirement would also cover LOMRs associated with the mapping of levee accreditations.

II.3 Whether FEMA fails to prohibit development and/or place significant restrictions on development.

One commenter commented that FEMA fails to prohibit and/or place significant restrictions on development in the floodplain.

As FEMA states in Section 1.3 of the NPEIS:

The power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. FEMA has no land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States,⁸ and the States delegate this power down to their respective political subdivisions. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides.

FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations authorizing local governments to regulate floodplain development under the State's police powers to protect the

⁸ Under the Tenth Amendment to the Constitution, "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people." This Amendment has been held to be the source of authority for the States to establish and enforce laws protecting the welfare, safety, and health of the public (i.e., the "police power").

health, safety, and general welfare of its citizens. For the most part, local governments bear the responsibility for protecting residents from flood hazards, working to reduce flood damage, and preserving floodplain functions and resources.

As stated on Section 1.3.1.9 of the Final NPEIS, FEMA's role under the NFIP is limited to enrolling communities in the NFIP, setting the minimum floodplain management criteria for communities to adopt into local ordinances, providing programmatic monitoring and oversight, and provision of technical assistance to ensure that communities are complying with the NFIP program requirements, and enforcing the program requirements when there are issues of programmatic non-compliance by a participating community. See National Wildlife Federation v. FEMA, 2014 U.S. Dist. LEXIS 151386 (W.D. Wa. 2014).

As explained in Section 2.3.2 of the NPEIS, FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of development that are allowed in the floodplain, the amount of development that is allowed in the floodplain, the uses of land in the floodplain, or any other general land use restriction that is under State or local land use authority.

What FEMA can do, however, is establish certain flood risk-reduction related requirements as to how floodplain development may be carried out, to be adopted into local ordinances by communities participating in the NFIP. These requirements would then apply to all new and substantially improved floodplain development in these NFIP participating communities. For example, FEMA has established a minimum floodplain management criterion requiring that all new and substantially improved structures in the floodway be built in such a manner so as not to cause a rise in flood levels (44 C.F.R. § 60.3(d)(3)). These minimum requirements can influence floodplain development by encouraging communities, and those in them, to build smarter and safer to minimize flood risk and the associated financial and personal costs of floods.

FEMA also believes it can modify the minimum standards for floodplain development to mitigate the negative impacts to the environment, including impacts to endangered species, from such development. Under Alternative 3 of the NPEIS (described in Sections 2.3.2 and 2.4.3 of the NPEIS), which FEMA agrees it has legal authority to implement with changes to its regulations in 44 C.F.R. Part 60, FEMA would have utilized its statutory and regulatory authority to require communities to ensure that the adverse impacts of private floodplain development to threatened and endangered species, and their habitat, are mitigated. As explained in Section 2.5 of the NPEIS, FEMA did not move forward with this alternative due to the lack of concurrence from the Services after approximately five years of working with them to move the draft rule forward (see response to Comment IV.2 for more detail). But for the Services lack of concurrence, Alternative 3 would have been the preferred alternative. However, as explained in the response to Comment IV.2, FEMA continues to work with the Services to find ways it can utilize its authorities to enact programs for the conservation of species, and FEMA hopes that future environmental documents will reflect the successful culmination of these efforts.

II.4 Whether the availability of flood insurance is the determining factor in the development of flood-prone areas.

Three commenters commented that flood insurance is a determining factor in the development of flood-prone areas. Two of the three commenters point to the congressional finding in 42 U.S.C. § 4002 in support of this statement. In Section 1302 of the NFIA, there is a congressional finding that "the availability of Federal loans, grants, guaranties, insurance, and other forms of financial assistance are often determining factors in the utilization of land and the location and construction of public and private industrial commercial, and residential facilities" (42 U.S.C. § 4002). Notably, while the commenters utilize this congressional finding as evidence of the effects of the NFIP on facilitating floodplain development, this finding was made before the NFIP was even established. Additionally, the validity of this finding – at least insofar as it relates to Federal flood insurance - was undermined shortly after the passage of this Act. As explained in Section 4.1.1 of the NPEIS, as of 1972, there were only 95,000 NFIP policies in force. If Federal flood insurance were a determining factor in the utilization of land, one would expect a commensurate precipitous drop in the rate of development, but there was no such decrease in development rates. Indeed, there were so few policies in force that Congress passed the Flood Disaster Protection Act of 1973 to require the purchase of flood insurance as a condition of all federally backed loans and Federal assistance for buildings located in the mapped SFHA.

Nevertheless, while the 1973 Act did increase the number of NFIP policies in existence, the uptake of such policies is still low as compared to the number of buildings located in the SFHA. As explained in Section 4.1.1.1 of the NPEIS, a 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that factors other than flood insurance are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress" (Congressional Research Service, 2013).

Moreover, although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of development in the floodplain. A 2006 American Institutes for Research (AIR) report provides a number of data points on the level and concentration of NFIP policies within the States, territories, and participating communities demonstrating this point. Out of approximately 20,000 communities participating in the NFIP in 2006:

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;

- Five states – California, Florida, Louisiana, New Jersey, and Texas - accounted for nearly 70 percent of all NFIP policies; and
- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (AIR - Monday et al., 2006)

Additionally, one commenter points to a 1984 letter by a solicitor with the Department of the Interior that was cited in Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1231 (S.D.Fl. 1994), which stated that if FEMA flood insurance was not made available in floodplains, there would be no development at all in the floodplains. This statement has been completely invalidated by the studies and research that have been undertaken since that date.⁹

For example, as further explained in Section 4.1.1.1 of the NPEIS, the Government Accountability Office (GAO) analyzed floodplain development data both before and after a community entered the NFIP. The GAO used (1) available U.S. Census Bureau data on population, per capita income, and new housing units authorized by building permits and public contracts in the United States, and (2) building permits which the six selected communities reportedly issued. The GAO's analysis concentrated on population growth and increases in housing units authorized for construction. The GAO compared the rate of population growth in a 20-year period with the dates the communities entered the program. Generally, the communities were growing before their entrance into the program from 1960 to 1970, and this rate of growth continued from 1970 to 1980.

The GAO obtained data on new housing units authorized for a 10-year period for the nation and the three larger communities, but the GAO was only able to obtain this data from 1977 to 1980 for the three smaller communities. New housing units authorized were increasing in all three larger communities prior to their entrance into the flood insurance program and continued to increase thereafter. The GAO was unable to attribute the rate of increase in new housing units authorized to the availability of flood insurance because of the many other factors that promote community development. The GAO found that annual increases and decreases in new housing units authorized generally paralleled the rise and decline of total housing units authorized in the nation and seemed to be more directly related to the state of the economy than the availability of flood insurance.

Additionally, as discussed in Section 4.1.1.1 of the NPEIS, the 2006 AIR report took a different approach and looked at floodplain development in areas where flood insurance is available compared to areas in which it is not available (e.g., Coastal Barrier Resources System [CBRS] units). In this study, AIR found that many CBRS units have been developed, often quite extensively, despite the absence of NFIP flood insurance. The report noted that development

⁹ Notably, the same commenter points to a 1988 Department of the Interior (DOI) Coastal Barrier Resources Report that reaches a similar conclusion. However, FEMA's review of the relevant portions reveals that the statements made in the report are unsupported speculation and conclusory assertions. In fact, the one relevant statement that the DOI did offer support for was the statement that "there is no convincing evidence that the availability of such insurance is itself a determining factor in decisions to develop property" (DOI, 1988, pp. IV-37). For this statement, the DOI cited the 1982 GAO report referenced in this response.

appeared to result from a combination of State and local government incentives and market forces. For example, units in Bethany Beach, Delaware; North Topsail Beach, North Carolina; and Cape San Blas, Florida studied in 1997 developed very much like nearby non-System areas. The report further found that market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce. (AIR - Rosenbaum, W., 2005)

As reported in the FEMA *Floodplain Management Losses Avoided Study*, which is also discussed in Section 4.1.1.1 of the NPEIS, more than half (57 percent) of residential properties located in SFHAs were built prior to the inception of the NFIP. As such, it is clear that development has occurred, and would continue to occur, in the SFHA even in the absence of flood insurance. Thus, the research and empirical evidence demonstrate that the availability of flood insurance has very little effect on the motivation to develop the floodplain, which was already well established prior to the inception of the program (FEMA, 2014).

Finally, one commenter refers to a statement made by the court in National Wildlife Federation v. FEMA, 345 F.Supp.2d 1151 (W.D. Wash. 2004), stating that "[i]f a community chooses not to participate in the [NFIP], economic development in the flood hazard area may be severely restricted." Notably, the court did not have any of the data, studies, and research cited above before it when it made this statement. Additionally, because the statement was made more than a decade ago, it fails to take into account the changes that have occurred due to the passage of the Biggert Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA), some of which are discussed below.

Environmental advocacy organizations, such as the commenter referenced in this response, have asserted that inexpensive NFIP premiums encourage development in high-risk flood zones that might not otherwise occur. Commonly suggested remedies include increasing NFIP premiums to reflect the true flood risk to the property (Pew Oceans Commission, 2003, p. 58). As explained in Section 4.5.2.1 of the NPEIS, until recently, one major obstacle for private market insurers entering the flood insurance market has been the inability of private carriers to compete with subsidized premiums that are offered by the NFIP for certain properties (i.e., pre-FIRM buildings) (Insurance Journal, 2014). While private insurers have the capacity to provide coverage for flooding risk and can price more accurately using better modeling tools, some have asserted that the lower premium rates offered by the NFIP have hindered their entrance into the market.

However, industry experts and reports have found that private insurers may be willing to write significant amounts of flood business if they are allowed to charge actuarially sound rates. According to the Fitch Ratings Report, if and when Federal subsidies for flood insurance are reduced and the cost of government provided flood insurance goes up, the demand for private flood coverage is projected to rise. (Insurance Journal, 2014)

As further explained in Section 4.5.2.1 of the NPEIS, following BW-12, HFIAA, and initiation of the phase out of flood insurance subsidies for pre-FIRM properties, a number of private insurance companies are beginning to offer private flood insurance at competitive rates. With

the introduction of private flood insurance into the Government dominated market, flood insurance rates are expected to become competitive and result in better policies and pricing for homeowners. Both Lloyd's of London and The Flood Insurance Agency (TFIA) are offering flood insurance policies in 33 States. The TFIA predicted an expansion from \$500M in insured property to \$1B by the end of 2014 (Hurtibise, 2014). Other insurance companies offering private flood insurance policies are Homeowners Choice Property & Casualty Insurance, who has just expanded their coverage area to include the State of Florida, Gridiron Insurance Underwriters, and Chubb Personal Flood Insurance. A number of private insurance providers also provide flood coverage that exceeds the maximum allowable limits statutorily authorized for the NFIP (\$250,000 for structural damage and \$100,000 for contents for residential properties, as well as \$500,000 each for structure and contents for non-residential properties) (Insurance Journal, 2014).

Premium rates are also increasing substantially for non-subsidized policies (i.e., policies on post-FIRM buildings) from the recent legislative changes. As a result of BW-12, FEMA is required to establish a Reserve Fund for the purpose of meeting the expected future obligations of the flood insurance program. FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment was introduced in October 2013 as a 5 percent assessment on all policies, and there is now a 15 percent assessment on all policies. That percentage is expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually. Additionally, as a result of HFIAA, all policyholders have to pay a surcharge of \$25 for policies on a primary residence and \$250 on all other policies. As such, even for non-subsidized policies, the market has grown significantly more competitive, and with the addition of these fees and surcharges, the NFIP is unlikely to be the most competitive insurer on the market in many cases.

BW-12 further removed obstacles to private market flood insurance by amending the Flood Disaster Protection Act of 1973 to allow federally backed lenders to accept private flood insurance in satisfaction of the mandatory purchase requirement (42 U.S.C. § 4012a). Communities do not need to participate in the NFIP to ensure their eligibility for Federal assistance. As long as flood insurance is purchased by recipients of federally backed loans and Federal assistance located in special flood hazard areas, it is irrelevant whether that flood insurance is purchased through the NFIP or through the private flood insurance market.

As noted in Section 4.5.2.1 of the NPEIS, private market participation has already increased significantly and will continue to do so as the NFIP moved further towards actuarial rates. As the market for private flood insurance grows, communities will still have access to flood insurance at the same price, but without the additional burden of compliance with the minimum floodplain management regulations and government-imposed assessments, fees, and surcharges. As such, even if one were to accept the premise that the availability of flood insurance has some role in facilitating floodplain development, this does not demonstrate that the NFIP is a "but for" cause of such development because there is a private flood insurance market and, in many cases, a more attractive private market alternative.

II.5 Whether artificially low flood insurance rates act as a subsidy to encourage unsustainable development in high risk areas and ecologically sensitive areas.

Three commenters commented that artificially low flood insurance rates act as a subsidy to encourage unsustainable development in high risk areas and ecologically sensitive areas. Since the inception of the program, it has been a common misconception that FEMA offers subsidized flood insurance rates for new floodplain development. For example, in an article cited by one of the commenters, entitled "Flooding the Market: The Distributional Consequences of the NFIP," the authors fail to distinguish between the subsidized flood insurance rates offered to existing development versus the actuarial flood insurance rates offered to new development. As discussed in Section 1.3.3 of Chapter 1 of the NPEIS, as originally established, the NFIA authorized FEMA to provide subsidized flood insurance for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings"). However, these subsidized flood insurance rates were not available for new development or for substantial improvements to existing development. Subject to very limited, short-term exceptions established in 42 U.S.C. § 4014(e)-(f), FEMA must apply actuarial rates to all buildings constructed, or substantially damaged or improved, on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later (generally referred to as "post-FIRM buildings") (42 U.S.C. §§ 4014(a)(1), 4015(b)).

Furthermore, under Alternatives 2, 3, and 4 of the NPEIS (discussed in Section 2.4 of the NPEIS), and as required by BW-12 and HFIAA, FEMA would phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25 percent premium rate increases per year, subsidies on lapsed policies will be phased out immediately, and the rest will be phased out at a rate of 5 percent to 15 percent premium rate increases per year. Accordingly, when this phase out is completed, FEMA will not offer subsidized flood insurance for either new or existing floodplain development (subject to the limited, short-term statutory exceptions referenced above).

Additionally, as explained in Section 4.5.2.1 of Chapter 4 of the NPEIS, the premium rates for non-subsidized policies (i.e., policies on post-FIRM buildings) are also increasing substantially from the recent legislative changes. Because of BW-12, FEMA is required to establish a Reserve Fund for meeting the expected future obligations of the flood insurance program. FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment was introduced in October 2013 as a 5 percent assessment on all policies, and there is now a 15 percent assessment on all policies. That percentage is expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually. Additionally, because of HFIAA, all policyholders have to pay a surcharge of \$25 for policies on primary residences and \$250 on all other policies. Because of all the additional fees and surcharges associated with a Federal insurance policy, these policies may be more expensive than private insurance policies even where the premiums on both policies are equal.

II.6 Whether FEMA influences floodplain development and/or community land use.

Five commenters commented that FEMA influences floodplain development and/or community land use. As demonstrated by the discussion in the NPEIS, FEMA agrees. As explained in Section 2.3.2 of the NPEIS, FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of floodplain development that are allowed in the floodplain, the amount of floodplain that is allowed in the floodplain, the uses of land that are allowed in the floodplain, or any other general land use restriction that is under State or local land use authority.

What FEMA can do, however, is establish certain flood risk-reduction related requirements as to how that floodplain development may be carried out, and these requirements apply to all new and substantially improved floodplain development in NFIP participating communities. For example, FEMA has established a minimum floodplain management criterion requiring that all new and substantially improved structures in the floodway be built in such a manner so as not to cause a rise in flood levels (44 C.F.R. § 60.3(d)(3)). These minimum requirements can influence floodplain development by encouraging communities, and those in them, to build smarter and safer to minimize flood risk and the associated financial and personal costs of floods. In Sections 3.1.16 and 4.3.2.2 of the NPEIS, FEMA acknowledges its influence on land use from the implementation of the floodplain management criteria, flood hazard mapping, and the CRS.

III. Whether FEMA's statements that it does not encourage or facilitate floodplain development are unsupported and/or contrary to the existing evidence

A number of commenters (Center for Biological Diversity, American Rivers, Columbia Law School, Association of State Floodplain Managers, National Wildlife Federation, Washington Department of Ecology, Audubon Society of Portland, Vermont Agency of Natural Resources) suggested that FEMA's statements that it does not encourage or facilitate floodplain development are unsupported and/or contrary to the existing evidence. Specific comments provided on this issue include:

- Whether FEMA's statement that it does not facilitate or encourage floodplain development is unsupported.
- Whether the 1982 GAO Report on which FEMA relies is outdated.
- Whether penetration rates data from 2013 Congressional Research Service is flawed.
- Whether the AIR Report demonstrates that FEMA incentivizes/encourages floodplain development.
- Whether the Biological Opinions demonstrate that FEMA facilitates and encourages floodplain development.
- Whether the lawsuits demonstrate that NFIP influences floodplain development/FEMA fails to consider lawsuits.
- Implications for the NFIP on land use and zoning and the appropriateness of a no-impact determination for land use and zoning.

III.1 Whether FEMA's statement that it does not facilitate or encourage floodplain development is unsupported.

Three commenters asserted that FEMA's statements that it does not facilitate or encourage private floodplain development are not well supported with data, research and studies. As noted in Section 4.1.1.1 of the NPEIS, studies have not shown that there is any demonstrable connection between the implementation of the NFIP and increased floodplain development. For example, the GAO analyzed floodplain development data both before and after a community entered the NFIP. The GAO obtained data on new housing units authorized for a 10-year period for the nation and for three larger communities; however, the GAO was only able to obtain data from 1977 to 1980 for three smaller communities. New housing units authorized increased in the three larger communities prior to their entrance into the flood insurance program and continued to increase thereafter. The GAO was unable to attribute the rate of increase in new housing units authorized to the availability of flood insurance because of the many other factors that promote community development. The GAO found that annual increases and decreases in new housing units authorized generally paralleled the rise and decline of total housing units authorized in the nation and seemed to be more directly related to the state of the economy than the availability of flood insurance. (GAO, 1982)

As further discussed in Section 4.1.1.1 of the NPEIS, the AIR report took a different approach and reviewed floodplain development in areas where flood insurance is available in comparison to areas in which it is unavailable (e.g., CBRS units). In this study, the AIR report found that many CBRS units have been developed, often quite extensively, despite the absence of Federal flood insurance. The report noted that development appeared to result from a combination of State and local government incentives and market forces. For example, CBRS units in Bethany Beach, Delaware; North Topsail Beach, North Carolina; and Cape San Blas, Florida studied in 1997 developed very much like nearby non-CBRS areas. The report further found that market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce. (AIR - Rosenbaum, W., 2005)

As reported in the FEMA Floodplain Management Losses Avoided Study, which was also discussed in Section 4.1.1.1 of the NPEIS, more than half (57 percent) of residential properties located in SFHAs were built prior to the inception of the NFIP. As such, it is clear that development has occurred, and would continue to occur, in the SFHA even in the absence of flood insurance. Thus, research and empirical evidence demonstrate that the availability of flood insurance has very little effect on the motivation to develop in the floodplain, which was already well established prior to the inception of the NFIP. (FEMA, 2014)

FEMA's conclusions that the NFIP does not encourage or facilitate private floodplain development are also supported by the policy data, which is elaborated upon in Section 4.1.1.1 of the NPEIS. As of 1972, there were only 95,000 NFIP policies in force. If Federal flood insurance were a determining factor in the utilization of land, one would expect a commensurate precipitous drop in the rate of development, because with so few policies in force (and many of those policies were likely for development that pre-dated the NFIP), there could not have been

much new development secured by flood insurance. However, there was no such decrease in development rates.

Indeed, there were so few policies in force that Congress passed the Flood Disaster Protection Act of 1973 to require the purchase of flood insurance as a condition of all Federally backed loans and Federal assistance for buildings located in the mapped SFHA. Nevertheless, while the 1973 Act did increase the number of NFIP policies in existence, the uptake of such policies is still low as compared to the number of buildings located in the SFHA. A 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that factors other than flood insurance are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress." (Congressional Research Service, 2013)

Moreover, although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of development in the floodplain. A 2006 AIR report provides a number of data points on the level and concentration of NFIP policies within the States, territories, and participating communities demonstrating this point. Out of approximately 20,000 communities participating in the NFIP in 2006:

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;
- Five states – California, Florida, Louisiana, New Jersey, and Texas – accounted for nearly 70 percent of all NFIP policies; and
- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (AIR - Monday et al., 2006)

In sum, the relatively low interest of those living in floodplain areas in actually securing flood insurance to protect their property is strong evidence of the lack of connection between the availability of Federal flood insurance and private floodplain development. Not only are individuals and businesses not moving into the floodplain due to the availability of Federal flood insurance, but the vast majority are not securing such flood insurance for the development after it has been completed.

III.2 Whether the 1982 GAO Report on which FEMA relies is outdated.

One commenter suggests that one of the studies relied upon by FEMA, the 1982 GAO report entitled *The National Flood Insurance Program: Status and Remaining Issues for Congress*, is

outdated and was subject to limitations in the availability of data. In support of its impact statements for this NPEIS, FEMA analyzed the best available data, research, and studies in order to reach its conclusions about the NFIP's role, or lack thereof, with respect to private floodplain development. FEMA identified existing credible scientific and peer-reviewed sources relevant to the environmental consequences analysis per CEQ's implementing regulations (40 C.F.R. § 1502.22). In addition, the EPA's review of the NPEIS did not note any substantive changes to the document. As shown in Section 4.1.1.1 of the NPEIS, as well as in Appendix C, FEMA's statement that the NFIP does not incentivize floodplain development is supported by the existing data, research, and studies. Additionally, while FEMA recognizes that, per Section 1502.22 of the NEPA implementing regulations, it may have a duty to collect the data necessary to examine alternatives under the NPEIS, this duty only applies where the overall costs of obtaining the data are no exorbitant. A study that meets or exceeds the caliber of the GAO study conducted in 1982, or any of the other studies conducted on the NFIP's relationship to private floodplain development and cited in the NPEIS, would be an expected multimillion-dollar undertaking. In light of the NFIP's limited budget, and the millions of dollars already invested in producing this NPEIS, the costs of obtaining this data would be cost prohibitive.

Furthermore, the reason this commenter offers for stating that this report is outdated, other than its age, is inaccurate. The commenter suggests that the GAO study pre-dated the NFIA's requirement prohibiting federally-regulated lenders from making, extending, or renewing any loan on applicable property unless flood insurance is purchased or maintained and that, because the GAO study pre-dated the NFIA and, as such, it is outdated. That is incorrect. This requirement was not, as asserted by the commenter, a product of the National Flood Insurance Reform Act of 1994 (1994 Act), but rather the Flood Disaster Protection Act of 1973. The 1994 Act merely instituted measures to improve compliance with the requirements of the NFIA (National Flood Insurance Reform Act of 1994, 1994). For example, the 1994 Act included a provision allowing the forced placement of insurance if a lender or servicer determines that the building securing the loan is not adequately insured (National Flood Insurance Reform Act of 1994, 1994). As such, the GAO study does not pre-date the implementation of the prohibition on federally-regulated lenders from making, extending, or renewing any loan on applicable property unless flood insurance is purchased or maintained. Therefore, it cannot be considered outdated on that basis.

III.3 Whether penetration Rates Data from 2013 Congressional Research Service is Flawed.

One commenter suggested that FEMA's 18 percent market penetration rate figure was flawed because it was based on one statement made by an insurance industry representative. In fact, this figure came from a 2013 Congressional Research Service report based on data provided by the Insurance Information Institute, an organization dedicated to improving the public's understanding of insurance. For over 50 years, the Insurance Information Institute has been a recognized source of insurance data and analysis for governments, regulatory agencies, academia, news outlets, and the public in providing insurance information on a wide range of insurance-related topics, including flood insurance.

Moreover, even if this 18 percent figure were discounted, there are other data points that support FEMA's statement that market penetration for flood insurance is consistently low.

The 2013 Congressional Research Service Report cites to other sources as evidence of such low penetration rates. For example, the study notes that estimates have been provided from insurance experts that only 15 percent to 25 percent of at-risk properties in SFHA in the Northeast were insured for flood losses (Lee, 2012). Only 38,785 residential and business policies were in force in New York City, out of an estimated 7.2 million households (2010 census), as of August 31, 2012; and only 8,129 households (out of about 39,000 households) and businesses in Atlantic City, NJ, had Federal flood insurance coverage (Lee, 2012).

Additionally, a 2006 study of the mandatory purchase requirement conducted by the Rand Corporation indicated that only about 49 percent of single-family homes in SFHAs are covered by flood insurance, but the penetration rates vary by geographic location (Dixon, Clancy, Seabury, & Overton, 2006). The Affordability of National Flood Insurance Program Premiums; Report 1 builds off the findings of the RAND report and agrees that rates vary by geographies, are "particularly low" where purchase is voluntary, and that "many people who are required to purchase the coverage do not" (Dixon, Clancy, Seabury, & Overton, 2006).

The NPEIS has been revised to include references to these other sources of estimates showing the low penetration rates of flood insurance in the SFHA.

III.4 Whether the AIR Report demonstrates that FEMA incentivizes/encourages floodplain development.

One commenter expressed the belief that the AIR report demonstrates that FEMA encourages floodplain development. While, as discussed above, the vast majority of available research and studies indicates that the NFIP does not cause development to occur, nor does it incentivize or encourage floodplain development, the commenter points to the 2006 AIR study as evidence of a contrary conclusion. The AIR study was actually a survey of floodplain administrators, real estate brokers, mortgage lenders, community developers, and insurance agents concerning the interests important to community development. The study sample size was 188 individuals, which, as acknowledged by the authors, is not a statistically valid sample size from which credible scientific and factual conclusions may be drawn (AIR - Rosenbaum and Boulware, 2006). Additionally, the questions for the vast majority of those surveyed (163 of 188) focused on the perceptions of the survey respondents about *others' behavior and motivations* (e.g., "Could you tell me what factors [from the options listed in the survey] you think might influence a person's decision to purchase or build property in the floodplain?"). There have been countless studies showing that people's perceptions, especially about events and people external to themselves, are often very inaccurate. For example, the studies discussed in Section 3.6.1 of Appendix C of the Draft NPEIS, including the 2006 AIR study discussed here, and anecdotal evidence have indicated that the vast majority of NFIP policyholders do not believe they are at risk of flood, but their perceptions are undermined by the actual flooding statistics. Based on the perceptions of this limited sample size of survey respondents, real estate brokers, mortgage lenders, community developers, and insurance agents believed that flood insurance was an

important factor in property owner's decisions about floodplain management ownership, they also believe that most people would continue to purchase, build, and stay in the floodplain in the absence of flood insurance (AIR - Rosenbaum and Boulware, 2006). For the reasons stated above and in Section 4.1.1.1 of the NPEIS, this report was not used in the analysis due to its lack of statistical credibility. A footnote has been added to Section 4.1.1.1 of the PEIS to address this study and FEMA's reasons for not relying on it.

III.5 Whether the Biological Opinions demonstrate that FEMA facilitates and encourages floodplain development.

Four commenters commented that the Biological Opinion on the implementation of the NFIP in specific states demonstrate that the NFIP facilitates and encourages development. The USFWS has issued three Biological Opinions on the NFIP for specific areas of the country. In two of these Biological Opinions, the ones concerning the implementation of the NFIP in Arizona and New Mexico, the USFWS determined that the implementation of the NFIP was "Not Likely to Adversely Affect" threatened and endangered species or adversely modify critical habitat. In the third, USFWS issued a jeopardy determination for the implementation of the NFIP in Monroe County, Florida. The NMFS has issued two jeopardy opinions on the implementation of the NFIP in the Puget Sound, Washington and the State of Oregon.

All of the past Biological Opinions on the implementation of the NFIP are based on the fundamental misconception that private floodplain development is attributable to, or caused (directly or indirectly) by FEMA through the implementation of the NFIP and, as such, should be treated as Federal actions subject to Section 7 consultation requirements under the ESA. The NFIP does not authorize, fund, carry out, or encourage private floodplain development (with the exception of certain grant programs). As such, private floodplain development is not an action undertaken pursuant to the NFIP for which Section 7 consultation under the ESA is appropriate.

The Biological Opinions have attempted to avoid this jurisdictional limitation of the ESA, and federalize private floodplain development for the purposes of applying the ESA to such development, by stating that the NFIP essentially causes floodplain development by incentivizing or facilitating it. However, the evidence offered in support of this conclusion is weak and contradicted by the available data, studies, and research cited in FEMA's Biological Evaluation of the NFIP, Appendix C, and Chapter 4 of the Draft NPEIS. Indeed, the 2010 Monroe County Biological Opinion includes no analysis whatsoever as to how the NFIP causes private floodplain development. It simply assumes that this is the case and proceeds to analyze the effects of the private floodplain development.

In the Oregon Biological Opinion, NMFS addresses this issue in three paragraphs, citing to a dated congressional finding and two studies in support of its conclusion that the NFIP incentivizes or facilitates private floodplain development (NMFS, 2016). However, as the analysis below shows, these documents offer very poor support for NMFS' conclusory assertion that the NFIP causes private floodplain development. Moreover, as stated in the response to Comment III.1, these documents are contradicted by the more credible data, studies, and research

on the topic cited in FEMA's Biological Evaluation of the NFIP, Appendix C, and Chapter 4 of the Draft NPEIS.

In support of its conclusion that the NFIP causes private floodplain development, NMFS points to Section 1302 of the NFIA, which is a congressional finding that "the availability of Federal loans, grants, guaranties, insurance, and other forms of financial assistance are often determining factors in the utilization of land and the location and construction of public and private industrial commercial, and residential facilities" (National Flood Insurance Reform Act of 1994, 1994). Notably, while NMFS utilizes this congressional finding as evidence of the effects of the NFIP on facilitating floodplain development, this finding was made before the NFIP was even established. Additionally, the validity of this finding – at least insofar as it relates to Federal flood insurance – was undermined shortly after the passage of this Act. As explained in Section 1.1.1 of the NPEIS, as of 1972, there were only 95,000 NFIP policies in force. If Federal flood insurance were a determining factor in the utilization of land, one would expect a commensurate precipitous drop in the rate of development, but there was no such decrease in development rates. Indeed, there were so few policies in force that Congress passed the Flood Disaster Protection Act of 1973 to require the purchase of flood insurance as a condition of all federally backed loans and Federal assistance for buildings located in the mapped SFHA.

Nevertheless, while the 1973 Act did increase the number of NFIP policies in existence, the uptake of such policies is still low as compared to the number of buildings located in the SFHA. A 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that factors other than flood insurance are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress" (Congressional Research Service, 2013).

Moreover, although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of development in the floodplain. A 2006 AIR report provides a number of data points on the level and concentration of NFIP policies within the States, territories, and participating communities demonstrating this point. Out of approximately 20,000 communities participating in the NFIP in 2006:

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;
- Five states – California, Florida, Louisiana, New Jersey, and Texas - accounted for nearly 70 percent of all NFIP policies; and

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- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (AIR - Monday et al., 2006)

In support of its conclusion that the NFIP causes private floodplain development, NMFS also points to two studies. However, the findings of these studies, and the conclusions that NMFS draws based on them, are easily dispensed with.

The first study cited to by NMFS is a 2006 AIR study. The AIR study was actually a survey of floodplain administrators, real estate brokers, mortgage lenders, community developers, and insurance agents concerning the interests important to community development. The study sample size was 188 individuals, which, as acknowledged by the authors, is not a statistically valid sample size from which credible scientific and factual conclusions may be drawn (AIR - Rosenbaum and Boulware, 2006). Additionally, the questions for the vast majority of those surveyed (163 of 188) focused on the perceptions of the survey respondents about *others' behavior and motivations* (e.g., "Could you tell me what factors [from the options listed in the survey] you think might influence a person's decision to purchase or build property in the floodplain?"). There have been countless studies showing that people's perceptions, especially about events and people external to themselves, are often very inaccurate. For example, the studies discussed in Section 3.6.1 of Appendix C of the Draft NPEIS, including the 2006 AIR study discussed here, and anecdotal evidence have indicated that the vast majority of NFIP policyholders do not believe they are at risk of flood, but their perceptions are undermined by the actual flooding statistics. Based on the perceptions of this limited sample size of study participants, the AIR study concluded that while a majority of community floodplain administrators, real estate brokers, mortgage lenders, community developers, and insurance agents believed that flood insurance was an important factor in property owner's decisions about floodplain management ownership, they also believe that most people would continue to purchase, build, and stay in the floodplain in the absence of flood insurance (AIR - Rosenbaum and Boulware, 2006).

The second study cited by NMFS, a 1989 article by J.A. Cross entitled "Flood Insurance and Coastal Development," is also based on the perceptions of NFIP stakeholders. This study was ever more limited than the AIR study because only one set of NFIP stakeholders was surveyed – realtors (Cross, 1989). While these studies may offer some insight on the perceptions of NFIP stakeholders about factors affecting community development, perceptions are not facts, and they cannot form the basis for a factual, data-driven determination about the impacts of the NFIP. The studies and research cited by FEMA in its Biological Evaluation at Appendix C of the Draft NPEIS focus on the behaviors of individuals and the factual evidence supporting the reasons for that behavior, and those studies and research support the conclusion that the NFIP does not cause development to occur, nor does it facilitate or encourage floodplain development.

In its Biological Opinion on the implementation of the NFIP in Washington, NMFS cites to the same congressional finding and studies, but it also cites to the court's opinion in National Wildlife v. Federation v. FEMA, 345 F.Supp.2d 1151 (W.D. Wash. 2004). NMFS then proceeds to ignore one of the central holdings of that legal opinion – that the sale of flood insurance is

non-discretionary for the purposes of consultation under the ESA. Despite the fact that the Federal district court for the Western District of Washington specifically held that NMFS has no authority to consult on the sale of flood insurance under the NFIP, NMFS proceeded to do just that. Indeed, the AIR and Cross studies NMFS cited in support of the proposition that the NFIP causes private floodplain development focused solely on the effects of the NFIP's provision of flood insurance. In short, the sole basis for which NMFS claims it has authority to attribute private floodplain development to the NFIP is the fact that FEMA makes Federal flood insurance available. However, this is the one aspect of the NFIP over which NMFS has no authority to consult because it has been held by the court to be non-discretionary for the purposes of the ESA. Accordingly, even if one were to accept the proposition that the NFIP's provision of flood insurance incentivizes or facilitates private floodplain development (which has already been discounted above), this would be irrelevant because that action is not subject to consultation under the ESA.

Having dispensed with the congressional finding, studies, and legal opinion offered by NMFS in support of its claims that the NFIP causes private floodplain development, all that is left in NMFS' Biological Opinions are unsupported statements and conclusory assertions. In conclusion, the Biological Opinions do not demonstrate that the NFIP facilitates or encourages private floodplain development. Section 4.3.4.2.1 of the Final NPEIS has been revised to further document FEMA's assessment of past Biological Opinions on the NFIP.

III.6 Whether the lawsuits demonstrate that NFIP influences floodplain development/FEMA fails to consider lawsuits.

Four commenters commented that the lawsuits demonstrate that FEMA causes floodplain development. Specifically, the commenters point to Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1238 (S.D. Fl. 1994) and National Wildlife Federation v. FEMA, 345 F.Supp.2d 1151 (W.D. Wash. 2004).

In Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1238 (S.D. Fl. 1994), affirmed Florida Key Deer v. Paulison, 522 F.3d 1133 (11th Cir. 2008), Plaintiffs argued that there was enough evidence of the NFIP's effects on encouraging/facilitating floodplain development to warrant FEMA's consultation under ESA Section 7 on the NFIP. The evidence offered in support of this statement were as follows: (a) the 1968 congressional finding in Section 1302 of the NFIA; (b) FEMA's 1976 Environmental Impact Statement (EIS) on the NFIP; (c) a 1984 letter by the USFWS opining that without flood insurance, floodplain development would not occur; (d) letters and congressional testimony by the USFWS in the mid to late 80s offering the opinion that the provision of flood insurance incentivizes or encourages floodplain development; (e) a 1988 CBRs Report written by the USFWS; and (f) a few statements proffered by purported experts on land development, banking, and loan making related to the inability of people/developers to obtain Federal financing in the absence of flood insurance and the lack of availability of private flood insurance).

What most of these documents and statements have in common is that they are not based on any actual hard data, studies, or research. Indeed the 1968 congressional finding in Section 1302 of

the NFIA, which is cited as evidence of the effects of the NFIP on facilitating floodplain development, was made before the NFIP was even established. The statements by USFWS are made prior to even starting a consultation on the NFIP and, as noted in the response to Comment III.5 by the time the USFWS actually did a Biological Opinion, they just assumed the NFIP caused private floodplain development and went on to discuss effects of such development. (USFWS, 2010a) (USFWS, 2010b)

The 1988 Department of the Interior (DOI) CBRS Report did cite to an actual study looking at the NFIP's effects on private floodplain development, but the study cited supported FEMA's position that the NFIP and the availability of Federal flood insurance does not drive private floodplain development. Citing to the 1982 GAO study cited in the NPEIS, the DOI's Report found that "there is no convincing evidence that the availability of such insurance is itself a determining factor in decisions to develop property." (DOI, 1988)

The congressional testimony by the USFWS proffered in the case did include a statement by the USFWS Coastal Barriers Coordinator that, based on his review of aerial photography, only 10 of 186 units in the CBRS that were selected by the USFWS for analysis were developed after the passage of the Coastal Barrier Resources Act (Statement of USFWS Coastal Barrier Coordinator, 1989). He further stated his belief, based on anecdotal evidence from Bethany Beach, Delaware, that this was due to the Coastal Barrier Resources Act's prohibition on the sale of flood insurance in those areas. However, upon questioning, he admitted that he had undertaken no formal study (Statement of USFWS Coastal Barrier Coordinator, 1989).

The AIR actually did undertake a study, and the results of its study contradicted the statements made in the USFWS Coordinator's testimony. AIR looked at floodplain development in areas where flood insurance is available compared to areas in which it is not available (e.g., CBRS units). In this study, AIR found that many CBRS units have been developed, often quite extensively, despite the absence of NFIP flood insurance. The report noted that development appeared to result from a combination of State and local government incentives and market forces. For example, units in Bethany Beach, Delaware; North Topsail Beach, North Carolina; and Cape San Blas, Florida studied in 1997 developed very much like nearby non-System areas. The report further found that market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce. (AIR - Rosenbaum, W., 2005)

As explained in the response to Comment III.1 the actual data, studies, and research cited by FEMA in its Biological Evaluation at Appendix C of the Draft NPEIS support the conclusion that the NFIP does not cause development to occur, nor does it facilitate or encourage floodplain development.

Moreover, a number of the statements, especially those produced by Plaintiffs experts attributed floodplain development to the NFIP on the basis of a few key facts:

- (a) The lack of available private insurance alternatives ("FEMA's witnesses were unable to state either that private flood insurance would definitely be offered in the Keys..." Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1238 (S.D. Fl. 1994));

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- (b) The available private flood insurance was more expensive than the NFIP ("[T]he rates [of private flood insurance] could be as much as ten times the cost of Federal flood insurance. Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1238 (S.D. Fl. 1994)); and
 - (c) Federal flood insurance is a pre-condition to the availability of federally backed loans and Federal assistance ("The Flood Disaster Protection Act requires the purchase of Federal flood insurance as a condition of receiving any form of Federal or federally-related financial assistance from any Federal agency for public or private land acquisition or construction purposes in any area identified by FEMA as a SFHA within any community participating in the NFIP." Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1230 (S.D. Fl. 1994)).

However, as explained below, due to changes in the law and the private insurance industry, these things are no longer true.

Plaintiffs experts asserted that inexpensive NFIP premiums encourage development in high-risk flood zones that might not otherwise occur due the much higher premiums charged by private flood insurance companies. Plaintiff's witness Lynn Kephart testified that if Federal flood insurance were replaced with private flood insurance at higher annual premiums, as little as 40 percent higher, that would cause less development in the area. Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1230 (S.D. Fl. 1994). This statement is consistent with research indicating that one major obstacle for private market insurers entering the flood insurance market has been the inability of private carriers to compete with subsidized premiums that are offered by the NFIP for certain properties (i.e., pre-FIRM buildings) (Insurance Journal, 2014). While private insurers have the capacity to provide coverage for flooding risk and can price more accurately using better modeling tools, some have asserted that the lower premium rates offered by the NFIP have hindered their entrance into the market.

Industry experts and reports have found that private insurers may be willing to write significant amounts of flood business if they are allowed to charge actuarially sound rates (Insurance Journal, 2014). According to the Fitch Ratings Report, if and when Federal subsidies for flood insurance are reduced and the cost of government provided flood insurance goes up, the demand for private flood coverage is projected to rise (Insurance Journal, 2014).

Following BW-12, HFIAA, and initiation of the phase out of flood insurance subsidies for pre-FIRM properties, a number of private insurance companies are beginning to offer private flood insurance at competitive rates. With the introduction of private flood insurance into the Government dominated market, flood insurance rates are expected to become competitive and result in better policies and pricing for homeowners. Both Lloyd's of London and TFIA are offering flood insurance policies in 33 States. The TFIA predicted an expansion from \$500M in insured property to \$1B by the end of 2014 (Hurtibise, 2014). Other insurance companies offering private flood insurance policies are Homeowners Choice Property & Casualty Insurance, who has just expanded their coverage area to include the State of Florida, Gridiron Insurance Underwriters, and Chubb Personal Flood Insurance. A number of private insurance providers also provide flood coverage that exceeds the maximum allowable limits statutorily authorized for the NFIP (\$250,000 for structural damage and \$100,000 for contents for

residential properties, as well as \$500,000 each for structure and contents for non-residential properties). (Insurance Journal, 2014)

Premium rates are also increasing substantially for non-subsidized policies (i.e., policies on post-FIRM buildings) from the recent legislative changes. As a result of BW-12, FEMA is required to establish a Reserve Fund for the purpose of meeting the expected future obligations of the flood insurance program. FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment was introduced in October 2013 as a 5 percent assessment on all policies, and there is now a 15 percent assessment on all policies. That percentage is expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually. Additionally, as a result of HFIAA, all policyholders have to pay a surcharge of \$25 for policies on a primary residence and \$250 on all other policies. As such, even for non-subsidized policies, the market has grown significantly more competitive, and with the addition of these fees and surcharges, the NFIP is unlikely to be the most competitive insurer on the market in many cases.

BW-12 further removed obstacles to private market flood insurance by amending the Flood Disaster Protection Act of 1973 (the 1973 Act) to allow federally backed lenders to accept private flood insurance in satisfaction of the mandatory purchase requirement (42 U.S.C. § 4012a). Communities do not need to participate in the NFIP to ensure their eligibility for Federal assistance. As long as flood insurance is purchased by recipients of federally backed loans and Federal assistance located in special flood hazard areas, it is irrelevant whether that flood insurance is purchased through the NFIP or through the private flood insurance market.

Private market participation has already increased significantly and will continue to do so as the NFIP moved further towards actuarial rates. As the market for private flood insurance grows, communities will still have access to flood insurance at the same price, but without the additional burden of compliance with the minimum floodplain management regulations and government-imposed assessments, fees, and surcharges. As such, even if one were to accept the premise that the availability of flood insurance has some role in facilitating floodplain development, this does not demonstrate that the NFIP is a but for cause of such development because there is a private flood insurance market and, in many cases, a more attractive private market alternative, that can be used to satisfy the flood insurance purchase requirement of the 1973 Act.

In National Wildlife Federation v. FEMA, 345 F.Supp.2d 1151 (W.D. Wash. 2004), Plaintiffs also argued that there was enough evidence of the NFIP's effects on encouraging/facilitating floodplain development to warrant FEMA's consultation under ESA Section 7 on the NFIP. The evidence used by the court in addressing this issue was as follows: (a) FEMA's 1976 EIS; (b) statements by the Washington Association of REALTORS, Piazza Construction, Inc.; and (c) the Home Builders Association of Kitsap County discussing the harm that would occur to the real estate and construction industries if the implementation of the NFIP was enjoined (as was requested by the Plaintiffs because "most real estate purchasers cannot purchase property without obtaining financing, and in areas where it applies, flood insurance is a prerequisite to obtaining financing." Id. (internal citations omitted)).

As with the Florida Key Deer v. Stickney case, what this documents and these statements have in common is that they are not based on any actual hard data, studies, or research. Conversely, as explained in the response to Comment III.1, the actual data, studies, and research cited by FEMA in its Biological Evaluation at Appendix C of the Draft NPEIS support the conclusion that the NFIP does not cause development to occur, nor does it facilitate or encourage floodplain development.

One commenter also cites National Wildlife Federation v. FEMA for the court's statement that FEMA acknowledges that filling in the floodplain fringe can have detrimental effects on fish and wildlife. FEMA does not deny that filling in the floodplain fringe can have detrimental effects. What FEMA does deny is that FEMA's actions in carrying out the NFIP somehow cause or encourage the filling of the floodplain. There are no data, studies, or research in existence that would suggest this connection.

In sum, the holdings in these lawsuits were based on the program as it existed at that time, and the program as it exists today is quite different from the program as it existed over a decade ago. Moreover, in those cases, the courts only had the benefit of Plaintiffs' cherry-picked documents in rendering its decisions. At that time, FEMA had not undertaken the rigorous analysis of the effects of the NFIP that it has now undertaken and documented in the Biological Evaluation at Appendix C of the Draft NPEIS. As such, FEMA does not believe the holdings in these lawsuits represent an obstacle to its determination that the implementation of the NFIP has "no effect" on ESA-listed species and habitat. Section 4.3.4.2.1 of the Final NPEIS further documents FEMA's assessment.

III.7 Implications of the NFIP on land use and zoning and the appropriateness of a no-impact for determination land use and zoning.

One commenter stated that while it is understood the NFIP does not have land use authority, FEMA should still recognize the implication of the NFIP on land use and zoning. The NPEIS states that there are less than significant impacts to Land Use and Planning for each of the alternatives. Please refer to Section 4.3.2 for the analysis of these potential impacts.

IV. Delay of Final NPEIS: Consultation

Three commenters (American Rivers, Willamette Partnership, Mississippi River Network) suggested that the NPEIS should be delayed until further consultation or coordination with the Services has taken place. Specifically, these commenters state that:

- Whether FEMA should delay the NPEIS to complete consultation on the NFIP.
- Whether FEMA should delay the NPEIS and spend additional time working to obtain the Services' concurrence on Alternative 3 of the NPEIS. This commenter also suggested that the Services' lack of concurrence should be documented.

IV.1 Whether FEMA should delay the NPEIS to complete consultation on the NFIP.

Two commenters stated that FEMA should delay completion of the NPEIS in order to complete ESA consultation on the NFIP. As explained in the response to Comment V.3 consultation with

the Services pursuant to the ESA is unnecessary because FEMA has reached a "no effect" determination for the implementation of the preferred alternative, Alternative 2 of the NPEIS. Should FEMA choose to proceed with either Alternative 3 or Alternative 4, FEMA would consult with the Services on the implementation of those alternatives.

IV.2 Whether FEMA should delay the NPEIS and spend additional time working to obtain the Services' concurrence on Alternative 3 of the NPEIS.

One commenter suggested that FEMA should delay finalization of the NPEIS in order to obtain the Services' concurrence on Alternative 3 of the NPEIS. As explained below, FEMA has worked with the Services since 2011 on the development of the program changes proposed in Alternative 3, and has been unable to secure concurrence. FEMA can no longer delay the completion of this effort in order to secure that concurrence.

However, despite this setback, FEMA and the Services continue to work together to identify 7(a)(1)-related changes that all the agencies can agree on. FEMA and the Services are meeting on a monthly basis to discuss a number of changes proposed by FEMA in furtherance of its obligations under Section 7(a)(1) of the ESA. FEMA hopes to work with Services to identify some conservation measures that FEMA can start implementing as early as next year, while also continuing to work with the Services on developing some of the proposals requiring more of a longer term effort by both agencies.

This commenter also suggested that the Services' lack of concurrence should be documented. While FEMA considers these documents to be protected by the deliberative process privilege, FEMA has provided a summary of this effort below.

In 2011, as part of its continuing efforts to carry out its responsibilities under Section 7(a)(1) of the ESA to utilize its authorities to enact programs for the conservation of species, FEMA undertook a comprehensive effort to identify program changes within its discretion to implement that would benefit ESA-listed species and designated critical habitat.

FEMA determined that the area of discretionary authority in which it could have the greatest impact, in terms of furthering the purposes of the ESA, is in the implementation of the minimum floodplain management criteria. In determining what program changes could be made to the minimum floodplain management criteria, FEMA utilized the existing program structure and legal authorities of the NFIP. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. As such, FEMA cannot require the communities to prohibit development in the SFHA; it can only place certain flood risk reduction-related conditions on how that development will be carried out.

Accordingly, as with all other minimum floodplain management criteria, any new criteria would have to be structured as mandatory performance standards. These new criteria would be implemented, monitored, and enforced in the same manner as the other performance standards in the NFIP floodplain management criteria. This includes the development and utilization of guidance to instruct communities as to how the performance standard can or should be met.

Thus, FEMA developed an ESA-related performance standard that would require participating communities to assess and mitigate the adverse impacts of development taking place in the SFHAs of participating communities on ESA species and designated critical habitat. FEMA hoped to be able to incorporate this standard into the minimum floodplain management criteria at 44 C.F.R. § 60.3. This, along with a few other proposed changes to the regulations, constitute what is described as Alternative 3 of the NPEIS.

In 2012, FEMA began meeting with the Services to coordinate with them on the development of these program changes. From 2012 through 2015, FEMA with the Services on a number of occasions and numerous drafts of a proposed rule were passed back and forth between the agencies.

On June 12, 2015, FEMA sent NMFS a draft Notice of Proposed Rulemaking (NPRM) for Services' concurrence. On July 6, 2015, NMFS non-concurred on the NPRM. On September 1, 2015, USFWS non-concurred, but also suggested that FEMA first proceed through an Advanced Notice of Proposed Rulemaking (ANPRM). From September, 2016 until April, 2017, FEMA worked to develop an ANPRM for the proposed program changes. On April 26, 2017, FEMA sent a request for concurrence to the Services. On May 24, 2016, USFWS non-concurred. NMFS did not respond. Section 2.5 of the NPEIS has been updated to better reflect the Office of Management and Budget's (OMB) process for Rulemaking and the Federal agency coordination obligations that are part of this process.

Nevertheless, as noted above, FEMA and the Services continue to work together to identify 7(a)(1)-related changes that all the agencies can agree on. Indeed, on May 17, 2017, FEMA submitted a comprehensive list of such changes to the Services. These proposed Section 7(a)(1) measures include, but are not limited to, the following:

- (i) Including data layers from authoritative sources showing critical habitat on FEMA's digital platform.
- (ii) Issuing clarifications that compliance with 44 C.F.R. § 60.3(a)(2) means documenting that all requirements of the ESA have been met.
- (iii) Encouraging communities to link to the Information, Planning, and Consultation System (IPaC) so that when granting a floodplain development permit, the permit applicant would also receive information about species in the area and how to mitigate potential effects.
- (iv) Increasing the credit points available under the CRS for those elements directly related to protecting ESA-listed species and habitat and/or the natural and beneficial functions of floodplains.
- (v) Highlighting, promoting, or developing CRS criteria prerequisites for certain elements related to protecting ESA-listed species and habitat and/or the natural and beneficial functions of floodplains.
- (vi) Working with the Services to prepare more detailed guidance materials and training on the ESA and incorporating the guidance and public information materials on a website.

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- (vii) Working with the Services to develop Best Management Practices (BMPs)/Technical Guidance for different types of projects (e.g., bulkheads, levee projects, etc.).
 - (viii) Developing guidance on incorporating concerns of ESA-listed species and habitat into hazard mitigation plans.
 - (ix) Sponsor, host, or partner in the development of national or regional conferences to educate floodplain managers on the ESA and how they can help.
 - (x) Include ESA training, education, and outreach activities as eligible for funding in FEMA's Community Assistance Program-State Support Services Element (CAP-SSSE) contracts with the States.
 - (xi) Working with NFIP communities and the Services to help populate IPaC.

FEMA and the Services are meeting on a monthly basis to discuss these changes in hopes of identifying changes that could be implemented by FEMA in furtherance of its obligations under Section 7(a)(1) of the ESA.

Because FEMA was not able to obtain Services' concurrence on Alternative 3 of the NPEIS, FEMA cannot move forward with this alternative. However, based on this comment, FEMA has provided additional explanation as to why this is the case. Section 2.5 of the NPEIS has been updated to better reflect the Office of Management and Budget's (OMB) process for Rulemaking and the Federal agency coordination obligations that are part of this process.

V. *Whether FEMA Needs to Consult with the Services*

Ten commenters (Center for Biological Diversity, American Rivers, Association for State Floodplain Managers, National Wildlife Foundation, Willamette Partnership, Audubon Society of Portland, Energy and Wildlife Action Coalition, Nicollet Island Coalition, Water Protection Network, Chad Berginnis) commented that FEMA should consult with the Services under Section 7(a)(2) of the ESA. One or all of the commenters provided comments on the following issues:

- Whether the NFIP influences floodplain development and, as such, listed species, triggering the duty to consult.
- Whether the Biological Opinions demonstrate that FEMA must consult.
- Whether FEMA lacks legal justification to argue that the programmatic nature of the NFIP allows the agency to skip ESA review.
- Whether FEMA has discretion over the provision of flood insurance.
- Whether the proposed insurance-related modifications to the NFIP in Alternatives 2, 3, and 4 of the NPEIS may affected listed species triggering the duty to consult.
- Whether the CRS may affect listed species.
- Whether FEMA allows and/or fails to prohibit private floodplain development, it should be obligated to consult under Section 7 of the ESA.
- Impacts of designating an area as inside or outside of the floodplain on the health of the floodplain/the ecosystem.
- Whether FEMA acknowledges placement of fill may trigger ESA.

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- Whether FEMA has more "Federal actions" than just issuance of LOMCs, Mapping Levees, and Mapping AR/A99 Zones.
 - Whether Alternatives 1 and 2 comply with ESA.
 - Whether there are inconsistent statements in the NPEIS about whether LOMCs are discretionary.
 - Whether there are inconsistent statements in the NPEIS about effects of Alternative 2 on biological resources.
 - Whether climate change impacts must be considered in complying with the ESA.
 - Whether private floodplain development projects have a Federal nexus through FEMA such that a consultation with the Services on national implementation of the NFIP is warranted.
 - Whether FEMA has discretionary actions under its program and therefore has a duty to consult on those actions.

V.1 Whether the NFIP influences floodplain development and, as such, listed species; therefore, it must consult.

Four commenters stated that FEMA influences floodplain development and, as such, listed species so it must consult pursuant to the ESA. FEMA acknowledges that the NFIP influences floodplain development in Sections 3.1.16 and 4.3.2.2 of the NPEIS. In fact, that is part of the purpose of the program – to encourage communities and individuals to build smarter and safer to minimize flood risk and the associated financial and personal costs of floods. However, this influence does not necessarily lead to effects to endangered species.

The influence of the NFIP on floodplain development was the primary issue FEMA wanted to explore in its Biological Evaluation. Having heard assertions over the years about the NFIP causing or increasing development, FEMA set out to explore what the relationship is between the NFIP and floodplain development. As discussed in Chapter 4 and Appendix C to the Draft NPEIS, FEMA concluded the FEMA's actions pursuant to the NFIP do not cause or increase private floodplain development. FEMA further concluded that while the NFIP may influence the way something is built, it does not do so in a way that might affect endangered species. FEMA reviewed its discretionary actions in the Biological Evaluation and made a determination that those actions have no effect on listed species or critical habitat. Based on that conclusion, FEMA determined that it has no legal obligation to consult on the NFIP pursuant to Section 7(a)(2) of the ESA.

V.2 Whether the Biological Opinions demonstrate that FEMA must consult.

Three commenters expressed the belief that the Biological Opinions demonstrate that FEMA must consult under the ESA. Some of the past Biological Opinions on the NFIP found that the NFIP, as implemented in particular areas, caused jeopardy to endangered species. All of the past Biological Opinions on the implementation of the NFIP are based on the fundamental misconception that private floodplain development is attributable to, or caused (directly or indirectly) by FEMA through the implementation of the NFIP and, as such, should be treated as Federal actions subject to Section 7 consultation requirements under the ESA. The NFIP does

not authorize, fund, carry out, or encourage private floodplain development (with the exception of certain grant programs). As such, private floodplain development is not an action undertaken pursuant to the NFIP for which Section 7 consultation under the ESA is appropriate.

The Biological Opinions have attempted to avoid this jurisdictional limitation of the ESA, and federalize private floodplain development for the purposes of applying the ESA to such development, by stating that the NFIP essentially causes floodplain development by incentivizing or facilitating it. However, the evidence offered in support of this conclusion is weak and contradicted by the available data, studies, and research cited in FEMA's Biological Evaluation of the NFIP, Appendix C, and Chapter 4 of the Draft NPEIS. Indeed, the 2010 Monroe County Biological Opinion includes no analysis whatsoever as to how the NFIP causes private floodplain development. It simply assumes that this is the case and proceeds to analyze the effects of the private floodplain development. Because FEMA has determined that the NFIP does not, in fact, cause or increase development, it did not rely on the Biological Opinion as a precedent demonstrating that consultation is required on the program nationally.

Further, FEMA completed its analysis of the effects of the NFIP on endangered species and concluded in its Biological Evaluation that implementation of the preferred alternative, Alternative 2 of the Draft NPEIS, has no effect. Therefore, consultation is unnecessary. However, should FEMA choose to proceed with either Alternative 3 or Alternative 4, FEMA would consult with the Services on the implementation of those alternatives.

Section 4.3.4.2.1 of the Final NPEIS has been revised to further document FEMA's assessment of past Biological Opinions on the NFIP.

V.3 Whether FEMA contends that the programmatic nature of the NFIP allows the agency to skip ESA review.

One commenter commented that FEMA lacks legal justification to argue that the programmatic nature of the NFIP allows the agency to skip ESA review. FEMA has neither "skipped" ESA review nor argued that the programmatic nature of the NFIP allows it to "skip" ESA review. In fact, FEMA did a full programmatic ESA review of the NFIP in its Biological Evaluation (see Appendix C of the NPEIS). Rather than simply stating that the NFIP has no effect on listed species, FEMA did a full analysis of the program first.

In the Endangered Species Consultation Handbook, "no effect" is defined as the appropriate conclusion when the action agency determines its proposed action will not affect a listed species or critical habitat (USFWS and NMFS, 1998). Moreover, in Figure 3-1 of the Handbook, if an action agency determines that its Proposed Action will not affect species or critical habitat, consultation ends and no written concurrence from the Services is needed.

The Biological Evaluation is an ESA review that FEMA undertook to determine whether the NFIP is likely to affect endangered species and habitat. As a threshold matter, FEMA determined in its Biological Evaluation that the NFIP has no effect on species. Therefore, further formal consultation under Section 7(a)(2) was not necessary.

FEMA in its disaster assistance programs does many project-specific ESA reviews and consultations. It is very familiar with this process. However, because the NFIP operates through its participating communities, there are no actions on the ground on which to do project specific reviews. Rather, FEMA's actions are all at the programmatic level. That is why FEMA undertook to do a Biological Evaluation on the program and look at its programmatic actions – setting the minimum floodplain management criteria, providing CRS credits to communities, mapping the floodplain, etc. The nature of those actions is different than the actions taken on the ground in the floodplain by private individuals, but they are still actions that warrant review. FEMA undertook such a review, and FEMA's programmatic ESA review concluded that its actions have no effect on listed species.

V.4 Whether FEMA has discretion over the provision of flood insurance.

One commenter expressed the belief that FEMA has discretion over the provision of flood insurance. FEMA does not have discretion over the provision of flood insurance. The NFIA provides that as long as a community has evidenced interest in joining the NFIP and has put in place measures that meet the minimum criteria required by FEMA, FEMA "shall" provide flood insurance to that community (42 U.S.C. 4012(c)). FEMA cannot ask a community to meet other requirements or determine that it will not make flood insurance available for any other reason. FEMA is bound to make flood insurance available as long as those two criteria are met.

In National Wildlife Federation v. FEMA, 2014 U.S. Dist. LEXIS 151386 (W.D. Wa. 2014), the Court ruled that because FEMA did not have discretion over the sale of flood insurance, it did not have to consult with the Services under Section 7(a)(2) of the ESA with respect to that action.

V.5 Whether the proposed insurance-related modifications to the NFIP in Alternatives 2, 3, and 4 of the NPEIS may affected listed species.

One commenter suggested that the phase out of subsidies may affect species in beneficial or adverse ways due to its impacts on new floodplain development. Since the inception of the program, it has been a common misconception that FEMA offers subsidized flood insurance rates for new floodplain development. As discussed in Section 1.3.3 of the NPEIS, as originally established, the NFIA authorized FEMA to provide subsidized flood insurance for existing buildings or buildings built prior to the community's first FIRM (generally referred to as "pre-FIRM buildings"). However, these subsidized flood insurance rates were not available for new development or for substantial improvements to existing development. As such, the phase out of subsidies will only affect existing development and, as such, have no potential to affect new floodplain development in any way, adverse or beneficial.

This commenter also suggests that the language in the NPEIS suggesting that the proposed program modification to implement installment plans – specifically the phrase "unlikely to encourage floodplain development" – suggests that these plans "may" encourage floodplain development. As an initial matter, FEMA would like to point out that, as stated in Section 2.2.4 of Appendix C to the Draft NPEIS, under Section 7(a)(2) of the ESA, Federal agencies are required to consult only if there is discretionary involvement or control: "...where the Federal

agency lacks the discretion to influence the private action, consultation would be a meaningless exercise; the agency simply does not possess the ability to implement measures that inure to the benefit [of] the protected species" (50 C.F.R. § 402.03). Accordingly, per the requirements of the Services' ESA-implementing regulations, Section 7 consultations typically focus on the actions where a Federal agency has discretionary control over implementation of the action. In National Wildlife Federation v. FEMA, the court held that **the provision of flood insurance is a non-discretionary action for which "FEMA has no obligation to consult"** Invalid source specified. (emphasis added). As such, even if there were potential effects due to FEMA's proposed modifications to its provision of flood insurance, FEMA would not be required to consult on them pursuant to Section 7 of the ESA.

That being said, FEMA acknowledges that it still has an obligation under NEPA to discuss the environmental impacts of its proposed program modification, and FEMA agrees the language is confusing. Therefore, FEMA has edited the text in Section 2.3.3.4 to better clarify the exact nature of the possible impacts of this proposed modification.

V.6 Whether CRS may affect listed species.

Two commenters expressed the belief that the CRS may affect listed species. In Florida Key Deer v. Paulison, 522 F.3d 1133 (11th Cir. 2008), the court found that the implementation of the CRS had "no effect" on listed species because it was only a voluntary program. Moreover, as FEMA points out in Section 6.1.1.6 of its Biological Evaluation at Appendix C of the Draft NPEIS, FEMA has no data or studies to support when and where actions under the CRS will take place or which CRS activities the community will undertake of the 19 categories of possible creditable activities. Moreover, even actions that are generally considered to benefit species – such as the creation of open space – would not be beneficial if there are no species or habitat in the area to benefit. In the Washington Biological Opinion, even the Services acknowledged that "evidence suggests that the impact of the CRS may be confined largely to minimizing flood damage, reducing repetitive claims, and increasing awareness of flood risk and strategies for structural mitigation" (USFWS, 2010a, p. 89). (NMFS, 2016, p. 200)

V.7 Whether FEMA allows and/or fails to prohibit private floodplain development and, as such it should be obligated to consult under Section 7 of the ESA.

One commenter commented that because FEMA allows and/or fails to prohibit floodplain development, it should be obligated to consult under Section 7 of the ESA. As an initial matter, FEMA does not allow private floodplain development to occur. Floodplain development is not authorized, funded, or carried out by FEMA (except with respect to certain grant programs outside the scope of this evaluation). FEMA has no land use authority. As stated in Section 1.3.1 of the NPEIS, the power to regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations requires land use authority. The regulation of land use falls under the State's police powers, which the Constitution reserves to the States, and the States delegate this power down to their respective political subdivisions. FEMA has no direct involvement in the administration of local floodplain management ordinances. The NFIP operates as a Federal-State-local partnership that depends on State statutes and regulations

authorizing local governments to regulate floodplain development under the State's police powers to protect the health, safety, and general welfare of its citizens. The NFIP was designed so that floodplain management would be carried out at the State and local levels, where land use authority resides.

FEMA sets certain nationally applicable minimum floodplain management criteria related to reducing flood hazard risk in floodplain areas for all NFIP participating communities. The communities must incorporate these minimum floodplain management criteria into community ordinances and regulations as a condition of participation in the NFIP. Because FEMA has no land use authority, the floodplain management criteria are essentially performance standards. FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of floodplain development that are allowed in the floodplain, the amount of development that is allowed in the floodplain, the uses of land that are allowed in the floodplain, or any other general land use restriction that is under State or local land use authority.

Moreover, the fact that FEMA does not do more to prohibit and/or significantly restrict development also does not mean that FEMA is allowing such development to occur. Unlike certain Federal agencies, such as the USACE, FEMA does not control whether development is or is not allowed within its area of regulatory jurisdiction. The State and communities retain the land use authority to determine what private floodplain development may, or may not, be carried out in the community and what requirements or restrictions, if any, should be placed on such private development. As explained in the response to Comment II.3, FEMA has no legal authority to prohibit and/or significantly restrict development. Nor does FEMA have the authority to authorize or permit such development. All of these authorities reside with the State and the local communities. FEMA's only role is to set certain minimum flood risk reduction-related criteria on how development in the floodplain is carried out for communities participating in the NFIP to adopt into their local ordinances and to monitor a community's programmatic compliance to ensure these criteria are being implemented and carried out.

Additionally, to suggest that FEMA's failure to prohibit and/or significantly restrict such development causes adverse effects on listed species and habitat and, as such, requires formal consultation under the ESA, reflects an inaccurate understanding of the applicability of Section 7(a)(2) of the ESA. Section 7(a)(2) of the ESA requires Federal agencies to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of ESA-listed species or adversely modify designated critical habitat. This provision applies only to Federal agency actions. It does not apply to an action the agency has not taken. Even if FEMA had the legal authority to prohibit or significantly restrict development, which it does not, that still does not mean that its failure to do so is the equivalent of undertaking an affirmative action that adversely affects ESA-listed species and habitat. Section 7(a)(2) of the ESA only applies to affirmative actions.

Because, as explained in Section 4.1.1.1 of the NPEIS, FEMA does not authorize, fund, or carry out floodplain development, any potential effects of the Proposed Action would necessarily be indirect. Floodplain development itself is not an action under the NFIP, and FEMA does not

control the rate or quantity of development in floodplains or the effects those development activities may have on ESA species, designated critical habitats, or Essential Fish Habitat (EFH). The ESA-implementing regulations define indirect effects as those that are "caused by the Proposed Action and are later in time, but are still reasonably certain to occur" (50 C.F.R. § 402.02). The available research and studies – discussed in Sections 3.5 and 3.6 of Appendix C to the Draft NPEIS – suggest that the NFIP is not a determining factor in the decision of whether or not to develop in the floodplain. As such, FEMA determined that this action would have no effect on ESA-listed species and designated critical habitat. And, as explained in the response to Comment V.3, a "no effect" determination is sufficient to meet FEMA's compliance obligation under the ESA.

Additionally, to the extent the two commenters are suggesting that FEMA enables development in the floodplain through the provision of flood insurance and that, as such, the provision of flood insurance is subject to consultation, FEMA also disagrees with this statement. As FEMA states in Section 2.2.4 of Appendix C to the Draft NPEIS, under Section 7(a)(2) of the ESA, Federal agencies are required to consult only if there is discretionary involvement or control: "...where the Federal agency lacks the discretion to influence the private action, consultation would be a meaningless exercise; the agency simply does not possess the ability to implement measures that inure to the benefit [of] the protected species" (50 C.F.R. § 402.03). Accordingly, per the requirements of the Services' ESA-implementing regulations, Section 7 consultations typically focus on the actions where a Federal agency has discretionary control over implementation of the action. In National Wildlife Federation v. FEMA, 345 F.Supp.2d 1151 (W.D. Wash. 2004), the court held that **the provision of flood insurance is a non-discretionary action for which "FEMA has no obligation to consult"** (emphasis added). This finding is supported by the language of Section 1315 of the NFIA, which requires FEMA to provide flood insurance to communities that have evidenced a positive interest in securing flood insurance coverage under the flood insurance program and are implementing and enforcing the minimum floodplain management criteria developed pursuant to Section 1361 of the NFIA. As such, even if there were potential effects due to FEMA's provision of flood insurance, FEMA would not be required to consult on them pursuant to Section 7 of the ESA. Nevertheless, as explained in the response to Comment III.1 and below, the provision of flood insurance does not facilitate floodplain development, and the two commenters' statements to this effect are undermined by the actual data, research, and studies on this issue.

One of the two commenters points to the congressional finding that "the availability of Federal loans, grants, guaranties, insurance, and other forms of financial assistance are often determining factors in the utilization of land and the location and construction of public and private industrial commercial, and residential facilities" (42 U.S.C. § 4002) as evidence of FEMA's effects on floodplain development and, as such, its duty to undertake consultation pursuant to the ESA. Notably, while this commenter utilized this congressional finding as evidence of the effects of the NFIP on facilitating floodplain development, this finding was made before the NFIP was even established. Additionally, the validity of this finding – at least insofar as it relates to Federal flood insurance – was undermined shortly after the passage of this Act.

As explained in Section 1.1.1 of the NPEIS, as of 1972, there were only 95,000 NFIP policies in force. If Federal flood insurance were a determining factor in the utilization of land, one would expect a commensurate precipitous drop in the rate of development, but there was no such decrease in development rates. Indeed, there were so few policies in force that Congress passed the Flood Disaster Protection Act of 1973 to require the purchase of flood insurance as a condition of all Federally backed loans and Federal assistance for buildings located in the mapped SFHA.

Nevertheless, while the 1973 Act did increase the number of NFIP policies in existence, the uptake of such policies is still low as compared to the number of buildings located in the SFHA. A 2013 Congressional Research Service report suggested that only 18 percent of Americans in flood zone areas have flood insurance, indicating that factors other than flood insurance are driving individuals to develop in the floodplain. This report found that "despite the existence of this mandatory flood insurance purchase requirement, take-up rates for flood insurance have historically been low and the Federal government's exposure to uninsured property losses from flooding remains substantial. Many homeowners do not completely recognize or internalize their flood risk and are overly optimistic about the magnitude of the flood risk to which they are exposed. Consequently, the NFIP has not achieved the level of individual participation originally envisioned by Congress." (Congressional Research Service, 2013)

Moreover, although more than 22,000 communities participate in the NFIP, the level of policy uptake within those communities demonstrates that flood insurance availability is not a key driver of development in the floodplain. A 2006 AIR report provides a number of data points on the level and concentration of NFIP policies within the States, territories, and participating communities demonstrating this point. Out of approximately 20,000 communities participating in the NFIP in 2006:

- 3,452 communities had no flood insurance policies whatsoever;
- Half of the communities had fewer than 10 flood insurance policies each, and 2/3 of the communities had fewer than 20 policies each;
- Five states – California, Florida, Louisiana, New Jersey, and Texas – accounted for nearly 70 percent of all NFIP policies; and
- Even within these five states, policies were often concentrated in certain areas. For example, Florida had 437 participating communities, but over half of the policies were concentrated in just 20 of those communities. (AIR - Monday et al., 2006)

Additionally, one commenter points to a 1984 letter by a solicitor with the Department of the Interior that was cited in Florida Key Deer v. Stickney, 864 F.Supp. 1222, 1231 (S.D.Fl. 1994), which stated that if FEMA flood insurance was not made available in floodplains, there would be no development at all in the floodplains. As discussed in Section 4.1.1.1 of the NPEIS, this statement has been completely invalidated by the studies and research that have been undertaken since that date.

For example, the GAO analyzed floodplain development data both before and after a community entered the NFIP. The GAO used (1) available Bureau of the Census data on population, per

capita income, and new housing units authorized by building permits and public contracts in the United States, and (2) building permits which the six selected communities reportedly issued. The GAO's analysis concentrated on population growth and increases in housing units authorized for construction. The GAO compared the rate of population growth in a 20-year period with the dates the communities entered the program. Generally, the communities were growing before their entrance into the program from 1960 to 1970, and this rate of growth continued from 1970 to 1980.

The GAO obtained data on new housing units authorized for a 10-year period for the nation and the three larger communities, but the GAO was only able to obtain this data from 1977 to 1980 for the three smaller communities. New housing units authorized were increasing in all three larger communities prior to their entrance into the flood insurance program and continued to increase thereafter. The GAO was unable to attribute the rate of increase in new housing units authorized to the availability of flood insurance because of the many other factors that promote community development. The GAO found that annual increases and decreases in new housing units authorized generally paralleled the rise and decline of total housing units authorized in the nation and seemed to be more directly related to the state of the economy than the availability of flood insurance.

As further discussed in Section 4.1.1.1 of the NPEIS, the AIR study took a different approach and looked at floodplain development in areas where flood insurance is available compared to areas in which it is not available (e.g., CBRS units). In this study, AIR found that many CBRS units have been developed, often quite extensively, despite the absence of NFIP flood insurance. The report noted that development appeared to result from a combination of State and local government incentives and market forces. For example, units in Bethany Beach, Delaware; North Topsail Beach, North Carolina; and Cape San Blas, Florida studied in 1997 developed very much like nearby non-System areas. The report further found that market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce. (AIR - Rosenbaum, W., 2005)

As reported in the FEMA *Floodplain Management Losses Avoided Study*, which was also discussed in Section 4.1.1.1 of the NPEIS, more than half (57 percent) of residential properties located in SFHAs were built prior to the inception of the NFIP. As such, it is clear that development has occurred, and would continue to occur, in the SFHA even in the absence of flood insurance. Thus, the research and empirical evidence demonstrate that the availability of flood insurance has very little effect on the motivation to develop the floodplain, which was already well established prior to the inception of the program. (FEMA, 2014)

Moreover, because the 1968 congressional finding and the 1984 DOI letter cited by one of the two commenters are so dated, they do not take into account the changes that have occurred due to the passage of BW-12 and HFIAA.

As explained in Section 4.5.2.1 of the NPEIS, until recently, one major obstacle for private market insurers entering the flood insurance market has been the inability of private carriers to compete with subsidized premiums that are offered by the NFIP for certain properties (i.e., pre-

FIRM buildings) (Insurance Journal, 2014). While private insurers have the capacity to provide coverage for flooding risk and can price more accurately using better modeling tools, some have asserted that the lower premium rates offered by the NFIP have hindered their entrance into the market.

However, industry experts and reports have found that private insurers may be willing to write significant amounts of flood business if they are allowed to charge actuarially sound rates. According to the Fitch Ratings Report, if and when Federal subsidies for flood insurance are reduced and the cost of government provided flood insurance goes up, the demand for private flood coverage is projected to rise. (Insurance Journal, 2014)

As further explained in Section 4.5.2.1 of the NPEIS, following BW-12, HFIAA, and initiation of the phase out of flood insurance subsidies for pre-FIRM properties, a number of private insurance companies are beginning to offer private flood insurance at competitive rates. With the introduction of private flood insurance into the Government dominated market, flood insurance rates are expected to become competitive and result in better policies and pricing for homeowners. Both Lloyd's of London and TFIA are offering flood insurance policies in 33 States. The TFIA predicted an expansion from \$500M in insured property to \$1B by the end of 2014 (Hurtibise, 2014). Other insurance companies offering private flood insurance policies are Homeowners Choice Property & Casualty Insurance, who has just expanded their coverage area to include the State of Florida, Gridiron Insurance Underwriters, and Chubb Personal Flood Insurance. A number of private insurance providers also provide flood coverage that exceeds the maximum allowable limits statutorily authorized for the NFIP (\$250,000 for structural damage and \$100,000 for contents for residential properties, as well as \$500,000 each for structure and contents for non-residential properties) (Insurance Journal, 2014).

Premium rates are also increasing substantially for non-subsidized policies (i.e., policies on post-FIRM buildings) from the recent legislative changes. As a result of BW-12, FEMA is required to establish a Reserve Fund for the purpose of meeting the expected future obligations of the flood insurance program. FEMA funds this account through a Reserve Fund Assessment added to the premium on NFIP policies. The Reserve Fund Assessment was introduced in October 2013 as a 5 percent assessment on all policies, and there is now a 15 percent assessment on all policies. That percentage is expected to increase until the annual collections from that Assessment reaches the statutory minimum amount, which at the time it was introduced was about \$1 billion annually. Additionally, as a result of HFIAA, all policyholders have to pay a surcharge of \$25 for policies on a primary residence and \$250 on all other policies. As such, even for non-subsidized policies, the market has grown significantly more competitive, and with the addition of these fees and surcharges, the NFIP is unlikely to be the most competitive insurer on the market in many cases.

BW-12 further removed obstacles to private market flood insurance by amending the Flood Disaster Protection Act of 1973 to allow federally backed lenders to accept private flood insurance in satisfaction of the mandatory purchase requirement (42 U.S.C. § 4012a). Communities do not need to participate in the NFIP to ensure their eligibility for Federal assistance. As long as the purchase of flood insurance is required as a condition of receiving

federally backed loans and Federal assistance in special flood hazard areas, it is irrelevant whether that flood insurance is provided through the NFIP or through the private flood insurance market.

As Section 4.5.2.1 of the NPEIS concludes, private market participation has already increased significantly and will continue to do so as the NFIP moved further towards actuarial rates. As the market for private flood insurance grows, communities will still have access to flood insurance at the same price, but without the additional burden of compliance with the minimum floodplain management regulations and government-imposed assessments, fees, and surcharges. As such, even if one were to accept the premise that the availability of flood insurance has some role in facilitating floodplain development, this does not demonstrate that the NFIP is a but for cause of such development because there is a private flood insurance market and, in many cases, a more attractive private market alternative.

V.8 Impacts of designating an area as inside or outside of the floodplain on the health of the floodplain/the ecosystem

One commenter expressed the belief that the act of designating an area as inside or outside the floodplain has implications for the health of the floodplain/ecosystem as it may signal to third parties the need to place fill too remove a property from the floodplain and, as such, FEMA must consult on this action. The NFIP's mission is, in part, to raise individual and community awareness of flood hazards so they make take action to mitigate that risk. FEMA does not encourage any particular action to mitigate that flood risk. FEMA merely provides data visually related to SFHAs and zones for a community to make decisions. Other agencies also provide information that communities use in making decisions. For example, the National Hurricane Center tracks and predicts tropical storm and hurricane forecasts, including storm-surge levels, using science-based environmental predictors on digital maps to issue advisories and warnings; however, it is up to the State or local jurisdiction to take action based on that information (e.g., by issuing an order the evacuation of areas within a hurricane or storm's path).

V.9 Whether FEMA acknowledges placement of fill may trigger ESA.

Two commenters stated that FEMA acknowledges that the placement of fill may trigger ESA. FEMA agrees. The placement of fill is an action that certainly has the potential to impact species since it directly impacts the natural environment. However, the determination of what provision of the ESA is triggered is dependent on who is taking the action. Section 7(a)(2) of the ESA applies to actions that are authorized, funded or carried out by Federal agencies (see 16 U.S.C. § 1536(a)) whereas Section 9 prohibits anyone from taking endangered species and Section 10 provides for take permits (see 16 U.S.C. § 1538-1539).

The requirements of Section 7(a)(2) do not apply to the placement of fill unless a Federal agency is authorizing, funding, or carrying out such fill. FEMA does none of those things in its implementation of the NFIP. Therefore, although the filling may be harmful to species and might trigger the ESA's requirements, it would trigger Sections 9 and 10 of the ESA, and not Section 7, unless a Federal agency was involved in funding, authorizing, or undertaking the fill

placement. The entity taking the action is prohibited from taking species and if there is a potential for take, that entity should apply under Section 10 for a take permit.

V.10 Whether FEMA has more "Federal actions" than just issuance of LOMCs, Mapping Levees, and Mapping AR/A99 Zones.

One commenter stated that FEMA has more actions than just the issuance of LOMCs, mapping levees, and designating AR/A99 zones. FEMA agrees. There are a number of Federal actions undertaken pursuant to the NFIP, and these are shown in Table 2-2 of the Biological Evaluation, which is Appendix C to the Draft NPEIS. The reason that LOMCs, including LOMCs associated with levee accreditations and the mapping of AR/A99 zones, are called out in Section 2.3.3 of the NPEIS is that the issuance of LOMCs is sometimes perceived, based on anecdotal evidence, to encourage floodplain development and, as such, any adverse effects to ESA-listed species and designated critical habitat that may result from such development. Because the purpose and need for the NPEIS is to demonstrate ESA compliance, FEMA's proposed alternative includes measures to address this perception.

To the extent that the issuance of certain LOMC are perceived to offer some encouragement to develop in the floodplain, FEMA proposes to take measures within its discretion – pursuant to Alternative 2 of the NPEIS – to demonstrate that its actions in issuing LOMRs and LOMR-Fs are ESA-compliant. As explained further in Section 2.3.3 of the NPEIS, FEMA will require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought is ESA-compliant, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat). As discussed above, FEMA has always required compliance with the ESA as a condition of the community's issuance of a floodplain development permit. This proposed clarification would simply add a documentation requirement that would assist FEMA and the NFIP-participating communities in documenting this compliance. Notably, the LOMC documentation requirement would also cover LOMCs associated with the mapping of levee accreditations, as well as AR zone and A99 zone determinations.

V.11 Whether Alternatives 1 and 2 Comply with ESA.

One commenter commented that Alternatives 1 and 2 do not comply with the ESA. Both Alternatives 1 and 2 were considered in FEMA's Biological Evaluation of the National Flood Insurance Program. Section 7(a)(2) of the ESA requires that Federal agencies, in consultation with the Services, insure that any actions it authorizes, funds, or carries out are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat (16 U.S.C. § 1536(a)(2)). The steps for insuring no jeopardy, however, start with the Federal agency assessing its action.

Federal agencies first request a list of species from the Services to determine if there are any endangered or threatened species in the action area. Next the agency evaluates its action to

determine if it has the potential to affect species. FEMA undertook such a review in its Biological Evaluation. Since the NFIP does not take actions on the ground, the purpose of the Biological Evaluation was to determine if the NFIP might have indirect effects on species. FEMA's Biological Evaluation concluded that implementation of the NFIP has no effect on species.

Such a determination is part of the ESA review process and is contemplated in the Services Consultation Handbook. The definition of "no effect" in the Handbook is "the appropriate conclusion when the action agency determines it proposed action will not affect a listed species or designated critical habitat." And in Figure 3-1 of the Consultation Handbook, which is a figure showing the informal consultation process, after determining if species or critical habitat are present, the agency determines whether the action may affect species or critical habitat. If the agency determines the action will not affect species or critical habitat, there is no need for written Service concurrence or continuation to formal consultation. (USFWS and NMFS, 1998)

FEMA undertook a Biological Evaluation of the implementation of the NFIP and determined that its actions in implementing the NFIP would have no effect on ESA-listed species and habitat. Having made this "no effect" determination, there is no need for FEMA to obtain written Services concurrence or proceed to formal consultation.

V.12 Whether there are inconsistent statements in the Draft NPEIS about whether LOMCs are discretionary.

One commenter stated that there are inconsistent statements in the draft NPEIS about whether LOMCs are discretionary. The commenter's perceptions of inconsistency appear to be based on the fact that FEMA states that the issuance of LOMCs is a non-discretionary action, yet also conditions the issuance of LOMCs on compliance with the minimum floodplain management criteria. Compliance with FEMA's floodplain management criteria, including the requirements of 44 C.F.R. § 60.3(a)(2), is a condition of participation in FEMA's program, as stated in Section 1.3.1.2 of the NPEIS. The provision of flood insurance is only available to communities that are implementing and enforcing the minimum floodplain management criteria. (42 U.S.C. § 4022). The fact that the issuance of flood insurance is a non-discretionary action does not mean that it must be provided even in communities that are not meeting the NFIP program requirements. Likewise, the issuance of LOMR-Fs is a non-discretionary action that is provided only to communities that are meeting the NFIP program requirements. If a community submits a request for a LOMR-F, it must be able to, at FEMA's request, document compliance with the NFIP's minimum floodplain management criteria. See, generally, 44 C.F.R. § 65.9(g). Section 1.3.2 of the NPEIS discusses the process for requesting a LOMR-F.

V.13 Whether there are inconsistent statements in the Draft NPEIS about effects of Alternative 2 on biological resources.

One commenter commented that there were inconsistent statements in the draft NPEIS about the effects of Alternative 2 on biological resources. However, because the commenter did not reference any specific statements they believed to be inconsistent, FEMA is unable to respond to this comment.

V.14 Whether climate change impacts must be considered in complying with the ESA. (NWF)

One commenter stated that climate change impacts must be considered in complying with the ESA. In FEMA's Biological Evaluation, which is found at Appendix C of the NPEIS, as well as in Sections 3.2.2.6 and 6.3 of the NPEIS, FEMA analyzed the effects of extreme weather events and climate change. Notably, FEMA concluded in the NPEIS that the NFIP as it is currently implemented, and the action alternatives that would modify the NFIP, do not have an impact on climate change (see NPEIS Section 4.2.6).

V.15 Whether private floodplain development projects have a Federal nexus through FEMA such that a consultation with the Services on national implementation of the NFIP is warranted.

One commenter commented that because private floodplain development projects have a Federal nexus through FEMA, a consultation with the Services pursuant to the ESA is warranted. The commenter further noted that this is where the ESA impacts of private floodplain development should be analyzed.

The consultation requirements of Section 7(a)(2) are triggered by actions funded, authorized, or carried out by Federal agencies (16 U.S.C. § 1536(a)). The concept of a "Federal nexus" in the ESA context does not expand on these categories of Federal action. It is not meant as a general term to cover any type of connection a Federal action might have to something else. Rather, Federal nexus is used as a phrase to cover actions funded, authorized or carried out by a Federal agency. In Fisher v. Salazar, where plaintiffs challenged critical habitat designation, the Court in explaining Section 7(a)(2)'s requirements, noted that "[a]ctions that have no Federal nexus, that are not authorized, funded, or carried out by a Federal agency, do not require a Section 7 consultation." Fisher v. Salazar, 656 F.Supp. 2d 1357, 1369 (N.D. Fla. 2009). Similarly, the Court in Markle Interests, LLC v. U.S. Fish and Wildlife Service, explicitly stated, "If a private party's action has no Federal nexus (if it is not authorized, funded, or carried out by a Federal agency), no affirmative obligations are triggered by the critical habitat designation" under the ESA. Id. at 749.

FEMA does not fund, authorize, or carry out floodplain development. As discussed in Section 1.3.1 of the NPEIS, FEMA establishes the minimum floodplain management criteria, maps the floodplain, sells flood insurance, and operates the Community Rating System. Because FEMA does not fund, authorize, or carry out floodplain development, floodplain development does not have a Federal nexus to the NFIP for the purpose of applying the requirements of Section 7 of the ESA to such private development.

V.16 Whether FEMA has discretionary actions under its program and therefore has a duty to consult on those actions.

Four commenters commented that because FEMA has discretionary actions under its program, it has a duty to consult under the Endangered Species Act (ESA). Section 7(a)(2) of the ESA requires Federal agencies to consult with the Services to insure that any action they authorize,

fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat (16 U.S.C. § 1536(a)). The regulations implementing the ESA state that Section 7 applies to all actions in which there is discretionary Federal involvement or control (50 C.F.R. § 402.03).

FEMA does have discretionary actions under the NFIP. However, the purpose of the consultation requirement is to determine whether an action might jeopardize species. FEMA looked at both the direct and indirect effects of such discretionary actions when we prepared our Biological Evaluation (Appendix C in the NPEIS). Because FEMA did not find any effect on species when it did its biological evaluation, it is not required to continue a formal consultation.

VI. Other Recommendations FEMA Should Adopt

A number of commenters made suggestions for additional program changes they believe the NFIP should make and/or include as part of the alternatives. Most are not consistent with the purpose and need of the NPEIS, some are already being implemented as part of the current program, some are already incorporated as part of the existing alternatives, and two are outside FEMA's legal authority to implement. Each one of these categories of activities will be addressed in turn.

VI.1 Beyond the Purpose and Need

Six commenters (Center for Biological Diversity, Columbia Law School, Thomas and Weiner, Nicollet Island Coalition, Water Protection Network, California Coastal Commission) made recommendations for program changes that FEMA should implement and/or include as alternatives to the NPEIS that do not meet the stated purpose and need. These recommendations include the following:

1. Require building codes to include certain basic energy efficiency requirements that would reduce emissions associated with heating and cooling, such as, for example, insulation standards.
2. Allow building codes to encourage practices generating fewer emissions, such as siting homes near schools and shopping to reduce driving distances, and development of apartment buildings and other dwellings that generate fewer emissions per occupant.
3. Encourage homeowners and businesses to improve their energy efficiency through energy audits, incentives for energy efficient appliances, and other measures to reduce energy usage, and therefore greenhouse gas (GHG) emissions.
4. FEMA's minimum floodplain management criteria should reflect the possible effects of climate change on flood risk.
5. Incentivize development of, and reliance on, renewable (GHG-free) energy resources, such as rooftop and community solar development, community wind power, and battery storage capacities, all of which can reduce GHG emissions.
6. Need for increased coordination through improved informational platforms to further the goals of the NFIP and the ESA.

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7. Approaches and tools should be utilized to maximize efficiency and costs savings. Regional variations in use of map models should be allowed as long as there is adequate linkage to national platforms and needs.
 8. The centrality of floodway and ecological considerations warrants making them the core of common mapping and modeling applications using platforms that interface with national information sources and with local applications.
 9. FIRMs and FISs should, at a minimum, include:
 - (i) Federal and/or State demographics for a watershed, including projections for the built environment;
 - (ii) State and regional assessment of the capacity in existing watersheds to avoid adverse impact and the creation of adverse impact downstream, due to the obsolete or inadequate drainage and detention, and due to earlier development which may in the future raise flood stages as conditions change;
 - (iii) State and regional assessment of the adequacy of watershed standards for development to effectively apply the standard of "no adverse impact" to new and future development; and
 - (iv) State and regional assessment of the impacts of observed changes in extreme events and changes in watershed conditions which may interact; e.g., increasing wildfire fuel loading interacts with inadequate management capacity and life/property-saving priorities to increase fire intensity, which interacts with flooding by increasing the speed and volume of run-off, which interacts with sedimentation and ash loads in aquatic environments and water supply systems.
 10. NFIP should be used as a means of communicating risks other than flood risk.
 11. Building codes should be modified for other foreseeable natural hazards as well as to incorporate resilient standards into our development practices and avoid the costly scenario of losses and future retrofits.
 12. Floodplain management criteria standards can be strengthened to improve compliance by lenders and policy writers.
 13. Undertake steps for efficient mapping and coordination [see specific recommendations in the comment from Thomas and Weiner (page 143 of the compiled comments)].
 14. Improve flood risk standards to better ensure community safety and maintain critical floodplain functions.
 15. The Coastal Zone Management Act requires that development in the coastal zone be protective of environmentally sensitive habitat areas so FEMA should provide adequate information in implementing NFIP to allow local communities to make well-informed
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land use decisions based on impacts to the hazard risk of flooding and impacts that development may have on environmentally sensitive resources.

The purpose for making program modifications to the NFIP is to (a) implement the legislative requirements of the BW-12 and HFIAA; and (b) to demonstrate compliance with the ESA. None of the recommendations listed above relate to the stated purpose and need, nor do any of the commenters suggest that they do.

VI.2 Recommendations by Commenters That Are Already Being Implemented as Part of the Current Program

Three commenters (Association of State Floodplain Managers, Thomas and Weiner, California Coastal Commission) each made recommendations for program changes that FEMA should implement and/or include as alternatives to the NPEIS that are already being implemented as part of the current program. Each of these recommendations will be addressed in turn:

1. FEMA should support State and local efforts to map other flood hazards such as riverine erosion.

FEMA concurs with this comment, and will continue to enhance and leverage the existing Cooperating Technical Partner (CTP) and CRS programs to address this recommendation. The CTP program establishes partnerships between FEMA and participating NFIP communities, regional and state agencies, tribes and universities to increase participation in the flood hazard mapping program. The CTP program, established in 1999, is a means of extending limited mapping funding and increasing local involvement in the creation of FIRMs and Digital Flood Insurance Rate Maps (DFIRMs). The objectives of the program are to maintain consistent national standards while enabling a tailored, local focus by involving local communities to provide training and technical assistance, and leveraging valuable local experience, knowledge, and data to facilitate floodplain management of localized flood hazards and maintenance.

In 2015, the CTP program underwent a series of enhancements, including the establishment of the CTP Collaboration Center, an online Microsoft SharePoint portal for information-sharing and discussion and the release of a training-focus CTP webinar series. Additionally, FEMA launched a CTP Community of Practice (CoP) to serve as a feedback mechanism and forum for information sharing, collaboration and training for CTP stakeholders and developed a draft system with the intent to categorize, define, and offer targeted incentives for CTP partners. The program is using performance measures to evaluate partners and identify areas of opportunity and improvement. FEMA will use the performance measures outcomes to inform the award of FY17 CTP grants. While the CTP program is not currently designed for non-governmental private sector partners, innovation of the program to develop methods to incentivize the CTPs to increase those partnerships through their coordination efforts is required. At present, FEMA is standing up two initiatives to highlight high-performing CTPs in the field of innovative partnership and to share best practices and lessons learned between CTPs. Additional initiatives will be planned for FY18 and beyond.

Additionally the CRS, which is discussed in Section 1.3.1.8, is a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards through the provision of flood insurance premium discounts. Under the CRS, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the CRS activities that communities implement. Depending on the number of credits they receive from CRS activities, communities qualify for different rating classes, which correspond to different discounts they can receive. Depending on rating class, discounts on flood insurance premium rates can be between 5 and 45 percent. This provides a financial incentive for communities to implement better floodplain management and mitigation activities that exceed the minimum NFIP standards. Communities are incentivized under CRS Activities 310 and 420 to map special flood-related hazards (e.g., tsunamis, migrating stream channels, coastal erosion, etc.). More information on these activities can be found in the CRS Coordinator's Manual available at <https://www.fema.gov/media-library/assets/documents/8768>.

2. The BFE should be made into an engineering quality standard, rather than an insurance-oriented estimation.

One of the TMAC recommendations was that FEMA should transition from identifying the 1-percent-annual-chance floodplain and associated base flood elevation as the basis for insurance rating. FEMA fundamentally concurs with this recommendation and considers the transition to a new approach crucial for the program. This recommendation will require an entirely new approach to insurance rating and underwriting, including new regulatory hazard and risk products and potential impacts on floodplain management standards. There are many technical considerations for implementation requirements, including conditions regarding: (1) the appropriate modeling for full probabilistic view of hazard (selected return periods or other solution); (2) whether current methodology is appropriate for biased or higher probability events; and (3) what consideration must be given to levees, dams, tsunamis, etc., for lower probability events that are not currently reflected in the model. Significant outreach to other Federal agencies, academia and private sector resources will be required to develop and test alternative approaches in implementing this recommendation. FEMA is currently assessing this recommendation in conjunction with an ongoing initiative to analyze technologies, data sources and trends for flood risk quantification toward a long-term goal of developing a redesigned risk rating system for the program.

3. Flood maps should be updated regularly to ensure flood insurance premiums accurately reflect current flood risk.

FEMA is required by statute to revise and update flood hazard maps (a) upon a determination that such revision or updates are necessary or (b) upon request from any State or community if accompanied by technical data sufficient to justify the requested change (42 U.S.C. § 4101(f)). Part of FEMA's Risk MAP program strategy is to invest more in monitoring the validity of published flood hazard information and tracking mapping needs. The principal factors that drive the need for updated flood hazard analyses are:

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- Physical changes: such as manmade influences which may include new bridges culverts, levees, and development in the floodplain;
 - Climate changes: such as recent flood disasters or additional stream gauge data; and
 - Engineering methodology changes: such as improved computer models and better understanding of the physics of water flow.

FEMA works with stakeholders to ensure that flood hazard information on FIRMs reflects existing conditions and is aligned with flood risk. This work will involve documenting the engineering gaps that require a map update based on the three principal factors mentioned above using FEMA's Coordinated Needs Management Strategy (CNMS). CNMS is a geospatial system that leverages a watershed validation evaluation strategy used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Communities and stakeholders can notify FEMA through the Regional offices with any input that will assist with the evaluation process for documentation with CNMS.

The results of these evaluations and other flood hazard data update needs identified throughout the mapping lifecycle will be managed systematically and will allow FEMA to effectively quantify the inventory maintenance required. This watershed validation evaluation will provide the necessary data required to identify the flood hazard engineering data and map needs and associate them with the level of risk for that geographic area. Through Risk MAP, FEMA will update the flood hazard data by watershed where necessary so that FEMA's flood hazard data is in agreement with other Federal agencies' scientific data within the watershed.

Regarding the accuracy of FEMA's flood maps, FEMA is continually improving our standards as science, technology, and available data improves. This has been ongoing since the beginning of the mapping program and continues through discussions with the Technical Mapping Advisory Council (TMAC). FEMA continues to work with stakeholders and flood mapping experts, including hiring the National Academies of Science (NAS) to look at the scientific credibility of our maps. The NAS found FEMA's methods credible, but highlighted the need for FEMA to use more accurate elevation data and more model backed analysis for floodplains. FEMA adopted new standards to address these recommendations.

Additionally, because some resistance to the maps is based more on a community's reaction to the information than the credibility of the information itself, FEMA is working harder to help communities and the public understand their risk and understand what actions they can take to reduce it. As a result, FEMA implemented Risk MAP with increased community engagement and new products that can help communicate risk more holistically.

4. Better communicate both current coastal flood risks as well as likely future risks associated with SLR, especially in areas like estuaries where riverine systems meet oceans or bays.

In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use

(Technical Mapping Advisory Council, 2015). As explained in Section 2.3.8 and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (FEMA, 2017) (Appendix L).

However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." *O'Reilly v. U.S. Army Corps of Engineers*, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. §1508.23). "The mere contemplation of certain action is not sufficient ..." *Id.* FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

VI.3 Recommendations by Commenters That Are Outside FEMA's Legal Authority to Implement

One commenter made recommendations for program changes that FEMA should implement and/or include as alternatives to the NPEIS that are outside FEMA's legal authority to implement. This commenter recommended that FEMA strengthen restrictions in floodways to inhibit development and prohibit fill in floodplains. As explained in the response to Comment I.2, FEMA cannot, either directly through the mechanism of the NFIP or indirectly through the NFIP-participating communities, impose restrictions or prohibitions on the types of floodplain development that are allowed in the floodplain, the amount of development that is allowed in the floodplain, the uses of land that are allowed in the floodplain, or any other general land use restriction that is under State or local land use authority. As such, FEMA cannot prohibit development or the placement of fill.

This commenter also recommended that FEMA work with the Services to identify the upland areas that will become important habitat for the landward migration of imperiled species as the coasts are inundated by sea level rise and intensified storm surge resulting from climate change and, once these upland habitat areas are identified, prohibit the sale of flood insurance for any new development in these areas. FEMA cannot refuse to provide flood insurance for new development. FEMA is required by statute to provide insurance to property owners in communities that have "evidenced a positive interest in securing flood insurance coverage under the flood insurance program" and have met the program requirements, namely the adoption and implementation of the minimum floodplain management criteria. *See* 42 U.S.C. §§ 4022, 4102; *see also, National Wildlife Federation v. FEMA*, 345 F.Supp.2d 1151, 1174 (W.D. Wash. 2004) (holding that FEMA has no discretion to deny flood insurance to a person in an NFIP-eligible community).

VI.4 Recommendations by Commenters That Are Already Included in NPEIS Alternatives

Seven commenters (CBD, AR, NWF, City of Portland Office of Management and Finance (Portland OMF), NIC, WPN, MRN) made recommendations for program changes that FEMA should implement and/or include as alternatives to the NPEIS that are already incorporated as part of current NPEIS alternatives. The discussion in this response is limited to a discussion of how the recommendations fall within existing NPEIS alternatives. FEMA's reasons for acceptance or rejection of these alternatives are already discussed in Section 2.5 of the NPEIS.

One commenter recommended that FEMA implement measures similar to reasonable and prudent alternatives (RPA) from regional ESA consultations:

- Interim measures that FEMA and NFIP-participating can promptly implement to reduce the impacts of floodplain development on natural floodplain functions needed to support certain listed species;
- Revised floodplain management criteria to provide greater certainty that the impacts of development in area of high hazard will be avoided, minimized, and mitigated to protect natural floodplain functions to support any affected listed species and their habitats;
- Data collection and reporting requirements needed to accurately track floodplain development impacts and these reasonable and prudent measures implementation; and
- Compliance and enforcements strategies to ensure the effects of floodplain development pursuant to the NFIP are avoided or reduced throughout the action area.¹⁰

Alternative 3 of the NPEIS already proposes revisions to the floodplain management criteria that FEMA and the NFIP participating communities could implement to reduce the impacts of floodplain development on natural floodplain functions to support listed species and provide greater certainty that the impacts of development in the SFHA will be avoided, minimized, and mitigated to protect those natural floodplain functions. This alternative would include the necessary reporting, compliance, and enforcement measures necessary to ensure the proper implementation of these changes. Alternative 3 is described in Section 2.3.2 of the NPEIS.

While FEMA cannot directly regulate land use, it can require participating communities to take measures to protect threatened and endangered species in order to be eligible.

Alternatives 3 and 4 of the NPEIS already include measures that all NFIP participating communities must take to protect threatened and endangered species and their habitat. Alternatives 3 and 4 are described in Section 2.3.2 of the NPEIS.

¹⁰ This commenter also recommended that FEMA revise mapping protocols to improve the identification of special hazard areas, including channel migration zones and areas of future risk for listed species. This recommendation, and others like it, are addressed in the discussion of the dismissal of the climate change mapping alternative.

There should be local flexibility built on minimum performance standards that will allow local needs to be met while meeting the intent of the ESA. Performance standards should be crafted in a way that local permitting authorities can develop a well-functioning system that builds on existing practices while meeting intent of ESA.

Alternatives 2, 3, and 4 utilize a flexible approach built on minimum performance standards that allow local needs to be met while meeting the intent of the ESA. The minimum floodplain management criteria are not a set of prescriptive land use requirements or conditions, but a set of flood risk reduction-related performance standards that the communities use as guideposts in developing consistent land use regulations. In clarifying (Alternatives 2 and 4) or revising (Alternative 3) the minimum floodplain management criteria, the performance standard approach of the NFIP is maintained. Rather than proscribing to participating communities how land should be used and what development should be allowed or disallowed (which the NFIP has no legal authority to do anyway), the NFIP allows the communities the flexibility to determine how the performance standard will be met. This is true whether the performance standard is documenting compliance with all Federal laws or documenting that all adverse effects to ESA-listed species, critical habitat, and the natural floodplain functions that support them are mitigated.

Improve the coordination between the NFIP and State or local agencies to improve local enforcement capabilities to protect threatened and endangered species.

Alternative 3 of the NPEIS includes a requirement that participating communities allow the Services the opportunity to comment on any proposed development in the floodplain for which a permit is sought. Through this requirement, FEMA would improve the coordination between the NFIP, the Services, the State, and the participating communities.

Assess alternatives such as stronger minimum standards that will better protect people and threatened and endangered species.

Under Alternative 3 of the NPEIS, FEMA would establish a new performance standard requiring communities to obtain and maintain documentation that any adverse impacts caused by proposed development in the SFHA to ESA-listed species and designated critical habitat, including the natural and beneficial functions of floodplains that support such species and habitat, will be mitigated to the maximum extent possible. This alternative would constitute a stronger minimum standard that better protects people (though the mitigation of impacts to natural floodplain functions) and threatened and endangered species (though the mitigation of impacts to threatened and endangered species and critical habitat).

VII. Do Not Support Alternative 2 or Needs Modifications

Nine commenters (American Rivers, National Association of Homebuilders, Thomas and Weiner, National Wildlife Foundation, Oregonians for Floodplain Protection, City of New York Law Department, Washington Department of Ecology, Energy and Wildlife Action Coalition, California Farm Bureau Federation) expressed a variety of concerns with FEMA's Preferred Alternative, Alternative 2 of the NPEIS. Specific comments provided on this issue include the following:

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- Whether Alternative 2 is the only alternative in FEMA's discretion.
 - Whether Alternative 2 requires regulatory change.
 - Whether Alternative 2 could be construed as an unfunded mandate.
 - Whether designation of Alternative 2 as preferred alternative is unwarranted if based on Services' lack of concurrence.
 - Whether Alternative 2 improperly expands the scope of the ESA and/or requires a Section 10 permit.
 - Whether communities have responsibility to ensure permit seekers provide documented proof that there is no possibility of a "take."
 - Whether Alternative 2 would produce changes in ESA compliance.
 - Whether communities have a "nexus" for compliance with Section 10 of the ESA.
 - Locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat.
 - Need clarification that NFIP participating communities do not serve in the role of a Federal action agency in the context of the ESA's requirements under Section 7/FEMA should pursue Section 7 compliance programmatically.
 - Whether, under Alternative 2, project proponents would have to demonstrate ESA compliance prior to submitting LOMC request or prior to permit issuance.
 - Whether, under Alternative 2, project proponents would be required to obtain a concurrence letter from the Services for a "no effect" determination for private floodplain development, leading to project delays.
 - Whether Alternative 2 would be time consuming and cause delays.
 - Whether Alternative 2 needs more discussion of the technical assistance that communities would need from FEMA.

VII.1 Whether Alternative 2 is based on overly narrow interpretation of land use authority; Alternative 2 is not the only alternative in FEMA's discretion.

One commenter expressed a belief that FEMA's selection of Alternative 2 is based on an overly narrow interpretation of FEMA's land use authority, and this alternative is not the only alternative in FEMA's discretion. While, as FEMA explains in its response to Comment I.2, FEMA's interpretation of its land use authority is well grounded in law and statutory authority, FEMA's selection of Alternative 2 is not based on that interpretation.

FEMA agrees that Alternative 2 is not the only alternative within its discretion, and this agreement is reflected in the fact that there are other alternatives proposed in the NPEIS that FEMA has authority to implement. For example, under Alternative 3 of the NPEIS (discussed in Sections 2.3.2 and 2.4.3 of the NPEIS), which FEMA agrees it has legal authority to implement with changes to its regulations in 44 C.F.R. Part 60, FEMA would utilize its statutory and regulatory authority to require communities to ensure that the adverse impacts of private floodplain development to threatened and endangered species, and their habitat, are mitigated. FEMA does not propose to move forward with this alternative due to the lack of concurrence from the Services after approximately five years of working with them to move the draft rule

forward (see response to Comment IV.2 for more detail). As explained in Section 2.5 of the NPEIS, but for the Services' lack of concurrence, Alternative 3 would have been the preferred alternative. However, as explained in the response to Comment IV.2, FEMA continues to work with the Services to find ways it can utilize its authorities to enact programs for the conservation of species, and FEMA hopes that future environmental documents will reflect the successful culmination of these efforts.

Section 2.4 of the Final NPEIS has been revised to clarify that Alternative 2 is not the only action within FEMA's discretion.

VII.2 Whether Alternative 2 requires regulatory change.

Three commenters expressed their belief that the proposed clarifications to 44 C.F.R. § 60.3(a)(2) under Alternative 2 would require regulatory change. NFIP-participating communities are already required, pursuant to 44 C.F.R. § 60.3(a)(2), to ensure that all required Federal permits are obtained as a condition of issuing a permit for development in the floodplain. The only thing that would change to this process as a result of the implementation of Alternative 2 is that communities would now also have an affirmative documentation requirement associated with this requirement so that FEMA can verify that the community is implementing and enforcing it. FEMA has the right to request documentation of community compliance with the minimum floodplain criteria at any time. For example, FEMA routinely makes such documentation requests at Community Assistance Visits and through Community Assistance Contacts.

VII.3 Whether Alternative 2 could be construed as an unfunded mandate.

One commenter noted the ESA-related requirements of Alternative 2 could be construed as an unfunded mandate. When implemented as Congress intended, the NFIP is a constitutional exercise of the Tax and Spend, or, General Welfare Clause of the Constitution, Article I, Section 8, Clause 1. Congress may attach conditions on the receipt of Federal funds, and has repeatedly employed this power "to further broad policy objectives by conditioning receipt of Federal moneys upon compliance by the recipient with Federal statutory and administrative directives." South Dakota v. Dole, 483 U.S. 203 (1987), citing Fullilove v. Klutznick, 448 U.S. 448, 474 (1980). See Lau v. Nichols, 414 U.S. 563, 569 (1974); Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275, 295 (1958); Oklahoma v. Civil Service Comm'n, 330 U.S. 127, 143-144 (1947); Steward Machine Co. v. Davis, 301 U.S. 548 (1937). As explained in the response to Comment I.2, there are limitations on the use of this spending authority, which were articulated by the court in South Dakota v. Dole, 483 U.S. 203 (1987). However, as explained in the responses to Comments I.5 and I.6, the alternatives presented in the NPEIS are valid uses of the NFIP's statutory authority pursuant to the NFIA.

VII.4 Whether designation of Alternative 2 as preferred alternative is unwarranted if based on Services' lack of concurrence.

One commenter expressed its belief that if FEMA's selection of preferred alternative is based on the Services' lack of concurrence, this is not a sufficient reason to abandon the other alternatives.

Before FEMA can publish a proposed or final rule, it is reviewed by other parts of the Federal government. By executive order, the OMB's Office of Information and Regulatory Affairs (OIRA) reviews draft proposed and final rules from executive agencies to ensure that regulations are consistent with applicable law and the President's priorities, and that decisions made by one agency do not conflict with the policies or actions taken or planned by another. If proposed or final rules are deemed "significant" pursuant to Executive Order (EO) 12866, *Regulatory Planning and Review*, OIRA must review them and coordinate review with other Federal agencies that have an interest in the issue. A "significant regulatory action" means any regulatory action that is likely to result in a rule that may: (1) have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

The interagency review of draft proposed and final regulatory actions is intended to ensure that actions are coordinated with other agencies to avoid inconsistent, incompatible, or duplicative policies. A draft rule must obtain the appropriate clearances before it can proceed to publication, and OIRA may return for further consideration draft rules that are not consistent with other Executive Branch agency regulations or efforts. Under EO 12866, disagreements or conflicts between or among agency heads or between OMB and any agency that cannot be resolved by the Administrator of OIRA must be resolved by the President, or by the Vice President acting at the request of the President.

The Services are the agencies charged with consulting on Federal agency actions, including proposed program changes and regulatory amendments, pursuant to the ESA. Because these agencies have equities in regulatory actions that relate to ESA compliance, FEMA engaged with them early and throughout the regulatory planning and development process.

After an extensive coordination effort with the Services, FEMA has been unable to secure the Services' concurrence on Alternative 3 of the NPEIS. In light of this, FEMA will continue to work with the Services to develop proposed changes pursuant to Section 7(a)(1) of the ESA, but any changes involving regulatory action will require a multi-year effort subject to an involved agency review process. Because FEMA was not able to obtain Services' concurrence on Alternative 3 of the NPEIS, FEMA cannot move forward with this alternative. However, based on this comment, FEMA has provided additional explanation as to why this is the case. Section 2.4 of the Final NPEIS has been revised to clarify OMB's rulemaking process and Federal agency coordination obligations that are part of the rulemaking process.

VII.5 Whether Alternative 2 improperly expands the scope of the ESA and/or requires a Section 10 permit.

Six commenters commented that Alternative 2 improperly expands the scope of the ESA and/or requires a Section 10 permit. Alternative 2 requires a community to obtain and maintain documentation of ESA compliance as a condition of granting floodplain development permits, and it also clarifies that certain LOMC requests are contingent on the community, or the project proponent on the community's behalf, submitting documentation of ESA compliance.

Alternative 2 does not require additional compliance actions beyond documentation of ESA compliance. FEMA does not intend, through these proposed program modifications, to expand the requirements applicable to private floodplain development under the ESA. FEMA is merely requiring communities to document the compliance that is already required by the ESA.

Project proponents of private floodplain development have always been required to ensure their project does not cause a "take" or, in the alternative, to secure a Section 10 incidental take permit authorizing the incidental take of threatened and endangered species (16 U.S.C. § 1538-1539). FEMA is merely clarifying that the existing requirement under 44 C.F.R § 60.3(a)(2) – that NFIP-participating communities ensure that all required Federal permits are obtained as a condition of issuing a permit for development in the floodplain – also includes a documentation requirement so that FEMA can verify that the community is implementing and enforcing this requirement. If there is no potential for take, the documentation will be different than if there is the potential for take and an incidental take permit is necessary, but FEMA is not requiring a Section 10 permit if that is not required by the ESA.

Moreover, this does not constitute an improper shift of FEMA's Section 7 responsibilities under the ESA to the communities or project proponents because the documentation requirements relate to the compliance of private project proponents with the sections of the ESA that are applicable to private floodplain development. FEMA does not authorize, fund, undertake, or encourage private floodplain development. As such, it has no responsibilities under Section 7 of the ESA with respect to such private development.

In recognition of the fact that several comments were submitted regarding this point, FEMA added clarifying language at Sections 2.3.2 and 2.3.3 in the NPEIS.

VII.6 Whether communities have responsibility to ensure permit seekers provide documented proof that there is no possibility of a "take."

One commenter noted that communities have no responsibility to ensure permit seekers provide documentation that there is no possibility of a "take." If the proposed project might cause a take of ESA-listed species in violation of Section 9 of the ESA, the community would be required to obtain and maintain documentation showing that an incidental take permit had been obtained under Section 10 of the ESA. To clarify this point and related concerns, FEMA added language at Sections 2.3.2 and 2.3.3 in the NPEIS.

VII.7 Whether Alternative 2 would produce changes in ESA compliance.

One commenter stated that implementation of Alternative 2 would result in no changes in ESA compliance. FEMA agrees. As stated in the response to Comment VII.5, FEMA does not intend, through the proposed program modifications under Alternative 2, to expand the requirements applicable to private floodplain development under the ESA. Furthermore, these proposed clarifications to the minimum floodplain management criteria and LOMC requirements would consist only of requirements to document the ESA compliance that is already occurring. As such, this alternative should produce no increase in actual ESA compliance, just an increase in FEMA's ability to demonstrate that ESA compliance is occurring.

VII.8 Whether communities have a "nexus" for compliance with Section 10 of the ESA.

Two commenters commented that communities do not have a "nexus" for compliance with Section 10 of the ESA. Under 44 C.F.R. § 60.3(a)(2), communities have a responsibility to "[r]eview proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law..."

Under Section 10 of the ESA, an incidental take permit is required when non-Federal activities will result in "take" of threatened or endangered wildlife. A habitat conservation plan (HCP) must accompany an application for an incidental take permit. "Take" is defined in the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species (16 U.S.C. § 1532(19)). Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction). The purpose of the incidental take permit is to authorize the incidental take of a listed species, not to authorize the activities that result in take.

If a proposed project for which a permit is sought may lead to the "take" of threatened or endangered species, the project proponent is required to obtain a Section 10 permit. And if the community is participating in the NFIP, that community has an obligation to ensure that the project proponent does so. This is a current requirement for NFIP-participating communities.

However, in recognition of the fact that there may be confusion on this point, FEMA added clarifying language at Sections 2.3.2 and 2.3.3 of the Final NPEIS.

VII.9 Locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat.

One commenter commented that locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat. Section 9 of the ESA prohibits taking endangered or threatened species. Take is defined to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 C.F.R. § 17.3). Therefore, the concept of take already includes actions that would damage species' habitat.

"Critical habitat" is not called out specifically in Section 9 of the ESA, but it is defined as the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection as well as those specific areas outside the geographical area occupied by the species that are essential for the conservation of the species (16 U.S.C. § 1532(5)(A)). It follows that negative impacts to critical habitat, which are essential to the species' conservation, will likely harm the species itself. And as "critical habitat" is a form of habitat that is included in the definition of "harm," FEMA's Alternative 3 proposal reflects that. In sum, Section 9's prohibition on the taking (e.g., harming) of species applies to private floodplain development secured by locally issued permits, and damage to critical habitat is likely to harm species.

VII.10 Need clarification that NFIP participating communities do not serve in the role of a Federal action agency in the context of the ESA's requirements under Section 7/FEMA should pursue Section 7 compliance programmatically.

One commenter commented that "FEMA must make clear that local government[s] are not being expected to act in lieu of a Federal agency and held to the same standard as such agency would be in ensuring ESA compliance before issuing locally required land development and building permits within SFHAs." Another commenter expressed the belief that FEMA should pursue ESA compliance programmatically, rather than putting the burden on individuals to demonstrate ESA Section 7 compliance. FEMA agrees that clarification is needed, and it has revised Sections 2.3.2 and 2.3.3 of the Final NPEIS to make it clear that FEMA's proposed alternatives would not shift any of FEMA's burdens under Section 7 of the ESA onto communities participating in the NFIP.

FEMA further notes that FEMA's Biological Evaluation, found at Appendix C of the NPEIS, and the "no effect" determination made in that document, satisfy FEMA's obligations under Section 7(a)(2) of the ESA at the programmatic level. FEMA did a full programmatic ESA review of the NFIP in its Biological Evaluation (see Appendix C of the NPEIS).

FEMA in its disaster assistance programs does many project-specific ESA reviews and consultations. It is very familiar with this process. However, because the NFIP operates through its participating communities, there are no actions on the ground on which to do project specific reviews. Rather, FEMA's actions are all at the programmatic level. That is why FEMA undertook to do a Biological Evaluation on the program and look at its programmatic actions – setting the minimum floodplain management criteria, providing CRS credits to communities, mapping the floodplain, etc. The nature of those actions is different than the actions taken on the ground in the floodplain by private individuals, but they are still actions that warrant review. FEMA undertook such a review, and FEMA's programmatic ESA review concluded that its actions have no effect on listed species.

VII.11 Whether, under Alternative 2, project proponents would have to demonstrate ESA compliance prior to submitting LOMC request or prior to permit issuance.

One commenter stated that project proponents would have to demonstrate ESA compliance prior to submitting a LOMC request or prior to permit issuance. FEMA's intention under Alternatives 2, 3, and 4 was to place the focus on ESA compliance where it begins, at the standard community permitting stage. Section 2.3.3.4 cites "FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, the community must obtain and maintain documentation of compliance with the ESA for the proposed floodplain development. Furthermore, FEMA would require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain."

VII.12 Whether, under Alternative 2, project proponents would be required to obtain a concurrence letter from the Services for a "no effect" determination for private floodplain development, leading to project delays.

One commenter commented that requiring a concurrence letter from the Services for a "no effect" determination would cause project delays. Alternative 2 requires a community to obtain and maintain documentation of ESA compliance as a condition of granting floodplain development permits, and it also clarifies that certain LOMC requests are contingent on the community, or the project proponent on the community's behalf, submitting documentation of ESA compliance. FEMA is not requiring a concurrence letter from the Services for a "no effect" determination for private floodplain development.

First of all, a "no effect" determination is made by a Federal agency taking a Federal action. Section 7 of the ESA would not be triggered unless there is a Federal agency involved in authorizing, funding, or undertaking the proposed development in the floodplain (16 U.S.C. § 1536(a)). In those cases, the Federal agency would document its "no effect" determination, and that would be sufficient to show compliance. FEMA does not authorize, fund, or carry out development in the floodplain pursuant to the NFIP and as such a "no effect" determination would not be necessary.

In addition, outside of the Section 7 context, an entity taking an action is prohibited from causing a take to endangered or threatened species (16 U.S.C. § 1536 Section 9). Therefore, the entity would either make a determination that there is no potential for take, or if take is possible, the entity would likely need to seek a permit or some kind of concurrence from the Services (16 U.S.C. § 1536 Section 10). That is what the ESA already requires, and FEMA is requiring documentation that those requirements have been met. FEMA is not requiring a concurrence from the Services for a "no effect" determination.

VII.13 Whether Alternative 2 would be time consuming and cause delays.

Two commenters expressed the belief that implementation of Alternative 2 would be time consuming and cause delays. Because the proposed clarifications to the minimum floodplain management and LOMC requirements under Alternative 2 would consist of obtaining and

maintaining documentation for ESA compliance (Section 2.4.2 in the NPEIS), FEMA anticipates the additional time and effort required would be minimal because ESA compliance should already be occurring.

Alternative 2 includes the requirement that communities obtain and maintain documentation of compliance with appropriate Federal or State laws, including the ESA. The key change from current requirements is that communities are required to maintain documentation of compliance. As explained in Section 4.3.1.3.3, Floodplain Management Criteria Guidance, and Section 4.3.1.3.4, LOMC Clarification, in the NPEIS, assuming project proponents are in compliance with existing laws, the communities could incur costs and delays associated with reviewing, processing, filing, and maintaining compliance documentation. FEMA anticipates that the increased cost and time burden is likely small and, in most cases, communities would ensure there is sufficient ESA compliance documentation and information within the project files.

VII.14 Whether Alternative 2 needs more discussion of the technical assistance that communities would need from FEMA.

One commenter commented that the alternatives discussion includes nothing about the technical assistance that communities would need from FEMA in implementing the alternatives. FEMA agrees that additional detail on this is needed, and new language has been added to Sections 2.3.2 and 2.3.3 in the Final NPEIS. As explained in these revised sections, FEMA's implementation of the changes in these NPEIS alternatives would be comparable with what has been done in the past with other program modifications.

VIII. Whether FEMA's Effects Analysis is Flawed

Seven commenters (Center for Biological Diversity, Association of State Floodplain Managers, Oregonians For Floodplain Protection, Washington Department of Ecology, Nicollet Island Coalition, Water Protection Network, Mississippi River Network) provided comments states that FEMA's effects analysis is flawed. Specific comments on this issue include:

- Whether FEMA's interpretation of its land use authority is too narrow and leads to a flawed effects analysis.
- Whether the ESA-related documentation requirements of Alternative 2 could have a significant impact on land use patterns.
- Whether FEMA should reconsider its cost estimate for conducting a CAC.
- Whether the NPEIS should take into account the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide.

VIII.1 Whether FEMA's interpretation of its land use authority is too narrow and leads to a flawed effects analysis.

Two commenters expressed the belief that FEMA's interpretation of its land use authority was too narrow, leading to a flawed effects analysis. The determination of effects in FEMA's draft NPEIS is based on the actions it is taking, or proposes to take, through the NFIP; not on the possible actions it might be able to take under its legal authorities. NEPA requires Federal agencies to evaluate proposed actions to determine their effects on the environment.

Specifically, it says that all agencies of the Federal Government shall "include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement" on "the environmental impact of the proposed action" (42 U.S.C. § 4332). The actions FEMA takes in implementing the NFIP are setting the minimum floodplain management criteria, mapping the floodplain, selling flood insurance, and operating the CRS.

The potential actions a Federal agency might take based on its interpretation of its legal authorities are not ripe for a NEPA review. There must be a proposed action for NEPA to be triggered. Whether FEMA's interpretation of its land use authority is narrow or broad is not relevant to determining the effects of its actions; what matters is the actions it takes or proposes to take. Therefore, FEMA's effects analysis looks at the actions it is proposing to take under the NFIP.

VIII.2 Whether the ESA-related documentation requirements of Alternative 2 could have a significant impact on land use patterns.

One commenter suggested that the documentation requirements of Alternative 2 could have a significant impact on land use patterns. In Alternative 2, FEMA is not changing the current legal requirements placed on communities. The ESA requirements are the same – everyone must avoid taking endangered or threatened species and if there is a potential for "take," a person or community should apply for a take permit or modify the action (16 U.S.C. § 1538-1539). Regardless of FEMA's actions under the NFIP, Sections 9 and 10 apply to anyone taking an action that might harm species.

As stated in Section 4.3.1.3.3 of the NPEIS, the documentation requirement in Alternative 2 is meant to simply memorialize that process of compliance with the ESA that should already be occurring. It is not meant to change the process or create additional requirements. Therefore, the documentation requirements of Alternative 2 should not have any impact on land use patterns.

VIII.3 Whether FEMA should reconsider its cost estimate for conducting a CAC.

One commenter suggested that FEMA should reconsider its cost estimate for conducting a CAC. FEMA's methodology for estimating the cost for conducting a CAC is documented in ESA-Related Performance Standard Impact Assessment, Appendix I of the NFIP NPEIS. The estimate includes preparation time before the CAC, conducting the CAC, and time spent after the CAC to prepare notes and follow up on any outstanding items with the community, and takes into account such items as annual wage increases under the General Schedule. See Page 5 of Appendix I of the Draft NPEIS for a complete methodology. The commenter has provided no detailed information on why FEMA's cost estimates are inaccurate or provided a basis for reconsideration of these estimates.

VIII.4 Whether the NPEIS should take into account the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide.

One commenter commented that the NPEIS needs to take into account the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide. Direct and indirect

impacts of the Preferred Alternative to floodplains and the ecosystem services they provide are discussed in Section 4.3.2.2.6 of the NPEIS.

IX. FEMA's Climate Change Analysis is Flawed

Two commenters (Center for Biological Diversity, Columbia Law School) commented that the climate change analysis is flawed. Specifically, commenters raised the following issues:

- Technical Issues/Correction.
- Whether FEMA's conclusion that there are no impacts on climate change is based on FEMA's flawed statements regarding its land use authority.
- Now repealed CEQ guidance states that agencies may not ignore the role of their activities on climate change on the grounds that the contribution is too small or insignificant to warrant consideration.
- Whether the NPEIS's summary of sea level rise (SLR) fails to include essential information on regional rates of SLR and projections of future SLR.
- Whether California's 2017 SLR guidance document authored by Griggs et. al should be incorporated into NPEIS.
- Whether the NPEIS must include the Best Available Science (BAS) demonstrating that climate change is imposing an increasing flood risk by heightening coastal exposure to high-tide flooding, storm surge, and wave run-up.
- Whether the NPEIS must include the BAS on inland flooding risk due to climate change.
- Whether FEMA may exacerbate climate change by inducing floodplain development.
- Whether if FEMA does not update maps, it could exacerbate effects of climate change by providing inaccurate information that leads to maladaptive choices. FEMA should consider updating flood maps to account for this.

IX.1 Technical Issues/Correction.

Two commenters provided references, citations, and summaries of recent studies related to climate change, sea level rise, and hurricanes. FEMA reviewed these materials and incorporated these studies into the Section 3.13, Climate Change, in the NPEIS.

IX.2 Whether FEMA's conclusion that there are no impacts on climate change is based on FEMA's flawed statements regarding its land use authority.

One commenter expressed the belief that FEMA's conclusion that its program, and the proposed modifications to that program, have no impacts on climate change is based on its flawed interpretations of its land use authority. The determination of effects in FEMA's NPEIS is based on the actions it is taking, or proposes to take, through the NFIP; not on the possible actions it might be able to take under its legal authorities. NEPA requires Federal agencies to evaluate proposed actions to determine their effects on the environment. Specifically, it says that all agencies of the Federal Government shall "include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement" on "the environmental impact of the proposed action" (42 U.S.C. § 4332). The actions FEMA takes in implementing the NFIP are setting the

minimum floodplain management criteria, mapping the floodplain, selling flood insurance, and operating the Community Rating System. Whether FEMA's interpretation of its land use authority is narrow or broad is not relevant to determining the effects of its actions, including the effects on climate change; what matters is the actions it takes or proposes to take. Therefore, FEMA's effects analysis looks at the actions it is proposing to take under the NFIP.

As explained in Section 4.1.1.1 of the NPEIS and the response to Comment II.1, because floodplain development is not authorized, funded, carried out, or encouraged by FEMA, there are no physical activities carried out pursuant to the NFIP that could result in impacts to climate change.

IX.3 Now repealed CEQ guidance states that agencies may not ignore the role of their activities on climate change on the grounds that the contribution is too small or insignificant to warrant consideration.

One commenter suggested that FEMA should follow repealed CEQ guidance stating that agencies should not ignore the effects of their activities on climate change on the grounds that their contribution is insignificant. Immediately before publication of the NFIP Draft NPEIS, on March 28, 2017, Executive Order (EO) 13783, *Promoting Energy Independence and Economic Growth*, Section 3c, directed the Council on Environmental Quality (CEQ) to rescind the August 2016 final guidance entitled *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. Nevertheless, Sections 3.13 and 4.2.3 of the NPEIS follow the suggestions in the now-repealed CEQ guidance, which provided methods for Federal agencies to use in characterizing and quantifying greenhouse gas emissions or projected climate change impacts in NEPA documents.

IX.4 Whether the NPEIS's summary of Sea Level Rise (SLR) fails to include essential information on regional rates of SLR and projections of future SLR.

One commenter stated that the NPEIS's summary of SLR fails to include essential information on regional rates of SLR and projections of future SLR. FEMA reviewed recent summaries of recent studies related to climate change and sea level rise. FEMA incorporated these studies into the Section 3.13.3, Climate Change - Nationwide, in the Final NPEIS.

IX.5 Whether California's 2017 Sea Level Rise (SLR) guidance document authored by Griggs et. al should be incorporated into NPEIS.

One commenter recommended incorporating California's 2017 SLR guidance into the NPEIS. The *Rising Seas in California, An Update on Sea-Level Rise Science*, by Griggs et. al suggests that the global mean sea level could rise as much as 8 feet by 2100. The report recommends that while the 8-foot estimate is the maximum sea level rise physically plausible, the estimate should be given greater weight in decision involving facilities or structures with a low tolerance for risk. Examples of these types of facilities and structures include airports, large power plants, and sewage treatment plants. The following statement has been incorporated into the Sea Level section in Chapter 3 of the Final NPEIS, "According to a recent study, the 'maximum physically

plausible' global mean sea level estimates indicate that sea levels could rise by as much as 8 feet by 2100." (Griggs, et al., 2017)

IX.6 Whether the NPEIS must include the BAS demonstrating that climate change is imposing an increasing flood risk by heightening coastal exposure to high-tide flooding, storm surge, and wave run-up.

One commenter provided references, citations, and summaries of studies describing that climate change is increasing the risk of flooding due to storm surge, sea level rise, and the frequency of Atlantic hurricanes. References, citations, and summaries of these studies have been incorporated into Section 3.13, Climate Change, in the Final NPEIS.

IX.7 Whether the NPEIS must include the BAS on inland flooding risk due to climate change.

One commenter provided references, citations, and brief summaries of studies describing that increased precipitation events could contribute to the potential risk of inland flooding and a shift in regional flood events. References, citations, and summaries of these studies have been incorporated into Section 3.13, Climate Change, in the Final NPEIS.

IX.8 Whether FEMA may exacerbate climate change by inducing floodplain development.

One commenter expressed the belief that FEMA may exacerbate climate change by inducing floodplain development. As explained in 'Section 4.1.1.1 of the NPEIS and the response to Comment II.1, floodplain development is not authorized, funded, carried out, encouraged, or induced by FEMA, there are no physical activities carried out pursuant to the NFIP that could exacerbate climate change.

IX.9 Whether if FEMA does not update maps, it could exacerbate effects of climate change by providing inaccurate information that leads to maladaptive choices.

One commenter expressed the belief that if FEMA does not update maps, it could exacerbate the effects of climate change by providing inaccurate information that leads to maladaptive choices. FIRMs are the regulatory products that form the basis for the insurance rates established by the NFIP for policies issued by the NFIP. As required by 42 U.S.C. § 4101(f), FEMA evaluates its FIRMSs every five years to ascertain whether they need to be updated. However, because NFIP insurance rates are set for a single policy year, the regulatory flood map cannot incorporate future conditions flood hazards. TMAC has recommended, and FEMA agrees, that FEMA should offer non-regulatory flood hazard products that reflect future conditions in order to support sound floodplain management, long-term mitigation, and understanding the exposure of our insurance program over the long-term. FEMA agrees with this recommendation.

In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained in Section 2.3.8 and in the FEMA Report to Congress on the TMAC's Recommendations from 2015 (Appendix L), FEMA

intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (FEMA, 2017).

However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." *O'Reilly v. U.S. Army Corps of Engineers*, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. 1508.23). "The mere contemplation of certain action is not sufficient ..." *Id.* FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

X. Whether PEIS Definition of "Action Area" Comports with Scope of ESA

One commenter (National Wildlife Federation) commented on the NPEIS' definition of the "action area" specifically stating:

- Whether action area as defined in the NPEIS encompasses action areas as defined by the ESA.

X.1. Whether action area as defined in the NPEIS encompasses action areas as defined by the ESA.

One commenter commented that the action areas as defined in the NPEIS does not encompass action areas as defined by the ESA, and FEMA must consider impacts to species within the action defined by the ESA. The Action Area for this NPEIS is the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as SFHAs on a FIRM under the NFIP. The same Action Area is used in the NFIP Biological Evaluation at Appendix C of the NPEIS. Under the ESA, "Action Area" is defined as, "All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 C.F.R. § 402.02(d)). The Action Area for this NPEIS is the limit of the jurisdictional boundaries of the NFIP participating communities. Since there are no effects in the action area, there can be no direct or indirect effects beyond the action area.

XI. Comments on Subsidy Phase Out

Two commenters (Columbia Law School, Sierra Club) commented on the subsidy phase out. These comments stated:

- FEMA should consider whether a more expedited phase out of subsidies is warranted in order to remove incentives for floodplain development.

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- Whether the NPEIS fails to adequately assess the combined effects on low-income communities of the increased risk of flooding due to climate change and the proposed plan to phase out subsidies.

XI.1 FEMA should consider whether a more expedited phase out of subsidies is warranted in order to remove incentives for floodplain development.

One commenter recommended that FEMA consider whether a more expedited phase out of subsidies is warranted in order to remove incentives for floodplain development. As discussed in Section 1.3.3 in the NPEIS, with the passage of BW-12 and HFIAA, FEMA is required to phase out the subsidies on pre-FIRM properties. Some subsidies must be phased out immediately, some will be phased out at a rate of 25 percent premium rate increases per year, and the rest will be phased out at a rate of 5 percent to 15 percent premium rate increases per year. FEMA uses 18 percent as the magnitude threshold because Congress gave prominence to this figure in HFIAA as a level of increase that no individual policy (or other policy not subject to the mandatory 25 percent premium rate increase provision) should exceed annually.

Because subsidies apply to pre-FIRM properties (i.e. existing buildings) only, not to new floodplain development, the removal or phase-out of subsidies will not have any effect on incentivizing, or removing incentives for, new floodplain development.

XI.2 Whether the NPEIS fails to adequately assess the combined effects on low-income communities of the increased risk of flooding due to climate change and the proposed plan to phase out subsidies.)

One commenter suggested that the NPEIS fails to adequately consider the combined effects on low-income communities of climate change and the subsidy phase out. The NFIP NPEIS considers the overall cumulative impacts of the proposed alternatives for those resource areas identified in Table 4.17, Summary of Alternatives Analysis, as having an impact. As stated in Section 4.5, Cumulative Impact Assessment, "If the alternative does not have direct or indirect effects for a particular resource, there can be no cumulative effects resulting from the project because there would be no impacts to add to past, present, or reasonably foreseeable actions." Resource areas having no impact, such as climate change, were not analyzed in Section 4.5, Cumulative Impact Assessment. Cumulative impacts of the proposed action on socioeconomic resources were considered in Section 4.5.3.1.

XII. Costs and Technical Assistance Considerations for NFIP Communities in Determining and Documenting ESA Compliance

Three commenters (Association of State Floodplain Managers, Willamette Partnership, City of New York Law Department) were concerned that FEMA's alternatives were placing requirements on communities and/or project proponents beyond those required under the ESA. Specifically, these commenters stated:

- There is no acknowledgment of Federal personnel costs associated with the ESA requirements in Alternatives 2, 3, and 4.

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- Costs of compliance with Alternatives 3 and 4 would be reduced if FEMA were to take the lead and consult with the Services and revise minimum floodplain management criteria.
 - NFIP communities do not have the capacity to analyze impacts of individual land use decisions on listed species, let alone the cumulative impacts of all such decisions.
 - Need Federal funding to support development of new procedures, training of staff, etc. City and permit applicants would need technical assistance.

XII.1 There is no acknowledgment of Federal personnel costs associated with the ESA requirements in Alternatives 2, 3, and 4.

FEMA assumes the commenter is referring here to the Federal personnel costs of other Federal agencies such as the USFWS and NMFS in implementing the alternative actions. The purpose of an Environmental Impact Statement is to "provide full and fair discussion of significant environmental impacts and to "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment" (40 C.F.R. §1502.1). A NEPA analysis is required to include a statement of Purpose and Need, a list of Alternatives, a description of the Affected Environment, and an analysis of Environmental Consequences.

The Environmental Consequences section shall include direct effects; indirect effects; possible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use plans; policies and controls for the area concerned; potential environmental effects of alternatives including the proposed action; energy requirements; natural or depletable resource requirements; urban quality; historic and cultural resources; design of the built environment; and means to mitigate adverse environmental impacts (40 C.F.R. § 1502.16). The focus is on the environment.

Costs to other Federal agencies to implement the alternatives would properly be considered when the alternative is moving forward for action. In promulgating a regulation, FEMA would be required to look at all costs involved per EO 12866, *Regulatory Planning and Review*. However, such an analysis of costs is not required for a NEPA analysis.

XII.2 Costs of compliance with Alternatives 3 and 4 would be reduced if FEMA were to take the lead and consult with the Services and revise minimum floodplain management criteria.

One commenter suggests that if FEMA were to consult with the Services and revise the minimum floodplain management criteria, the costs of compliance with Alternatives 3 and 4 would be reduced. If FEMA pursues Alternatives 3 or 4, FEMA would consult with the Services. Alternative 3 would also involve revisions to the floodplain management criteria. As such, the actions recommended by the commenter to reduce costs are already incorporated as part of the proposed alternatives in the NPEIS. However, FEMA has added a clarifying footnote to alternatives 3 and 4 noting that if FEMA chooses to pursue either of these alternatives, it will undertake consultation with the Services.

XII.3 NFIP communities do not have the capacity to analyze impacts of individual land use decisions on listed species, let alone the cumulative impacts of all such decisions.

Three commenters stated that the NFIP communities do not have the capacity to analyze the impacts of individual land use decisions on listed species. Under Alternative 2, FEMA is not changing the current legal requirements on communities. The ESA requirements are the same – everyone must avoid taking endangered or threatened species and if there is a potential for take, a person or community should apply for a take permit or modify the action per 16 U.S.C. §§ 1538-1539. Regardless of FEMA's actions under the NFIP, Sections 9 and 10 apply to anyone taking an action that might harm species. The documentation requirement in Alternative 2 is meant to simply memorialize that process of compliance. It is not meant to change the process or create additional requirements. It is merely looking for proof of compliance.

That being said, the community may choose to take on the responsibility for assessing the impacts of individual land use decisions on listed species, but they do not have to because it is the responsibility of the project proponent, as are other technical aspects of the permitting process such as soil testing or floodway no-rise determinations. The community's only responsibility is to obtain and maintain documentation of this compliance.

In order to assist all communities in their implementation of the proposed program modifications, FEMA is planning to expand the provision of technical assistance, outreach, and training at every opportunity it touches States, communities and stakeholders. Please see Section 2.3.2.2 of the Final NPEIS for more detail on the types of technical assistance FEMA will provide to assist communities in implementing the Alternatives.

XII.4 Need Federal funding to support development of new procedures, training of staff, etc. City and permit applicants would require technical assistance.

One commenter commented that communities need technical assistance, as well as Federal funding to support development of new procedures, training of staff, etc. Generally, when a change is made to the way in which FEMA administers a program, FEMA responds by providing stakeholders with technical assistance, which may take the form of guidance documents, toolkits, suggested templates, and other items. In the case of the NFIP, member communities would benefit from this technical assistance, as described in Section 2.3.2 in the NPEIS.

XIII. Support Alternative 3

Four commenters (Center for Biological Diversity, American Rivers, National Wildlife Federation, John McShane) expressed support in favor of the adoption of Alternative 3. Some comments were accompanied by additional recommendations. Specifically, these commenters stated:

- Support Alternative 3 if it also includes compliance with Federal laws requiring FEMA to take into account climate change and SLR, and use the BAS.
- Support the establishment of an ESA performance standard in the minimum floodplain management criteria, but this will require technical guidance from FEMA and the Services.

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- Support Alternative 3, but think that FEMA could go farther with changes to the minimum floodplain management criteria.
 - Alternative 3 is the best course of action for the NFIP to achieve the goals of floodplain management and is consistent with both EO 11988, *Floodplain Management*, and Section 1302(c) of NFIA.
 - The proposed clarification to the no-rise performance standard in Alternative 3 will allow important projects to move forward to protect and restore the natural functions of floodplains that were often adversely impacted by structural flood risk reduction projects in the past.

XIII.1 Support Alternative 3 if it also includes compliance with Federal laws requiring FEMA to take into account climate change and SLR, and use the BAS.

As stated in Section 2.5 of the Final NPEIS FEMA was not able to secure the concurrence from the USFWS or the NMFS necessary to further consideration of Alternative 3. The lack of concurrence from the USFWS and the NMFS which, as explained in the response to Comment VII.4, is required for all program changes that require rulemaking. Moreover, the additional program changes the commenter seeks to add to Alternative 3 were dismissed because, as explained in the response to the comments in Section XVI, these program changes are not ripe for NEPA analysis.

XIII.2 Support the establishment of an ESA performance standard in the minimum floodplain management criteria, but this will require technical guidance from FEMA and the Services.

One commenter supports the establishment of an ESA performance standard, but suggests that implementation of this alternative would require technical guidance from FEMA and the Services. FEMA agrees. Generally, when a change is made to the way in which FEMA administers a program, FEMA responds by providing stakeholders with technical assistance, which may take the form of guidance documents, toolkits, suggested templates, and other items. In the case of the NFIP, member communities would benefit from this technical assistance. In order to assist all communities in their implementation of the proposed program modifications, FEMA is planning to expand the provision of technical assistance, outreach, and training at every opportunity it touches states, communities and stakeholders.

FEMA agrees that additional detail on this is needed, and new language has been added on this point to Sections 2.3.2 and 2.3.3 of the Final NPEIS.

XIII.3 Support Alternative 3, but think that FEMA could go farther with changes to the minimum floodplain management criteria.

One commenter supports Alternative 3, but believes FEMA could go further with changes to the minimum floodplain management criteria. As stated in Section 2.5 of the Final NPEIS, FEMA was not able to secure the concurrence from USFWS or NMFS necessary to further consideration of Alternative 3. The lack of concurrence from USFWS and NMFS which, as explained in the response to Comment VII.4, is required for all program changes that require

rulemaking. Moreover, the additional program changes the commenter seeks to add to Alternative 3 were dismissed because, as explained in the response to the comments in Section XVI, these program changes are not ripe for NEPA analysis.

XIII.4 Alternative 3 is the best course of action for the NFIP to achieve the goals of floodplain management and is consistent with both EO 11988, *Floodplain Management*, and Section 1302(c) of NFIA.

One commenter states that Alternative 3 is the best course of action for the NFIP to achieve the goals of floodplain management and is consistent with both EO 11988 and Section 1302(c) of the NFIA. FEMA agrees that Alternative 3 is the best option, but for the lack of concurrence from the USFWS and NMFS, which, as explained in the response to Comment VII.4, is required for all program changes that require rulemaking. Nevertheless, as explained in the response to Comment IV.1, FEMA continues to work with the Services to find ways it can utilize its authorities to enact programs for the conservation of species, and FEMA hopes that future environmental documents will reflect the successful culmination of these efforts. Notwithstanding, Alternative 2 is also consistent with EO 11988 and Section 1302(c) of NFIA.

XIII.5 The proposed clarification to the no-rise performance standard in Alternative 3 will allow important projects to move forward to protect and restore the natural functions of floodplains that were often adversely impacted by structural flood risk reduction projects in the past.

One commenter expresses the belief that the proposed clarification to the no-rise performance standard will allow important projects to move forward to protect and restore the natural functions of floodplains. We agree Alternative 3 is the best option, but for the lack of concurrence from the USFWS and the NMFS which, as explained in the response to Comment VII.4, is required for all program changes that require rulemaking. However, according to Section 4.3.1.2.3, only 15 non-public purpose projects per year that currently qualify for the exception to the no-rise performance standard would no longer qualify for that exception. Therefore, this change is not predicted to not have the level of benefits assumed by the commenter.

XIV. Do Not Support Alternative 3

Two commenters (National Association of Homebuilders, Energy and Wildlife Action Coalition) submitted comments that were not in support of Alternative 3. Specifically, commenters raised the following issues:

- Locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat.
- The standard requiring mitigation to the maximum extent possible has no basis in the ESA.
- The requirements of this alternative go beyond the requirements of Section 9 of the ESA and limit flexibility.

XIV.1 Locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat.

One commenter expressed the belief that locally issued permits have no obligation to comply with the ESA to either avoid or address impacts to critical habitat. When communities grant floodplain development permits, the development must comply with the Endangered Species Act. Unless there is a Federal action, this means the development must comply with Section 9 of the ESA. Section 9 of the ESA prohibits taking endangered or threatened species. "Take" is defined to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 C.F.R. § 17.3). Therefore, the concept of "take" already includes actions that would damage species' habitat.

"Critical habitat" is not called out specifically in Section 9 of the ESA, but it is defined as the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection as well as those specific areas outside the geographical area occupied by the species that are essential for the conservation of the species (16 U.S.C. § 1532(5)(A)). It follows that negative impacts to critical habitat, which are essential to the species' conservation, will likely harm the species itself. And as "critical habitat" is a form of habitat that is included in the definition of "harm," FEMA's Alternative 3 proposal reflects that. Damage to critical habitat is likely to harm species, which is prohibited by Section 9.

Section 9 of the ESA prohibits taking endangered or threatened species. "Take" is defined to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 C.F.R. § 17.3). Therefore, the concept of "take" already includes actions that would damage species' habitat.

"Critical habitat" is not called out specifically in Section 9 of the ESA, but it is defined as the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection as well as those specific areas outside the geographical area occupied by the species that are essential for the conservation of the species (16 U.S.C. § 1532(5)(A)). It follows that negative impacts to critical habitat, which are essential to the species' conservation, will likely harm the species itself. And as "critical habitat" is a form of habitat that is included in the definition of "harm," FEMA's Alternative 3 proposal reflects that. Damage to critical habitat is likely to harm species, which is prohibited by Section 9.

XIV.2 The standard requiring mitigation to the maximum extent possible has no basis in the ESA.

One commenter commented that the standard requiring mitigation to the maximum extent possible has no basis in the ESA. While the ESA does not, in Section 7 or Sections 9 or 10, require mitigation to the maximum extent possible, that requirement in the standard FEMA proposes in Alternative 3 is related to the ESA's requirements. FEMA did not set out, in this alternative, to simply restate the requirements that are explicit in the ESA. Instead, in developing Alternative 3, FEMA sought to find an ESA-related standard that would be workable and would advance the conservation of species under Section 7(a)(1) of the ESA. Section 7(a)(1) requires Federal agencies to utilize their authorities in furtherance of the conservation of species.

Under Alternative 3, FEMA would use its authorities under the NFIA to advance the conservation of species by requiring mitigation to the maximum extent possible for actions taken that might harm species or habitat. In this way, under Alternative 3, FEMA is seeking to further the goals of the ESA, but also creating a standard that is different and unique to the NFIP. It is not intended to mirror the language of the ESA, but it does have its basis in the overall purpose of the ESA and in the requirements of Section 7(a)(1) of the ESA.

XIV.3 The requirements of this alternative go beyond the requirements of Section 9 of the ESA and limit flexibility.

One commenter expressed the belief that the requirements of Alternative 3 go beyond the requirements of Section 9 of the ESA and limit flexibility. The requirements of Alternative 3 do go beyond the requirements of Section 9 of the ESA. While this proposed alternative standard is related to the ESA, it was not intended to simply restate the requirements that are already explicit in the ESA. Instead, under Alternative 3, FEMA sought to find an ESA-related standard that would be workable and would advance the conservation of species under Section 7(a)(1) of the ESA. Section 7(a)(1) requires Federal agencies to utilize their authorities in furtherance of the conservation of species.

Under Alternative 3, FEMA would use its authorities under the NFIA to advance the conservation of species by requiring mitigation to the maximum extent possible for actions taken that might harm species or habitat. In this way, FEMA is seeking to further the goals of the ESA, but also creating a standard that is different and unique to the NFIP. Contrary to the comment that it would limit flexibility, FEMA's goal was to create more flexibility. FEMA designed a protective standard that didn't rely on a habitat conservation plan, but would still achieve the conservation goals of the ESA. Additionally, because, like all other minimum floodplain management criteria, the new ESA-related criterion would be designed as a performance standard, the communities and project proponents would have flexibility in determining how to meet the standard.

XV. Do Not Support Alternative 4

Four commenters (National Wildlife Federation, National Association of Homebuilders, Thomas and Weiner, Oregon Department of Land Conservation and Development) submitted comments that were not in support of Alternative 4.

- A guidance only approach will not alone achieve needed protections for listed species.
- Whether communities have responsibility to ensure permit seekers provide documented proof that there is no possibility of a "take."
- For projects where a Federal permit is involved, project proponents would be required to get incidental take authorization whenever species/habitat are present and/or complete Section 7 consultation/implement RPAs, and this is time consuming and expensive.
- For projects where no Federal permit is involved, and where species/habitat are present, project proponents would have to get an incidental take permit through completion of a HCP, and this is time consuming and expensive-even more so than Section 7 process.
- Whether Alternative 4 could be construed as an unfunded mandate.
- Could be interpreted by project proponent not to apply through the use of apparently qualified evidence.
- Requirements of this alternative go beyond the requirements of ESA Section 9 and limit flexibility/stifle collaboration.

XV.1 A guidance only approach will not alone achieve needed protections for listed species.

One commenter stated that a guidance only approach would not achieve needed protections for listed species by itself. The comment reflects a misunderstanding of FEMA's intent in proposing the clarifications and program changes in Alternatives 2, 3, and 4 of the PEIS. As explained in Section 2.3.3., the proposed clarifications under Alternative 2 would consist only of requirements to document the ESA compliance that is already occurring. As such, this alternative should produce no increase in actual ESA compliance, just an increase in FEMA's ability to demonstrate that ESA compliance is occurring.

Additionally, as explained in Section 2.3.2, Alternatives 3 and 4 are changes proposed to further the conservation goals of the ESA, thereby demonstrating compliance with Section 7(a)(1) of the ESA. FEMA made a "no effect" determination in its Biological Evaluation, which means that FEMA has determined that there are no adverse effects for which program changes to the NFIP would be necessary to address per the requirements of Section 7(a)(2) of the ESA.

As to the ESA obligations of project proponents of private floodplain development, FEMA does not intend, through any of the proposed alternatives, to supplant the requirements of the ESA applicable to private development in the floodplain. The proposed clarifications and program changes under Alternatives 3 and 4 would be made to further the conservation goals

of the ESA, not to supplant the ESA. Project proponents of private floodplain development must still comply with the ESA to ensure the necessary protection of listed species. Language has been added to Sections 2.3.2 and 2.3.3 to make it clearer that FEMA does not intend, through any of the proposed alternatives, to supplant the requirements of the ESA already applicable to private floodplain development.

XV.2 Whether communities have responsibility to ensure permit seekers provide documented proof that there is no possibility of a "take."

One commenter noted that communities have no responsibility to ensure permit seekers provide documentation that there is no possibility of a "take." Under Alternative 4, the communities would not be required to produce documentation that there is no possibility of a "take." However, if the proposed project could cause a take of ESA-listed species in violation of Section 9 of the ESA, the community would be required to obtain and maintain documentation showing that an incidental take permit had been obtained under Section 10 of the ESA. To clarify any confusion on this point and related concerns, FEMA added clarifying language at Section 2.3.2 in the NPEIS.

XV.3 For projects where a Federal permit is involved, project proponents would be required to get incidental take authorization whenever species/habitat are present and/or complete Section 7 consultation/implement RPAs, and this is time consuming and expensive.

Any applicable Federal permits are required to be obtained as a condition of all permits for development in the floodplain. If the proposed development in the floodplain is authorized, funded, or carried out by a Federal agency, compliance with Section 7 of the ESA is also required. This may include a requirement to obtain an incidental take statement to ensure compliance with Section 9 of the ESA. These requirements exist under the current law, and nothing in Alternative 4 would alter the existing requirements.

XV.4 For projects where no Federal permit is involved, and where species/habitat are present, project proponents would have to get an incidental take permit through completion of a HCP, and this is time consuming and expensive-even more so than Section 7 process.

Project proponents of private floodplain development are required, under Section 9 of the ESA, to ensure their project does not cause a "take" or, in the alternative, to secure a Section 10 incidental take permit authorizing the incidental take of threatened and endangered species (16 U.S.C. § 1538-1539). Under Section 10 of the ESA, an incidental take permit is required when non-Federal activities would result in "take" of threatened or endangered species. A HCP must accompany an application for any incidental take permit. These requirements exist under the current law, and nothing in Alternative 4 would alter the existing requirements.

XV.5 Whether Alternative 4 could be construed as an unfunded mandate.

One commenter noted the ESA-related requirements of Alternative 4 could be construed as an unfunded mandate. When implemented as Congress intended, the NFIP is a constitutional

exercise of the Tax and Spend, or, General Welfare Clause of the Constitution, Article I, Section 8, Clause 1.

Congress may attach conditions on the receipt of Federal funds, and has repeatedly employed this power "to further broad policy objectives by conditioning receipt of Federal moneys upon compliance by the recipient with Federal statutory and administrative directives." South Dakota v. Dole, 483 U.S. 203 (1987), citing Fullilove v. Klutznick, 448 U.S. 448, 474 (1980). See Lau v. Nichols, 414 U.S. 563, 569 (1974); Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275, 295 (1958); Oklahoma v. Civil Service Comm'n, 330 U.S. 127, 143-144 (1947); Steward Machine Co. v. Davis, 301 U.S. 548 (1937). As explained in the response to Comment I.2, there are limitations on the use of this spending authority, which were articulated by the court in South Dakota v. Dole, 483 U.S. 203 (1987). However, as explained in the responses to Comments I.5 and I.6, the alternatives presented in the NPEIS are valid uses of the NFIP's statutory authority pursuant to the NFIA.

XV.6 Could be interpreted by project proponent not to apply through the use of apparently qualified evidence.

One commenter stated that Alternative 4 could be interpreted by project proponents not to apply through the use of apparently qualified evidence. However, because the commenter failed to elaborate on what was meant by this comment, FEMA is unable to respond.

XV.7 Requirements of this alternative go beyond the requirements of ESA Section 9 and limit flexibility/stifle collaboration.

One commenter commented that the requirements of Alternative 4 go beyond the requirements of Section 9 of the ESA and limit flexibility. While the proposed ESA guidance under Alternative 4 is related to the ESA, it was not intended to simply restate the requirements of the ESA. Instead, under Alternative 4, FEMA sought to find an ESA-related performance standard that would be workable and would advance the conservation of species under Section 7(a)(1) of the ESA. Section 7(a)(1) requires Federal agencies to utilize their authorities in furtherance of the conservation of species.

Under Alternative 4, FEMA would use its authorities under the NFIA to advance the conservation of species by implementing an ESA-related performance standard through guidance. In this way, FEMA is seeking to further the goals of the ESA, but also proposing a standard that is different and unique to the NFIP. Contrary to the comment that it would limit flexibility, FEMA's goal was to create more flexibility. FEMA designed a protective standard that did not rely on a HCP, but would still achieve the conservation goals of the ESA. Additionally, because, like all other minimum floodplain management criteria, the new ESA-related performance standard would allow communities and project proponents flexibility in determining how to meet the standard.

XVI. Failure to Consider an Alternative that incorporates Climate Change and SLR into FIRMS/Rejection of Future Conditions Mapping Alternative

Six commenters (Center for Biological Diversity, American Rivers, Association of State Floodplain Managers, Columbia Law School) commented that FEMA failed to consider an alternative that incorporated climate change and SLR into FIRMs and/or that FEMA should not have rejected a Future Conditions Mapping Alternative. Specifically, commenters raised the following issues:

- BW-12 directs FEMA to incorporate the TMAC's future conditions risk assessment and modeling report into its update and revisions of flood maps.
- TMAC Report recommends incorporation of the effects of SLR and long-term erosion.
- TMAC recommends that FEMA develop regional approaches to mapping riverine flood risk.
- There is actionable science to map climate change and SLR, and FEMA is required to use the BAS.
- TMAC states that land use change and erosion hazards can be incorporated into flood maps.
- NEPA requires FEMA to consider and analyze an alternative involving the incorporation of climate change and SLR into flood maps.
- FEMA should collaborate with other Federal agencies to agree on a national methodology for mapping SLR and increased storm intensity.
- Without adequate consideration of future conditions, there cannot be adequate understanding of impending changes in the flood hydrographs that will arrive in the floodway after the FIRM is set but long before potentially affected structures have been removed.
- FEMA's reasons for rejection of the future conditions mapping alternative do not apply to advisory components of flood maps.

XVI.1 BW-12 directs FEMA to incorporate TMAC's future conditions risk assessment and modeling report into its update and revisions of flood maps.

One commenter stated that BW-12 directs FEMA to incorporate TMAC's future conditions risk assessment and modeling report into its update and revisions of flood maps. FEMA agrees, and the language in Section 2.3.8 of the Final NPEIS has been revised to reflect FEMA's acknowledgment of, and responses to, the TMAC's recommendations in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report. As explained in Section 2.3.8, as revised, and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the

purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.2 TMAC Report recommends incorporation of the effects of SLR and long-term erosion.

One commenter states that the TMAC recommends incorporations of the effects of SLR and long-term erosion. FEMA agrees, and the language in Section 2.3.8 of the Final NPEIS has been revised to reflect FEMA's acknowledgment of, and responses to, the TMAC's recommendations in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report. As explained in Section 2.3.8, as revised, and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.3 TMAC recommends that FEMA develop regional approaches to mapping riverine flood risk.

One commenter states that the TMAC recommends that FEMA develop regional approaches to mapping riverine flood risk. However, it is not sufficiently clear from the commenter which TMAC recommendation is being referred to. As such, FEMA is unable to provide a response.

XVI.4 There is actionable science to map climate change and SLR, and FEMA is required to use the Best Available Science (BAS).

One commenter states that there is actionable science to map climate change and SLR, and FEMA is required to use the BAS. In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained

in Section 2.3.8 of the Final NPEIS and in the FEMA Report to Congress on the TMAC's Recommendations from 2015 (Appendix K), FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.5 TMAC states that land use change and erosion hazards can be incorporated into flood maps.

Two commenters state that land use change and erosion hazards can be incorporated into flood maps. In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained in Section 2.3.8 of the Final NPEIS and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.6 NEPA requires FEMA to consider and analyze an alternative involving the incorporation of climate change and SLR into flood maps.

One commenter states that NEPA requires FEMA to consider and analyze an alternative involving the incorporation of climate change and SLR into flood maps. In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate

change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained in Section 2.3.8 of the Final NPEIS and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.7 FEMA should collaborate with other Federal agencies to agree on a national methodology for mapping Sea Level Rise (SLR) and increased storm intensity.

One commenter comments that FEMA should collaborate with other Federal agencies to agree on a national methodology for mapping SLR and increased storm intensity. In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained in Section 2.3.8 in the Final NPEIS and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017).

As part of this effort, it is necessary for the Agency to ensure that it is not duplicating efforts already underway by other Federal agencies. Moreover, FEMA understands that where possible, its efforts should complement and enhance existing initiatives from other Federal investments in the state of the science and its application to flood risk management. FEMA will ensure a thorough analysis of the current application of this science by other agencies, along with a comprehensive needs assessment that will inform how FEMA can and should contribute.

However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations

concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.8 Without adequate consideration of future conditions, there cannot be adequate understanding of impending changes in the flood hydrographs that will arrive in the floodway after the Flood Insurance Rate Map (FIRM) is set but long before potentially affected structures have been removed.

One commenter suggests that adequate consideration of future conditions is important to understanding the impacts of FIRMs. In the TMAC 2015 Future Conditions Risk Assessment and Modeling Report, the TMAC offered a variety of recommendations related to the mapping of future conditions flood hazards, including climate change in coastal areas, erosion zones, and future conditions land use (Technical Mapping Advisory Council, 2015, pp. 4-26). As explained in Section 2.3.8 and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." *O'Reilly v. U.S. Army Corps of Engineers*, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." *Id.* FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVI.9 FEMA's reasons for rejection of this alternative are not well supported.

Two commenters express the belief that FEMA's reason for dismissal of the climate change mapping alternative are not well supported. NEPA requires that Federal agencies include in its analysis of the environmental impacts of a proposed action alternatives to the proposed action. NEPA regulations specify that in the Alternatives section of an EIS, agencies shall:

- (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
- (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
- (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
- (d) Include the alternative of no action.
- (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

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- (f) Include appropriate mitigation measures not already included in the proposed action or alternatives. (40 C.F.R. § 1502.14)

FEMA agrees that additional clarification was needed, and the language in Section 2.3.8 of the Final NPEIS has been revised to provide that clarification. As explained in Section 2.3.8, as revised, and in the FEMA Report to Congress on the TMAC's Recommendations from 2015, FEMA intends to implement the TMAC recommendations contained in the TMAC 2015 Future Conditions Risk Assessment and Modeling Report (Appendix K), and FEMA has provided its responses and proposed implementation steps in its report to Congress responding to the TMAC's 2015 recommendations (Appendix L) (FEMA, 2017). However, as demonstrated by this report, these changes are not ripe for NEPA analysis at this time. "[P]rojects' for the purposes of NEPA, are described as 'proposed actions,' or proposals in which action is imminent." *O'Reilly v. U.S. Army Corps of Engineers*, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." *Id.* FEMA is still at the very early stages of determining the implementation steps necessary to incorporate the TMAC's recommendations in FEMA's Flood Hazard Mapping Program. Thus, implementation of the TMAC recommendations, including recommendations concerning mapping climate change, is not yet ripe for inclusion as an alternative that warrants analysis of environmental impact.

XVII. Dismissal of Modifying SFHA Alternative

Two commenters (American Rivers, Association of State Floodplain Managers) commented that the dismissal of the alternative to modify the SFHA is not well supported. Specifically, commenters stated that:

- FEMA can get critical habitat information from Services website, it does not need to procure it directly from the Services.
- FEMA should document Services' failure to cooperate with FEMA in providing critical habitat information.
- FEMA cites studies saying that avoiding floodplain development maintains natural functions benefitting habitats, but then says that ESA-listed species will not benefit from expanded SFHA.
- The 1976 EIS said a stronger flood standard would be the most direct means to meet the intent of the NFIP, protection of life and property in flood-prone areas, and prevent disruption and endangerment if floodplain ecosystems.

XVII.1 FEMA can get critical habitat information from Services website, it does not need to procure it directly from the Services.

One commenter suggests that FEMA can get critical habitat information from the Services website to use in determining where species are located vis-a-vis the floodplain. In general, the Federal government does not have good standards in place for ensuring the interoperability of data sets among different Agencies. FEMA recognizes the need to involve our IT infrastructure

to ensure the flood hazard products generated can be integrated into products from other Agencies. As we reevaluate future investments within our IT infrastructure, particularly within FIMA and the Mapping Program, FEMA's priority will be to ensure that other data relevant to flood hazard mapping program can be visually depicted in relation to the flood hazard identified by FEMA. Currently, however, a significant part of the data provided by the Services on its website is not in a format for which it can be readily visually depicted in relation to the flood hazard. Moreover, the Services' critical habitat information is lacking for a number of areas of the country, and thus would be unavailable for FEMA to use.

XVII.2 FEMA should document Services' failure to cooperate with FEMA in providing critical habitat information.

One commenter suggested that FEMA document the Services' failure to cooperate with FEMA in providing critical habitat information. After multiple verbal requests, in a letter dated, December 3, 2014, FEMA requested assistance from the Services to secure a list of the federally listed threatened, endangered, proposed, or candidate species, and designated or proposed critical habitat within the mapped SFHA, which is the jurisdictional area of the NFIP. In an effort to assist the Services to provide FEMA with the list of species and critical habitat in the mapped SFHA, FEMA provided the Services access to maps of the SFHAs, which are located at FEMA Flood Map Service Center. FEMA also requested the GIS data that defines the geospatial extents of listed species' ranges and critical habitats. FEMA had hoped to utilize the data to identify where species' habitat nationwide intersected with the mapped SFHAs in NFIP participating communities. The letter of request is included as part of the consultation history in FEMA's Biological Evaluation, Appendix C in the Draft NPEIS. FEMA has not received a response from the Services on this request.

XVII.3 FEMA cites studies stating that avoiding floodplain development maintains natural functions benefitting habitats, but then says that ESA-listed species and critical habitat will not benefit from expanded SFHA.

Two commenters express the belief that there is an inconsistency between FEMA's statement that avoiding floodplain development can help maintain natural floodplain functions, thereby benefitting habitats, and FEMA's statement that ESA-listed species and critical habitat will not benefit from an expanded SFHA. There is not a clear analysis that shows that increasing the SFHA would apply floodplain management criteria to more critical habitat because no one has intersected the two. In 2014, a request was made of the Services to provide FEMA with critical habitat data. No response was received. However, if the Services were ever to provide critical habitat data, it may be possible to do some level of analysis, but it would take significant time and funding. Without this information, FEMA is unable to ascertain whether an alternative involving expansion of the SFHA could result in any benefit to ESA-listed species and critical habitat.

XVII.4 The 1976 EIS said a stronger flood standard would be the most direct means to meet the intent of the NFIP, protection of life and property in flood-prone areas, and prevent disruption and endangerment of floodplain ecosystems.

One commenter pointed to a statement in the 1976 EIS on the NFIP touting the benefits of a stronger flood standard, such as protection of life and property in flood-prone areas and preventing disruption of floodplain ecosystems. The purpose for making program modifications to the NFIP is to (a) implement the legislative requirements of BW-12 and HFIAA; and (b) to demonstrate compliance with the ESA. A stronger flood standard does not relate to the stated purpose and need, nor does the commenter suggest that it does.

XVIII. Rejection of "No LOMR-F" Alternative

One commenter (Association of State Floodplain Managers) commented that FEMA's rejection of the "No LOMR-F" Alternative not well supported. Specifically, the commenter stated that:

- With more focus on changes to CLOMR-F process, and better acknowledgment of adverse effects of fill, this would be a reasonable alternative.
- Changes to State or local requirements where fill is the only means of properly elevating structures is no less burdensome than the requirements regarding ESA compliance in the non-dismissed NPEIS alternatives.

XVIII.1 With more focus on changes to CLOMR-F process, and better acknowledgment of adverse effects of fill, this would be a reasonable alternative.

Commenter failed to provide sufficient detail as to why they think this would be a reasonable alternative.

XVIII.2 Changes to State or local requirements where fill is the only means of properly elevating structures is no less burdensome than the requirements regarding ESA compliance in the non-dismissed NPEIS alternatives.

One commenter expressed its belief that changes to State or local requirements for the LOMR-F alternative would be no less burdensome than the changes required as a result of implementation of the alternatives in the NPEIS. In Section 2.4.5 of the NPEIS, FEMA stated that if it were to adopt the alternative involving making changes to the LOMR-F process, there would be a major practical hurdle to implementation of this alternative in that there are a number of States that require placement of fill as the only means of elevating structures in the floodplain. If this alternative were implemented, all of these States would be required to change their laws, which would be a very time-consuming and difficult process. Conversely, FEMA is not aware of any State laws that would need to be changed for local communities to adopt ordinances consistent with any of the alternatives in the NPEIS.

FEMA believes that changing State and local requirements together would be significantly more burdensome than communities only making changes to their local laws and regulations. State legislative actions, legal reviews, outreach to communities, technical assistance and time consuming community adoption processes for the new laws and regulations alone would add a

major layer of burden and delays to the communities' ordinance adoption process. Because the alternatives proposed in the NPEIS do not require this additional layer of regulatory complexity to implement, they are less burdensome than the dismissed alternative involving changes to the LOMR-F process.

XIX. Clarification is Needed on How This Impacts Ongoing and Future Implementation of Oregon RPA

Four commenters (Oregonians for Floodplain Protection, Willamette Partnership, City of Portland Office of Management and Finance Oregon Department of Land Conservation and Development) commented that clarification is needed on how the NPEIS and/or the preferred alternative will impact the ongoing and future implementation of the Oregon RPA. Specifically, commenters raised the following issues:

- FEMA Region X's message indicating an intent to implement RPA 2 contradicts FEMA Headquarters' intent to implement the Preferred Alternative.
- Despite the release of the Biological Opinion in 2016, significant uncertainty continues as communities wait for clear guidance from FEMA on the appropriate route for meeting both the NFIP and ESA requirements for permitting land use decisions in flood hazard areas.
- The NPEIS does not address how changes implemented under any of the proposed alternative would relate to, influence, or otherwise interact with the Oregon Biological Opinion.
- The lack of clarity around the intersection between the NFIP and ESA creates a significant source of uncertainty, risk, and cost for local governments as they determine how best to grow their communities in safe and resilient ways.

XIX.1 FEMA Region X's message indicating an intent to implement RPA 2 contradicts FEMA Headquarters' intent to implement the Preferred Alternative.

FEMA's plans for implementation of the RPA that the NMFS provided in Oregon have not yet been determined. FEMA is still in the process of evaluating the options, gathering data, reviewing feedback received, etc.

The NPEIS covers FEMA's implementation of the program nationally. Whatever alternative is implemented, it will be implemented in Oregon just as it will in all other NFIP-participating states and communities. Implementation of these program changes will not influence FEMA's plans to implement NMFS' RPA.

XIX.2 Despite release of the Biological Opinion in 2016, significant uncertainty continues as communities wait for clear guidance from FEMA on the appropriate route for meeting both NFIP and ESA requirements for permitting land-use decisions in flood hazard areas.

The Oregon Biological Opinion released by NMFS in 2016 contained a RPA with a number of recommended changes (NMFS, 2016). Determining whether and how to implement these recommended changes is a huge undertaking, and FEMA has sought feedback from various

sources to help inform its decision-making. It is currently in the process of digesting the feedback and considering options and gathering data to determine how to move forward. FEMA will let the public know when decisions are made.

XIX.3 NPEIS does not address how changes implemented under any of the proposed alternatives would relate to, influence, or otherwise interact with the Oregon Biological Opinion.

The NPEIS does not address how changes implemented under any of the proposed alternatives would relate to, influence, or otherwise interact with the Oregon Biological Opinion because FEMA has not developed an implementation plan for implementation of the program changes laid out in the RPA included in the Oregon Biological Opinion. For the purposes of NEPA "projects" are described as 'proposed actions,' or proposals in which action is imminent." O'Reilly v. U.S. Army Corps of Engineers, 477 F.3d 225, 236(5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." Id. FEMA is still at the very early stages of determining how it will implement the RPA in the Oregon Biological Opinion. Thus, any program changes to be made based on that RPA are not yet ripe for inclusion as an alternative in the NPEIS.

XIX.4. The lack of clarity around the intersection between NFIP and ESA creates a significant source of uncertainty, risk, and cost for local governments as they determine how best to grow their communities in safe and resilient ways.

FEMA understands that because it has not determined how to implement the Oregon RPA, there is some uncertainty about what may be required of NFIP participating communities in Oregon. FEMA is currently working on digesting the feedback it received as well as looking at options and information gathered to determine how best to move forward. FEMA will let the public know as soon as it has made a decision and set a path forward.

XX. Supplemental EIS is Required to Address Environmental Impacts of Implementation of the Oregon RPA

One commenter (Oregonians for Floodplain Protection) commented that a supplemental EIS is required to address environmental impacts of the implementation of the Oregon RPA. Specifically, this commenter raised the following issue:

- If FEMA intends to proceed with implementing the RPA in Oregon, FEMA needs to issue a supplemental EIS to review the effects of those program changes on the environment as required by NEPA.

XX.1 If FEMA intends to proceed with implementing the RPA in Oregon, FEMA needs to issue a supplemental EIS to review the effects of those program changes on the environment as required by NEPA.

Since FEMA has not yet determined how to implement the RPA in Oregon, it is not clear at this time what environmental analysis might be needed. FEMA is currently considering its options for implementation, taking into account feedback it has received. It is premature to predict what

type of environmental analysis might be warranted. Once FEMA determines a path forward for implementing the RPA, it will also assess the need for further environmental analysis.

Nevertheless, FEMA has added a new section 1.5.3 to address the possibility that there may be tiering off of the NPEIS to cover program changes undertaken based on the recommendations made in the Oregon RPA.

XXI. Delay of Final NPEIS for NFIP Reauthorization

Seven commenters (American Rivers, Association of State Floodplain Managers, Thomas and Weiner, Audubon Society of Portland, Fort Bend Flood Management Association, California Farm Bureau Federation, Husch Blackwell) commented that FEMA should delay issuing a final NPEIS until the reauthorization of the NFIP is complete and should reinitiate scoping meetings. Specifically, the commenters raised the following issues:

- Reauthorization of the NFIP and the accompanying legislative changes would constitute "significant new circumstances or information relevant to environmental concerns..." and therefore a supplemental EIS may be required.
- Given the age of the initial NPEIS, FEMA should conduct further public scoping to incorporate features of the upcoming NFIP reauthorization.

XXI.1 Reauthorization of the NFIP and the accompanying legislative changes would constitute "significant new circumstances or information relevant to environmental concerns..." and therefore a supplemental NPEIS may be required.

Four commenters stated that reauthorization of the NFIP and accompanying legislative changes would constitute "significant new circumstances or information relevant to environmental concerns", requiring a supplemental PEIS. Federal agencies are urged to apply NEPA as early in the process of considering an action as possible. "Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts" (40 C.F.R. § 1501.2). FEMA, in considering its implementation of the NFIP, with certain program modifications, is focused on those program modifications that are currently sufficiently developed to warrant analysis under NEPA. The NFIP is an ongoing program and may undergo changes at any point. The NEPA review is a point in time analysis. FEMA is analyzing program changes that are currently ripe for analysis under NEPA.

CEQ's scoping regulations note that an agency may need to revise its scoping determinations if substantial changes are later made in the proposed action or if significant new information arises which bear on the proposal (40 C.F.R. § 1501.7(c)). Reauthorization of the NFIP may result in program changes to the NFIP and may, therefore, require additional analysis. However, such program changes are not imminent. Once the reauthorization is passed, FEMA will determine how to implement the changes at that time, and FEMA will also assess the need for further environmental analysis.

XXI.2 Given the age of the initial NPEIS, FEMA should conduct further public scoping to incorporate features of the NFIP Reauthorization.

Three commenters suggested that following the NFIP Reauthorization, the NFIP should re-open the scoping period.

FEMA engaged in a fulsome scoping process when it began to shape its Draft NPEIS for the NFIP. As required by NEPA regulations, FEMA published a notice of intent in the Federal Register and invited the participation of affected Federal, State and local agencies, affected Indian tribes, and other interested persons (40 C.F.R. §§ 1501.7, 1501.7(a)(1)). FEMA then determined the scope and the significant issues to be analyzed and identified and eliminated from detailed study the issues that were not significant (40 C.F.R. §§ 1501.7(a)(2) and (3)). CEQ's regulations on scoping indicate that "[a]n agency shall revise the determination made under paragraphs (a) and (b) of this section if substantial changes are made later in the proposed action, or if significant new circumstances or information arise which bear on the proposal or its impacts" (40 C.F.R. § 1501.7(c)).

NEPA regulations state that "Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts" (40 C.F.R. § 1501.2). As noted, FEMA completed an initial EIS for the NFIP in 1976. FEMA recognized the need to do a new EIS based on changes to the program since that time and particularly the changes resulting from the BW-12 and HFIAA legislation. Waiting for further changes to complete the NPEIS would not be productive. It would only serve to delay the needed analysis of the current program and the legislatively mandated changes.

While more changes to the NFIP are likely in the future, from both as a result of the NFIP reauthorization and potentially other ongoing efforts, it is the reality of an ongoing program that changes come periodically. Any future changes will need to be analyzed to determine if they warrant further environmental review. However, FEMA would prefer not to delay this important step of finalizing the NPEIS because the future changes are uncertain at this time. If FEMA waited to finalize the NPEIS until the NFIP reauthorization was complete, it is quite possible that a new proposal for change or new circumstances might arise that would then suggest further delay. At this point in time, FEMA knows it must implement certain changes to the program to comply with the above-referenced legislation, and it can complete an analysis based on those changes and other changes that are ripe for NEPA analysis.

Rather than delay the NPEIS, FEMA will move forward at this time and then determine whether additional changes as a result of the reauthorization will trigger further review. If additional environmental analysis becomes necessary, additional scoping will be considered as well.

XXII. Delay of Final NPEIS: Misc.

Three commenters (Fort Bend Flood Management Association, Husch Blackwell, Thomas and Weiner) commented that FEMA should delay issuing a final NPEIS for reasons other than the reauthorization of the NFIP. Specifically, the commenters raised the following issues:

-
- Whether FEMA should delay the NPEIS to do further scoping in light of passage of EO 13690, *Federal Flood Risk Management Standard*.
 - Whether FEMA should delay NPEIS until after release of the affordability study.

XXII.1 Whether FEMA should delay the NPEIS to do further scoping in light of passage of EO 13690, *Federal Flood Risk Management Standard*.

Two commenters suggested that FEMA should delay the NPEIS to do further scoping in light of the passage of EO 13690 in order to identify and understand the implications to communities and leveed areas and to provide an opportunity for public input. On August 15, 2017, the President of the United States of America signed EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects*, which revoked the January 30, 2015 EO 13690, *Establishing a Federal Flood Risk Management Standard*. As such, no delays to the NPEIS are warranted based on that Executive Order.

XXII.2 Whether FEMA should delay NPEIS until after release of the affordability framework.

One commenter suggested that FEMA should delay the NPEIS until after release of the affordability framework. HFIAA, mandated that FEMA develop an affordability framework aimed at providing targeted assistance for policy holders rather than the current approach that provides generally subsidized rates within the NFIP. Section 4.3.1 of the Final NPEIS identifies that FEMA expects to complete the affordability framework by the end of 2017. CEQ regulations on incomplete or unavailable information allow for situations where the agency cannot secure the information within the timeframe for the decision-making as long as credible information is used to inform the assessment(s) and decision-making (40 C.F.R. §1502.22(b)). Because the affordability framework has not yet been publicly released, it is not available for use in this analysis. As such, FEMA believes the information used in the NPEIS satisfies its obligations under NEPA and complies with the CEQ's regulations.

XXIII. *Miscellaneous Comments*

Five commenters (Thomas and Weiner, Vermont Agency of Natural Resources, Center for Biological Diversity, Mark Riebau, Sarah Bruce) provided miscellaneous comments on the NFIP Draft NPEIS. These comments stated:

- FIRMs by definition should not be a compromise; better risk estimations and communication are possible, but hydrology is non-negotiable. Many maps are representations of preferences and aspirations, or demands and conditions.
- Treatment of weather and hydrologic impacts in the Draft NPEIS would not be considered adequate for a project with conventional place-specificity.
- The NPEIS is inadequate because it cannot address the environmental issues with sufficient specificity. However, the programmatic changes needed to facilitate this are beyond FEMA's discretion, but nevertheless nationally important. However, FEMA does have the discretion to achieve the necessary specificity.
- A genuine programmatic EIS would not be limited in scope to the ESA.

-
- FEMA should clarify that its discretion is limited to assessing risk of property damage due to flooding.
 - FEMA needs to require a permit for floodplain development from a local government as part of the LOMR-F application.
 - Concerns about why BW-12 and HFIAA-related program changes are included as part of this NPEIS.

XXIII.1 FIRMs by definition should not be a compromise; better risk estimations and communication are possible, but hydrology is non-negotiable. Many maps are representations of preferences and aspirations, or demands and conditions.

A major purpose of the NFIP is to alert communities to the danger of flooding and to assist them in reducing potential property losses from flooding. Therefore, FEMA determines flood risk through the use of all available information for each community. The SFHA is defined as the area subject to inundation by the base (1-percent-annual-chance) flood. In conducting a Flood Insurance Study (FIS), FEMA considers all available information to determine SFHAs. FEMA disagrees with the notion that the flood hazards are depicted based on "aspirations" or "negotiation." Information used to determine flood hazards can include statistical analyses of riverflow, storm tide, and rainfall records; information obtained through consultation with the community; topographic data; and hydrologic and hydraulic analyses. For more information on FEMA's guidelines and standards for flood risk analysis and mapping, see: <https://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping>.

XXIII.2 Treatment of weather and hydrologic impacts in the NPEIS would not be considered adequate for a project with conventional place-specificity.

The intent of this NPEIS is to provide a "broad view of environmental impacts and benefits for a proposed decision" consistent with the memorandum distributed by CEQ. The NPEIS can be used for agency decisions "such as a rulemaking or establishing a policy, program, or plan..." Impacts in a programmatic EIS typically address environmental effects over a broad geographic area and "the depth and detail in programmatic analyses will reflect the major broad and general impacts" resulting from the broad programmatic decisions (CEQ, 2014). As a result, weather and hydrologic impacts in the NFIP NPEIS are addressed broadly at the nationwide level instead of at a site-specific project location.

XXIII.3 The NPEIS is inadequate because it cannot address the environmental issues with sufficient specificity. However, the programmatic changes needed to facilitate this are beyond FEMA's discretion, but nevertheless nationally important. However, FEMA does have the discretion to achieve the necessary specificity.

The intent of this NPEIS is to provide a "broad view of environmental impacts and benefits for a proposed decision" consistent with the CEQ memorandum entitled *Effective Use of Programmatic NEPA Reviews*. The NPEIS can be used for agency decisions "such as a rulemaking or establishing a policy, program, or plan..." Impacts in a programmatic EIS typically address environmental effects over a broad geographic area and "the depth and detail in programmatic analyses will reflect the major broad and general impacts" resulting from the

broad programmatic decisions (CEQ, 2014). As a result, the description of the affected environment and the analysis of environmental consequences in the NFIP NPEIS are addressed broadly at the nationwide level instead of at a site-specific project location.

XXIII.4 A genuine programmatic EIS would not be limited in scope to the ESA.

There are generally two types of environmental impact statements – project-level or programmatic. These are sometimes referred to as site-specific or planning level. CEQ issued recommendations in 2014 on *Effective Use of Programmatic NEPA Reviews*. The guidance cited the value of programmatic analyses in setting out the broad view of environmental impacts and benefits for a proposed decision (CEQ, 2014). It also states that the term "programmatic" describes any broad or high-level NEPA review; it is not limited to a NEPA review for a particular program (CEQ, 2014, p. I(A)). As described in the guidance, "[p]rogrammatic NEPA reviews assess the environmental impacts of proposed policies, plans, programs, or projects for which subsequent actions will be implemented either based on the PEA or PEIS, or based on subsequent NEPA reviews tiered to the programmatic review ..." (CEQ, 2014).

While the subject of this NPEIS is the National Flood Insurance "Program," since it is an ongoing and not a new program, the nature of what is being considered, or the proposed action, is certain changes to the program. The range of potential actions a Federal agency might take are not ripe for a NEPA review. For the purposes of NEPA, "proposed actions" involve action that is imminent. See *O'Reilly v. U.S. Army Corps of Engineers*, 477 F.3d 225, 236 (5th Cir. 2007) (citing 40 C.F.R. § 1508.23). "The mere contemplation of certain action is not sufficient ..." *Id.* Therefore, FEMA's effects analysis looks at the actions it is proposing to take under the NFIP. That is why the alternatives are focused on meeting the purpose and need of implementing changes required from BW-12 and HFIAA and demonstrating compliance with the ESA rather than an infinite array of possible changes to the program.

XXIII.5 FEMA should clarify that its discretion is limited to assessing risk of property damage due to flooding.

FEMA's discretion is not limited to assessing the risk of property damage due to flooding.

XXIII.6 FEMA needs to require a permit for floodplain development from a local government as part of the LOMR-F application.

The commenter recommends that FEMA require a permit for development in the floodplain as part of the documentation that FEMA requires for a LOMR-F application. A LOMR-F is a revision to the effective FIRM that establishes whether a specific property, or specific structure on the property, is located in a SFHA based on the placement of fill. The commenter's recommendation appears to be focused on his concern that the community official is aware of, and has a role in, the LOMR-F process in order to ensure that the development associated with the LOMR-F application is development that has been properly permitted. FEMA will not issue a LOMR-F unless and until, the community official responsible for floodplain development, signs the acknowledgment statement on the Community Acknowledgment Form, MT-1 Form 3. The statement acknowledges that the official has "received and reviewed" the LOMR-F

request and found that the completed project meets "all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been" obtained. In addition, for LOMR-F requests, "compliance with Sections 9 and 10 of the ESA have been achieved independently of FEMA's process."

XXIII.7 Concerns about why BW-12 and HFIAA-related program changes are included as part of this NPEIS.

FEMA considered all program changes that were ripe for analysis and met the purpose and need.

XXIV. Unrelated Comments

FEMA received two comments (Maxime Tanis, Olivia Ten) that were unrelated to the Draft NPEIS.

Thank you for your comments.

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June 6, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

Via Regulations.gov

RE: Public Comments on National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement, Docket ID FEMA-2012-0012

To Whom It May Concern:

Thank you for the opportunity to submit comments on the Federal Emergency Management Agency's (FEMA) draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP). The Nicollet Island Coalition is a group of taxpayer, environmental, and conservation non-profits dedicating to protecting and restoring the Upper Mississippi River (UMR) by advocating for reforms to the navigation system to create a healthy, natural and sustainable UMR. On the UMR, floods are a reality that communities deal with frequently. The UMR is also a large, dynamic river system that requires seasonal access to its floodplains to support native flora and fauna. Balancing the need to protect communities and critical infrastructure from flood damages while supporting natural floodplain functions can be challenging. And the NFIP plays a critical role in community decision-making about floodplain use and infrastructure development that can have profound impacts on natural resources.

We see this play out as levee districts along the UMR build higher levees to chase the "100-year flood" accreditation to protect what is primarily open farmland. Such activities not only put neighboring communities at a higher flood risk, but have also

- Damaged riverine-side of the levee wetlands as the levee bases must be widened,
- Encouraged the conversion of landside wetlands to agriculture production,

American Rivers · Great Rivers Habitat Alliance · Izaak Walton League of America
Missouri Coalition for the Environment · National Wildlife Federation · Prairie Rivers Network
River Alliance of Wisconsin · Sierra Club · Taxpayers for Common Sense

- Threatened nearby fish and wildlife refuge infrastructure that was not designed to handle the increasing flood surcharges, and
- Reduced the river's access to its floodplain during flood events to the detriment of native fish and wildlife.

While other permitting procedures, like the Corps' 408 permits, Clean Water Act 404 permits, state floodplain development laws, and local floodplain development ordinances, should catch and prohibit these kinds of damaging floodplain development, recent activities on the UMR showcase significant loopholes. The financial incentives offered through the NFIP and frequent lack of coordination between FEMA and the other local, state and federal agencies drives communities and levee developers to disregard the appropriate permitting procedures and environmental considerations.

The NFIP needs to be structured and applied in a way that acknowledges and addresses the program's role in incentivizing floodplain development and flood damage reduction infrastructure, often at the expense of taxpayers, to the detriment of the environment. This can be accomplished by

- Considering the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide;
- Broadening the analysis to review how the NFIP impacts development and flood damage reduction infrastructure decisions and cumulatively harms people and wildlife;
- Consulting with other federal agencies, such as the US Fish and Wildlife Service, to analyze the NFIP's impacts on floodplains and those agencies' statutory responsibilities that are impacted by the NFIP;
- Improving the coordination between NFIP and state or local agencies to improve local enforcement capabilities to protect threatened species and habitats;
- Improving flood risk standards to better ensure community safety and maintain critical floodplain functions; and
- Assessing alternatives such as stronger minimum standards that will better protect people and endangered and threatened species.

The Nicollet Island Coalition urges FEMA to address these concerns as the NPEIS is finalized to ensure a legally defensible, scientifically defensible, and practical flood insurance program that will preserve both the environment and public safety. Thank you for considering our comments. For any further information, please contact Olivia Dorothy at American Rivers, odorothy@americanrivers.org.

Sincerely,



Olivia Dorothy, Facilitator
American Rivers



American Rivers
Rivers Connect Us



NATURAL RESOURCES DEFENSE COUNCIL



June 6, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

**Re: National Flood Insurance Program Draft Nationwide Programmatic
Environmental Impact Statement**

Dear Federal Emergency Management Agency (FEMA):

Thank you for this opportunity to comment on the draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP).

American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature. Since 1973, American Rivers has protected and restored more than 150,000 miles of rivers through advocacy efforts, on-the-ground projects, and an annual America's Most Endangered Rivers® Campaign. Headquartered in Washington, DC, American Rivers has offices across the country and more than 250,000 members, supporters, and volunteers.

The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 2 million members and online activists. Our organization works to safeguard the earth—its people, its plants and animals, and the natural systems on which all life depends. Our organizational goals include curbing global warming, safeguarding human health, and ensuring safe and sufficient water for people and the environment.

Defenders of Wildlife (“Defenders”) is a major national conservation organization focused solely on wildlife and habitat conservation and the safeguarding of biodiversity. We believe in the inherent value of wildlife and the natural world, and this singular focus defines our important

niche in the environmental and conservation community and serves as the anchor for our organizational values. Defenders works on the ground, in the courts, and on Capitol Hill to protect and restore imperiled wildlife across North America and around the world.

The NFIP is a far reaching federal program that has implications for land use development, endangered species protections, and preparing for the impacts of climate change. American Rivers, NRDC, and Defenders have significant concerns regarding the quality of analysis in FEMA's draft NPEIS and the conclusions FEMA reached based on that analysis. Thus, we respectfully submit the following observations and recommendations:

I. FEMA Should Delay Finalizing the Draft NPEIS Until After Congress Reauthorizes the NFIP.

The NFIP expires on September 30th, 2017.¹ Since the NFIP's last reauthorization in 2012, significant discussion has occurred as to the future structure and operation of the program.² Recently, several draft bills to reauthorize the NFIP have been proposed in both the House and the Senate, and which include proposals that could potentially present significant new circumstances for the operation of the NFIP.³

FEMA should delay finalizing the draft NPEIS until after Congress reauthorizes the NFIP to account for and analyze any legislative changes to the program that present "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts."⁴ Failure to account for these potentially significant new circumstances before issuing a Final NPEIS may require FEMA to prepare a Supplemental Environmental Impact Statement.⁵ "NEPA's approach to environmental protection and its manifest concern with

¹ 42 U.S.C. § 4026.

² See Andrew G. Simpson, *Here's What the House Has in Mind for Revamping Flood Insurance Program*, Insurance Journal (May 26, 2017), <http://www.insurancejournal.com/news/national/2017/05/26/452260.htm>; see also U.S. Gov't Accountability Office, GAO-17-425, *Flood Insurance: Comprehensive Reform Could Improve Solvency and Enhance Resilience* (2017); Rachel Cleetus, *The National Flood Insurance Program Must Be Improved: 5 Ways to Promote Climate Resilience*, Union of Concerned Scientists Blog (Aug. 10, 2016, 9:52 AM), <http://blog.ucsusa.org/rachel-cleetus/national-flood-insurance-program-must-be-improved-to-promote-climate-resilience>; U.S. Gov't Accountability Office, GAO-13-858T, *National Flood Insurance Program: Continued Attention Needed to Address Challenges* (2013).

³ See e.g., Press Release, Congressman Sean Duffy, Congressman Sean Duffy's Statement on NFIP Discussion Draft (May 25, 2017) available at <https://duffy.house.gov/press-release/congressman-sean-duffy-s-statement-on-nfip-discussion-draft>; Press Release, Senator Bill Cassidy, Cassidy, Gillibrand Release National Flood Insurance Extension Draft Legislation for Comment (April 26, 2017) available at <https://www.cassidy.senate.gov/newsroom/press-releases/cassidy-gillibrand-release-national-flood-insurance-extension-draft-legislation-for-comment>; see also Flood Insurance Market Parity and Modernization Act, S. 563, 115th Cong., (2017).

⁴ 40 C.F.R. § 1502.9(c)(1)(ii).

⁵ *Id.*; see also *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 873 (9th Cir. 2004) (stating a supplemental environmental impact statement is required if a new proposal "will have a significant impact on the environment in a manner not previously evaluated and considered).

preventing uninformed action” makes clear that significant new changes or information to a proposed action should be considered and evaluated.⁶

FEMA’s justification for preparing the current draft NPEIS is to evaluate “proposed modifications to the [NFIP.]”⁷ FEMA is modifying the NFIP to implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA).⁸ As of June 2017, several draft bills to reauthorize the NFIP have been introduced in the both the House and Senate. Many of these bills propose significant changes to the current operation of the program. For example, the draft discussion bill titled, “Flood Risk Mitigation Act of 2017,” contains a provision directing the Administrator of FEMA to promulgate regulations to require NFIP participating communities to mitigate flood risks if the community has a high number of repeatedly flooded properties.⁹ Community-proposed mitigation actions, which must be reviewed and authorized by FEMA per the draft bill, could have a significant impact on floodplain environments. As FEMA must promulgate the rules to create such a program, which may influence the types of mitigation actions employed by these flood-prone communities, FEMA would be wise to delay finalization of the draft NPEIS until after Congress has passed a final NFIP reauthorization bill.

Therefore, delaying finalization of the draft NPEIS would allow for potentially significant new changes to the NFIP to be considered and evaluated. Such reasonable precaution would minimize the likelihood that FEMA would later be required to supplement its NPEIS.

II. The Draft NPEIS’ Assessment of the NFIP’s Effect on Floodplain Development Is Inadequate and Relies on Inconclusive and/or Contrary Sources.

Congress established the NFIP to “encourag[e] sound land use by minimizing exposure of property to flood losses.”¹⁰ Congress found the “availability of Federal ... insurance... [is] often [a] determining factor in the utilization of land and the location and construction of public and of private industrial, commercial, and residential facilities.”¹¹ Congress intended the NFIP to influence floodplain development in a manner that would reduce the nation’s flood exposure.¹² Hence, an expectation has existed since the inception of the program that the NFIP would affect floodplain development.

⁶ *Marsh v. Oregon Nat. Res. Council*, 490 U.S. 360, 371 (1989).

⁷ FEMA, National Flood Insurance Program Draft NPEIS (2017) at ES-1.

⁸ *Id.*

⁹ See Press Release, Congressman Sean Duffy, Congressman Sean Duffy’s Statement on NFIP Discussion Draft (May 25, 2017) (Draft discussion bill FSC04- Enhance the NFIP’s Mitigation Process proposing a new program for communities with high numbers of repeatedly flooded properties).

¹⁰ 42 U.S.C. § 4001(c)(1).

¹¹ 42 U.S.C. § 4002(a)(2).

¹² 42 U.S.C. § 4001(e) (stating a purpose of the NFIP is encourage the constriction of development in floodplain areas and to direct new development away from locations susceptible to flooding).

Whether the NFIP “constricts” floodplain development or, conversely, actually encourages floodplain development to occur has been a central question concerning the program’s success.¹³ Research indicates the NFIP can have direct and indirect impacts on floodplain development, including encouraging development in floodplains by removing potential barriers to that development.¹⁴

In contrast, FEMA strongly asserts throughout the draft NPEIS that the NFIP does not encourage floodplain development.¹⁵ FEMA relies on this questionable assertion to determine that floodplain development is “neither a direct or **indirect effect** of the implementation of the NFIP” [**emphasis added**].¹⁶ Based on this determination, FEMA’s draft NPEIS concludes the NFIP’s implementation has almost no environmental impacts.¹⁷

However, FEMA’s effects analysis is insufficient to conclude implementation of the NFIP does not influence floodplain development, including encouraging it to occur. Additionally, studies to which FEMA cites to support this conclusion, either contradict, in some instances, such a finding or are, at best, inconclusive. As such, FEMA failed to adequately evaluate the indirect effects the NFIP may have on floodplain development and the related environmental impacts as required by NEPA. FEMA should further analyze the influence the NFIP has on floodplain development, including indirectly encouraging development, before finalizing the draft NPEIS.

A. FEMA’s Indirect Effects Analysis Fails to Satisfy NEPA Requirements.

FEMA violates NEPA by failing to adequately evaluate the indirect effects of the NFIP on floodplain development. Federal agencies must consider “indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.”¹⁸ These effects “may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”¹⁹ Indirect impacts need only to be reasonably foreseeable, which is defined as “sufficiently likely to occur that person of ordinary prudence would take it into account in reaching decision,” to require an assessment of the environmental impact.²⁰

¹³ See, Walter A. Rosenbaum & Gary Boulware, American Institutes for Research, *The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report* vii (2006)

¹⁴ See, *Id.* at 65.

¹⁵ See generally, FEMA, National Flood Insurance Program Draft NPEIS (2017) (stating multiple times that “Floodplain development is not an action under the NFIP. Floodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP, nor does the NFIP encourage such floodplain development to occur”).

¹⁶ *Id.* at 4-4.

¹⁷ *Id.* at ES-8.

¹⁸ 40 C.F.R. § 1508.8(b)

¹⁹ *Id.*

²⁰ *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549 (8th Cir. 2003). *But see, Mooreforce, Inc. v. U.S. Dep’t of Transp.*, 243 F. Supp. 2d 425, 431 (M.D.N.C. 2003) (finding Federal agencies must consider indirect

The NFIP's potential inducement of floodplain development is a reasonably foreseeable indirect effect. Academic research,²¹ case history,²² National Marine Fisheries Service and U.S. Fish and Wildlife Service issued Biological Opinions,²³ and FEMA commissioned research studies²⁴ have all found that the implementation of the NFIP influences floodplain development, and may actually encourage such development to occur.

For example, the National Marine Fisheries Service's (NMFS) extensive Biological Opinion for the NFIP in the State of Oregon concluded that the NFIP both facilitates floodplain development and establishes the land-use and construction standards pursuant to which such development may occur.²⁵ This conclusion affirmed a previous NMFS' Biological Opinion for the NFIP in the State of Washington. NMFS held that the inducement of floodplain development due to NFIP implementation affects endangered species. A biological opinion assesses whether the federal action, such as FEMA's implementation of the NFIP, is likely to negatively impact endangered species. Its indirect effects analysis is similar to the NEPA process.²⁶ As such, NMFS' conclusion that the implementation of the NFIP indirectly impacts endangered species is sufficiently analogous to reasonably foresee floodplain development would be an indirect effect of NFIP implementation under NEPA.

In addition, a FEMA commissioned study found the provision of federally-subsidized flood insurance creates an incentive for development in floodplains by reducing barriers to such development.²⁷ Further, the study found the availability of flood insurance is one of the two most significant factors driving decisions to develop, buy, or build in flood risk areas. For example, the study found "[a]lmost eighty percent of the respondents with potential investments in community property development stated that they would not finance or develop floodplain

effects of a proposed action on environment that are "reasonably foreseeable," but not "highly speculative or indefinite" potential effects).

²¹ See e.g., Jennifer Wriggins, *Flood Money: The Challenge of U.S. Flood Insurance Reform in a Warming World*, 119 Penn St. L. Rev. 361, 393 (2014); French Wetmore et al., American Institutes For Research, *An Evaluation of The National Flood Insurance Program: Final Report* x, 9, 12-14 (2006) available at http://www.fema.gov/media-library-data/20130726-1602-20490-1463/nfip_eval_final_report.pdf. Beth Davidson, *How Quickly We Forget: The National Flood Insurance Program and Floodplain Development in Missouri*, 19 Wash. U. J.L. & Pol'y 365 (2005).

²² See generally, *Coal. for Sustainable Delta v. Fed. Emergency Mgmt. Agency*, 812 F.Supp.2d 1089 (E.D. Cal. 2011); *Florida Key Deer v Paulison*, 522 F.3d 1133 (11th Cir., 2008); *Nat'l Wildlife Fed'n v. Fed. Emergency Mgmt. Agency*, 345 F.Supp.2d 1151 (W.D. Wash. 2004).

²³ National Marine Fisheries Service, "Endangered Species Act Section 7(a)(2) Jeopardy and Adverse Modification of Critical Habitat Biological Opinion, ESA Section 7(a)(2) "Not Likely to Adversely Affect" Determination, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Implementation of the National Flood Insurance Program in the State of Oregon." (April, 14 2016) (hereinafter "NMFS Oregon Biological Opinion"); U.S. Fish and Wildlife Service. 2003. Biological Opinion. Amendment to the June 16, 1997, biological opinion on the effects of the FEMA's continued administration of the NFIP in Monroe County, Florida. Atlanta, Georgia.

²⁴ See generally, Rosenbaum, *supra* note 13.

²⁵ NMFS Oregon Biological Opinion, *supra* note 23 at 138.

²⁶ See 50 C.F.R. 402.2 ("Effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur").

²⁷ See Rosenbaum, *supra* note 13 at 65.

property if federal flood insurance were unavailable.²⁸ Strong evidence exists for one to conclude that the implementation of the NFIP potentially encourages floodplain development and other related land use changes, and is therefore a reasonably foreseeable indirect effect.

However, FEMA summarily dismisses the notion that the NFIP's implementation has the indirect effect of encouraging floodplain development. Per the draft NPEIS, FEMA repeatedly and specifically asserts the NFIP does not encourage floodplain development, ignoring existing evidence to the contrary. FEMA discounts such evidence by claiming only "some perceive, based on anecdotal evidence, that the NFIP reduces the financial risk to property owners and communities from potential flood disasters through relatively low-cost property insurance."²⁹ FEMA's dismissal of the above-referenced sources as "anecdotal evidence" lacks merit.

While the position that implementation of the NFIP encourages floodplain development remains controversial, FEMA's position that the NFIP does not significantly impact floodplain development, and strong rejection that the NFIP's implementation may indirectly encourage such development is an improper conclusion made in the draft NPEIS. Considerable evidence exists for a "person of ordinary prudence" to determine that the NFIP's indirect effects on floodplain development, and related environmental impacts, merit further evaluation. FEMA should postpone finalization of the draft NPEIS until the agency has conducted an earnest and proper review of how the NFIP affects floodplain development, including whether an indirect effect of implementation is the inducement of development, and what are the corresponding environmental impacts of such development.

B. FEMA Relies on Inadequate or Contrary Sources to Support its Conclusion that the NFIP Does Not Induce Development in Floodplains.

FEMA states there is no clear causal link between the availability of flood insurance and resulting impacts on development or the environment.³⁰ FEMA asserts because the "NFIP does not cause development to occur, and does not play a significant role in facilitating or encouraging floodplain development"³¹ that such development is neither "a direct nor an indirect effect of the implementation of the NFIP."³²

However, the evidence to which FEMA points to support the conclusion that the NFIP does not encourage floodplain development, and thus there are no related environmental impacts, is challengeable. FEMA's minimal and inadequate analysis relies on sources that are either inconclusive at best, or actually found that the NFIP can induce floodplain development.

²⁸ *Id.* at 18.

²⁹ FEMA, National Flood Insurance Program Draft NPEIS (2017) at 4-4.

³⁰ *Id.*

³¹ *Id.*

³² *Id.*

Per section 4.1.1.1 - Availability of NFIP Flood Insurance and in FEMA's Biological Evaluation,³³ FEMA heavily relies on the following reports and studies to support its conclusion: (1) 2006 American Institutes for Research (AIR), The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report,³⁴ (2) 1982 Government Accountability Office (GAO), National Flood Insurance: Marginal Impact on Floodplain Development,³⁵ and (3) 2013 Congressional Research Service Report (CRS), The National Flood Insurance Program: Status and Remaining Issues for Congress.³⁶

1. 2006 AIR Report (Coastal Barrier Resources Act Areas Comparison)

FEMA commissioned AIR to study the NFIP's developmental and environmental impacts. While the report acknowledged that the NFIP's influence is "nuanced," the report states that the NFIP has "direct and indirect impacts on the amount of development that occurs in floodplains."³⁷ AIR found the NFIP has both the effect of discouraging development in floodplains and encouraging floodplain development by "act[ing] to remove barriers to that development."³⁸ For example the report found that federally-backed flood insurance, in addition to property characteristics, is one of the two most significant factors driving floodplain development.³⁹ Further, report authors conducted a nationwide survey of property developers, insurers, lenders, realtors, and floodplain administrators, which found:

- *Flood insurance was identified among the most important factors affecting decisions to either purchase or develop property in the community;*
- *More than three-quarters of the respondents identified flood insurance as "very important" to decisions regarding where they would develop or purchase property in their community;*
- *Almost eighty percent of the respondents with potential investments in community property development stated that they **would not finance or develop floodplain property if federal flood insurance were unavailable** [emphasis added].⁴⁰*

The AIR report supports finding that floodplain development is a reasonably foreseeable indirect effect of the NFIP, meriting additional evaluation. However, FEMA appears to ignore this evidence, and instead uses the report's analysis of development in Coastal Barrier Resources System (CBRS) areas to confirm FEMA's belief that the NFIP does not encourage development.⁴¹ While the report found that some CBRS areas still developed despite the prohibition of NFIP flood insurance, the report stated "inferences about the NFIP's

³³ *Id.* at 4-5, C-59.

³⁴ See Rosenbaum, *supra* note 13.

³⁵ U.S. Gov't Accountability Office, GAO-82-105, *National Flood Insurance: Marginal Impact on Flood Plain Development* (1982) (hereinafter "1982 GAO")

³⁶ Rawle O. King, Cong. Research Serv., R42850, *The National Flood Insurance Program: Status and Remaining Issues For Congress* (2013) (hereinafter "2013 CRS").

³⁷ Rosenbaum, *supra* note 13 at 65.

³⁸ *Id.* at 18.

³⁹ *Id.* at 67.

⁴⁰ *Id.* at 18.

⁴¹ FEMA, National Flood Insurance Program Draft NPEIS (2017) at 4-7.

developmental impact drawn from current information about the status of CBRS properties are problematic.”⁴² The reports holds:

*The CBRS may not presently be an appropriate basis for such generalizations for several reasons. First, discussions with USFWS staff indicate that maps of CBRS land and related developments are frequently outdated, sometimes unrevised since the early 1980s, and conclusions about the rate of development on CBRS lands and its causes are often anecdotal. Second, the motivation for purchase and development of property on CBRS land, and the extent to which this is analogous to property development on non-CBRS lands is not well established. These may constitute different marketplaces with different clientele.*⁴³

The 2006 AIR report not only contradicts FEMA’s strong denial of the NFIP’s potential to encourage development in floodplains, but the report also explicitly states that the evidence concerning CBRA areas upon which FEMA relies to support its stance is “problematic” and should not be used to generalize about the influence of the NFIP on development. Thus, FEMA inappropriately concludes that the NFIP does not encourage development in floodplains; FEMA must go back and conduct an in-depth review of how the NFIP affects floodplain development to satisfy NEPA requirements.

2. 1982 GAO Report (Pre- and Post- NFIP Floodplain Development)

Likewise, FEMA’s heavy reliance on the 1982 GAO report also results in FEMA drawing conclusions that are not definitively supported by the report’s findings. First, the report is nearly 35 years old. The NFIP has expanded substantially since the issuance of this report. At the time of the report’s publication, only 1.9 million NFIP policies were in existence.⁴⁴ Today, more than 5 million policies have been issued.⁴⁵ Additionally, the number of participating communities has increased substantially.⁴⁶ Further, a decade after the publication of the GAO report, Congress passed the National Flood Insurance Reform Act of 1994, which prohibited Federally-regulated lenders from making, extending, or renewing any loan on applicable property unless flood insurance is purchased and maintained.⁴⁷ The effect of this requirement must be accounted for in any analysis of the NFIP’s influence on floodplain development as such a requirement directly impacts the availability of financing for such development. As stated above, the AIR report found “[a]lmost eighty percent of the respondents with potential investments in community property development stated that they would not finance or develop floodplain property if federal flood insurance were unavailable.”⁴⁸ The requirements of the 1994 Act may be an influencing

⁴² Rosenbaum, *supra* note 13 at 72.

⁴³ *Id.* at 63.

⁴⁴ 1982 GAO, *supra* not 35 at 2.

⁴⁵ FEMA, Total Policies in Force by Calendar Year *available at* <https://www.fema.gov/total-policies-force-calendar-year>

⁴⁶ When the 1982 GAO report was published only 17,000 communities participated in the program. There are now over 22,000 communities in the program.

⁴⁷ National Flood Insurance Reform Act of 1994, Pub. L. No. 103-325 (1994).

⁴⁸ See Rosenbaum, *supra* not 13 at 18.

factor concerning this figure, which were not in place when the 1982 study was conducted. As such, the data included in the 1982 GAO report may not be an accurate indicator of the current influence the NFIP has on development in floodplains.

Second, the report only analyzed development patterns in 6 coastal and barrier island communities.⁴⁹ The report compared the rate of population growth in a 10-year period before communities entered the program with the rate of population growth in a 10-year period after the communities joined the program. While the 1982 GAO report found that development was occurring in these communities both before and after the creation of the NFIP, the data cannot be offered as definitive proof that the NFIP does not influence, including potentially encouraging, floodplain development. One, the GAO was only able to obtain these data from 1977 to 1980 for three of the six communities. This is a significant information gap that impacts half of the study. Second, the GAO recognizes the study cannot be used to generalize about the NFIP on a national level as the report solely focused on barrier islands and coastal communities with characteristics like those barrier islands.⁵⁰ As the more recent AIR report states, comparing development in barrier islands to non-barrier islands is not a reliable indicator of the NFIP's influence on development.

Third, the 1982 GAO report acknowledged that the NFIP was a factor in encouraging floodplain development. The report found that while the NFIP was not the “principal factor” in encouraging floodplain development on barrier islands, it was a factor in the sense that it “offers a marginal added incentive to development in coastal and barrier island communities because it offers financial security against the risk of loss.”⁵¹ This is supported by the more recent AIR report, which found the availability of NFIP insurance reduces barriers to entry for floodplain development.

3. 2013 CRS Report (Low Flood Insurance Penetration Rates)

FEMA inappropriately references less than tenable sources to justify its conclusions in the draft NPEIS. FEMA states that low-participation rates demonstrate that the availability of flood insurance is an irrelevant factor in encouraging floodplain development, indicating that other factors are more likely the driving force behind development in the floodplain.⁵² FEMA states only 18 percent of Americans in flood zone areas have flood insurance.⁵³ FEMA references this figure repeatedly throughout the draft NPEIS as proof that the NFIP does not encourage floodplain development.⁵⁴

⁴⁹ 1982 GAO, *supra* note 35 at 4-5.

⁵⁰ *Id.* at 6. (stating “[t]he information we obtained as to whether the flood insurance program was encouraging development in coastal and barrier island communities is limited to those types of communities and cannot be extended to flood-prone riverine and lake communities”).

⁵¹ *Id.* at 13.

⁵² FEMA, National Flood Insurance Program Draft NPEIS (2017) at 4-5.

⁵³ *See Id.*

⁵⁴ *See Id.* at 4-5, 4-72, c-vi, c-66, and c-216.

The 18 percent figure on which FEMA relies is mentioned only briefly in the 2013 CRS report and the source for this figure is a one-line quote from an insurance industry representative in a New York Times article.⁵⁵ In contrast, there are other more credible sources which estimate the participation rate to be much higher. For example, the same CRS report contains significant discussion of participation rates in a section titled “Factors Affecting Financial Soundness of the NFIP: Low NFIP Program Participation,” which finds NFIP participation rates to be closer to 50 percent.⁵⁶ This figure is based on an extensive 2006 FEMA-commissioned Rand Corporation study, which specifically focused on the NFIP’s market penetration rate.⁵⁷ Further, the Rand report found that in coastal areas, participation rates are closer to 63 percent.⁵⁸ FEMA’s strong reliance on the 18 percent figure, which is a quote from a news article, rather than more credible and rigorously researched sources is inappropriate. FEMA’s use of such a figure reduces the agency’s credibility in strongly asserting the NFIP does not encourage floodplain development. At a minimum, further analysis is needed to determine whether low market penetration rates do indicate the availability of flood insurance is an irrelevant factor in driving floodplain development.

In sum, FEMA’s analysis of the NFIP’s effect on floodplain development is inadequate, and fails to satisfy NEPA requirements. Floodplain development is influenced, including potentially encouraging such development to occur, due to the implementation of the NFIP and therefore is a reasonably foreseeable indirect effect. Congress clearly intended for the NFIP to influence development, significant evidence exists to support a finding that the NFIP may encourage floodplain development, and the sources on which FEMA relies are not conclusive enough for FEMA to state that the NFIP does not encourage floodplain development. FEMA must not finalize the draft NPEIS without consideration of more credible sources and should consider conducting a more in-depth and meaningful review of the NFIP’s impact on floodplain development and the corresponding environmental outcomes.

III. Direct Land-Use Authority is not required for FEMA to Establish Federal Land-Use Standards to Mitigate the NFIP’s Indirect Effect of Inducing Floodplain Development.

FEMA also improperly concludes the agency lacks land use authority to direct the type of development which may occur in the floodplain. FEMA implies that this lack of land use authority prevents the agency from regulating floodplain development to mitigate the negative impacts to the environment, including impacts to endangered species, from such development. While FEMA may lack direct land use authority (i.e. the ability to issue and deny individual

⁵⁵ See 2013 CRS, *supra* note at 3 (The corresponding footnote references a New York Times article, “Reconsidering Flood Insurance” as the source of information for this figure).

⁵⁶ *Id.* at 21.

⁵⁷ See generally, Lloyd Dixon et. al., *The National Flood Insurance Program’s Market Penetration Rate: Estimates and Policy Implications* (2006) (analyzing the market penetration rate of the NFIP, including reasons for lower than expected participation).

⁵⁸ *Id.* at xviii.

permits), FEMA retains the authority to establish minimum land use standards, which States and local governments must adopt to participate in the NFIP.⁵⁹ FEMA is also responsible for publishing Flood Insurance Rate Maps (FIRMS) that depict areas at a high risk of flooding. Communities must adopt these maps to participate in the NFIP; the maps determine where the minimum land use standards apply. Through these minimum standards and publication of flood maps, FEMA can influence floodplain development.

A. FEMA's Characterization of the Agency's Ability to Regulate Floodplain Development Is Inappropriately Narrow and Ignores the Agency's Existing Statutory and Regulatory Authority.

FEMA's characterization of land use authority is misleading. While FEMA is correct that land use authority, in the narrowest sense of the term, is a power typically exercised by the States and localities, FEMA is incorrect to imply the agency lacks the authority to establish land use standards to guard against the NFIP inducing floodplain development. FEMA's interpretation of land use authority is inappropriately narrow. FEMA's statutory and regulatory authority permit the agency to act to influence, including proscribe, such development.⁶⁰

In contrast, FEMA repeatedly asserts it has no land use authority. Specifically, FEMA states:

*The power to regulate development in the floodplain, including requiring and approving permits and citing violations requires land use authority. The regulation of land use falls under each State's police powers, which the Constitution reserves to the States; the States delegate this power down to their respective political subdivisions. Therefore, floodplain development is regulated at the community level through the community's floodplain management regulations and permitting process for development in the floodplain. As such, FEMA has no role in the issuance, denial, or enforcement of individual permits, nor does it have the land use authority necessary to prescribe the types of development that may take place in the floodplain.*⁶¹

First, Congress fully intended for the NFIP to restrict risky floodplain development. Congress declared a central purpose of the NFIP was to (1) encourage State and local governments to make appropriate land use adjustments to constrict the development of land which is exposed to flood damage and (2) to guide the development of proposed future construction, where practicable, away from locations threatened by flood hazards.⁶² Additionally, Congress held flood damages were increasing nationwide due to accelerated floodplain development and "the purpose of [the NFIP] is therefore to **require** States or local communities, as a condition of future

⁵⁹ 42 USC § 4022 (flood insurance in exchange for adopting land use controls).

⁶⁰ See e.g., *Florida Key Deer v Paulison*, 522 F.3d 1133, 1144 (11th Cir., 2008) (stating "FEMA has the authority in its administration of the NFIP ... to prevent the indirect effects of its issuance of flood insurance by, for example, tailoring the eligibility criteria that it develops...").

⁶¹ FEMA, National Flood Insurance Program Draft NPEIS (2017) at 4-9.

⁶² 42 U.S.C. § 4001(e).

Federal financial assistance to participate in the flood insurance program and *to adopt adequate flood plain ordinances with effective enforcement provisions*...to reduce or avoid future flood losses.”⁶³ [emphasis added]. Further, Congress stipulated States and local governments must adopt “*adequate land use and control measures*” (with effective enforcement provisions) to participate in the program, which would make flood insurance available to their residents.⁶⁴ To achieve these goals, Congress authorized FEMA to develop land use criteria designed to encourage the adoption of State and local measures which, to the maximum extent feasible, will:

- constrict the development of land which is exposed to flood damage where appropriate;
- guide the development of proposed construction away from locations which are threatened by flood hazards;
- assist in reducing damage caused by floods; and
- otherwise improve the long-range land management and use of flood-prone areas.⁶⁵

As noted above, States and local governments are required to adopt land-use regulations and ordinances that satisfy the land-use criteria developed by FEMA to participate in the program. Congress clearly envisioned a program that would restrict floodplain development by providing a federal agency the authority to promulgate specific land use criteria. Thus, FEMA has significant influence over floodplain development; FEMA has clear authority to establish the minimum land use standards by which all States and local government must abide to participate in the NFIP. FEMA wrongly implies that without direct land use authority it lacks the ability to act.

Second, FEMA’s regulations reflect the agency’s authority to link flood insurance controls on floodplain development. Per 44 CFR § 59.2(b), FEMA requires state and local governments to adopt and enforce floodplain management regulations that satisfy, at minimum, FEMA-established criteria for land use management qualify for the sale of federally-subsidized flood insurance. FEMA has direct authority to establish such criteria.⁶⁶ In addition, FEMA has asserted that the regulations adopted by NFIP participating communities must take precedence over any less restrictive or conflicting local laws, ordinances or codes for floodplain management.⁶⁷ Hence, while States and local governments may have direct land use authority, such as the authority to issue or deny individual permits, they must, nevertheless, abide by the minimum land use management criteria established by FEMA. These regulations thus obviously can influence floodplain development. And FEMA already prohibits certain types of development under its regulations. For example, FEMA prohibits any development in a regulated floodway that potentially could elevate flood levels in a NFIP participating community during

⁶³ 42 U.S.C. § 4002(a)(1)

⁶⁴ 42 U.S.C. § 4022.

⁶⁵ 42 U.S.C. § 4102(c).

⁶⁶ 44 C.F.R. § 60.1(a).

⁶⁷ 44 C.F.R. § 60.1(b).

the occurrence of the 100-year flood.⁶⁸ Thus, FEMA is not without recourse to impose floodplain development restrictions as the draft NPEIS implies.

Third, FEMA has enforcement authority to penalize NFIP communities for failing to properly implement and enforce the minimum land use criteria promulgated by the agency. If floodplain development restrictions are being violated, FEMA has the authority to place a community on probation and ultimately suspend the community from the program for violating local regulations implementing FEMA's land use management criteria.⁶⁹ Per 44 CFR § 59.24(g), a suspended community loses its right to obtain federally-subsidized flood insurance and becomes ineligible for federal development and disaster assistance.⁷⁰ FEMA has exercised this authority: Formal threats of probation in the form of probation letters have been issued 104 times; probation has been imposed 49 times; 10 communities have been suspended.⁷¹

In addition, FEMA also has the authority to penalize individual NFIP policyholders. Per 44 CFR Part 73, FEMA has the authority to deny flood insurance coverage on individual structures for NFIP violations. If a policyholder is violating laws or regulations intended to discourage or otherwise restrict land development or occupancy in the flood-prone area., the community may issue a notice of violation. If subsequent efforts to remedy the violation to the maximum extent possible are not sufficient to prompt action by the policyholder, the community may request FEMA deny flood insurance coverage.⁷² FEMA will exercise its authority to deny flood insurance coverage if the requesting community demonstrates that it has attempted to remedy a violation to the maximum extent possible and the policyholder is in fact in violation of a regulation restricting floodplain development.⁷³ The ultimate decision to deny flood insurance coverage rests with FEMA. While FEMA must receive a request by the State or community to deny flood insurance under Section 1316, denial of flood insurance is still considered an enforcement action available to FEMA to address individual acts of noncompliance. Further, FEMA also has the authority to recommend a State or local community make such a request.⁷⁴

FEMA can influence and/or restrict floodplain development under existing statutory and regulatory authority. As intended by Congress, FEMA, through the implementation of the NFIP, has a clear role in avoiding risky land use. As such, FEMA can act to mitigate the indirect effects of floodplain development due to the implementation of the NFIP. *Florida Key Deer v. Paulison* confirms FEMA has such authority.⁷⁵ Thus, FEMA's characterization of its land use authority is

⁶⁸ 44 C.F.R. § 60.3(d)(3).

⁶⁹ See 44 C.F.R. § 59.24.

⁷⁰ FEMA, "Suspension" available at <https://www.fema.gov/suspension>

⁷¹ See Jacquelyn Monday et al., *An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance* 153. (Most recent publicly available data is from Oct 31, 2003).

⁷² FEMA, *National Flood Insurance Program Community Compliance Program Guidance*, FEMA P-1022, 36-37 (2014).

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Florida Key Deer*, F.3d at 1143 (holding "FEMA has the authority in the administration of the NFIP to prevent the indirect effects of its issuance of flood insurance").

impermissibly narrow and leads to an incorrect conclusion about the agency's ability to influence floodplain development.

B. The NFIP is a Voluntary Federal Benefit for States and Local Communities. Congress May Condition Receipt of Federal Funds on State Compliance with Federal Standards.

FEMA does not need “land use authority,” as it narrowly defines it, to modify federal floodplain management criteria to limit floodplain development. The NFIP is a voluntary federal benefit. States and local governments are free to join the program. In exchange, States and local governments must adopt and enforce federal land use standards.

Under the “spending clause” of the U.S. Constitution, Congress may require compliance with federal standards in exchange for receipt of federal funds. The U.S. Supreme Court has explicitly held “Congress may attach conditions on the receipt of federal funds ... ‘to further broad policy objectives by conditioning receipt of federal moneys upon compliance by the recipient with federal statutory and administrative directives.’”⁷⁶ The U.S. Supreme Court has repeatedly affirmed this constitutional interpretation. For example, in *National Federation of Independent Business v. Sebelius* the Court stated “[w]e have long recognized that Congress may use [its spending clause] power to grant federal funds to the States, and may condition such a grant upon the States' taking certain actions that Congress could not require them to take.”⁷⁷

Congress's spending power must be exercised within certain parameters. The Supreme Court has ruled that “[t]he legitimacy of Congress's exercise of the spending power ... rests on whether the State voluntarily and knowingly accepts” the conditions on the receipt of federal funds.⁷⁸ Additionally, such conditions on the receipt of federal funds are held constitutional so long as the funds are expended for the “general welfare,” the funding conditions are unambiguous enabling states to exercise their choice knowingly, cognizant of consequences of participation, and the financial inducement is not unduly coercive.⁷⁹

The NFIP plainly satisfies these requirements. The program is for the “general welfare” of the United States. As stated in 42 USC § 4001, Congress found “disasters have created personal hardships and economic distress which have required unforeseen disaster relief measures and have placed an increasing burden on the Nation's resources” and that the creation of a national flood insurance program would help ease this burden.⁸⁰ Additionally, the NFIP is a voluntary program. States and local communities are free to choose whether to participate. Further, the requirements are not unduly coercive. As FEMA notes in the draft NPEIS, private flood

⁷⁶ *South Dakota v. Dole*, 483 U.S. 203, 206 (1987) (upholding a federal requirement that states enact a minimum drinking age of 21 as a condition of receiving federal highway funding).

⁷⁷ *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 132 S.Ct. 2566, 2601 (2012)

⁷⁸ *Id.* at 2602, quoting *Pennhurst State School and Hospital v. Halderman*, 451 U.S. 1, 17 (1981)).

⁷⁹ See generally, *Dole*, 483 U.S. 203. (describing the limitations on Congress's use of the spending clause power).

⁸⁰ 42 U.S.C. § 4001(a).

insurance is already an option under the NFIP,⁸¹ and is becoming more readily available.⁸² States and local governments do not have to join the NFIP for flood insurance to be available to their residents.

Thus, FEMA has the authority to guide and even restrict certain land use practices of communities participating in the NFIP. FEMA would not be exercising direct land use authority, as the agency implies is necessary to restrict floodplain development, but instead, would be establishing certain requirements and standards States and local communities must adopt in exchange for voluntarily accepting a federal benefit. FEMA does have the authority to impose more restrictions on use of floodplains, including erosion areas, and to encourage mitigation for impacts on floodplains. As such, FEMA has the authority to act to protect harmful environmental impacts to the nation's floodplains.

IV. FEMA Improperly Determines the Implementation of the NFIP Does Not Affect Endangered Species.

The goal of the Endangered Species Act (ESA) is the conservation of endangered and threatened species and their ecosystems.⁸³ A list is maintained of all endangered and threatened species and the designation of their critical habitats that must be protected. Section 7 of the ESA requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (FWS) to ensure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification to its critical habitat.⁸⁴ The expert agency issues a biological opinion (BiOp) at the conclusion of the consultation process containing the impact(s) of the agency's action to endangered or threatened species. A federal agency is required to initiate the consultation process under Section 7 of the ESA whenever it takes an action that "may affect" a listed species.⁸⁵ Through consultation, federal agencies ensure that the actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify any critical habitat.⁸⁶

A. NFIP Actions Requiring Expert Agency Consultation

The National Flood Insurance Act gives FEMA the authority to implement the NFIP in a manner that would avoid or minimize harm to threatened or endangered species or their critical habitat. FEMA has the authority to benefit floodplains and thus threatened and endangered species and their critical habitat by mapping floodplains, implementing the Community Rating System (CRS), and promulgating minimum eligibility criteria. These are agency actions and as such

⁸¹ 42 U.S.C. § 4012a(b)(7).

⁸² FEMA, National Flood Insurance Program Draft NPEIS (2017) at 4-120.

⁸³ 16 U.S.C. § 1531(d).

⁸⁴ 16 U.S.C. § 1536.

⁸⁵ 50 C.F.R. § 402.14(a).

⁸⁶ 16 U.S.C. § 1536(a)(1), (2).

require FEMA to consult with expert agencies under Section 7 of the ESA. These are actions that not only require consultation but also allow FEMA to proactively conserve endangered and threatened species by providing more detailed and up-to-date maps, enrolling more communities in the CRS, and adopting stricter minimum eligibility criteria.

1. Mapping

FEMA implements the NFIP in part through the development and implementation of maps that identify flood-prone areas, known as Flood Insurance Rate Maps (FIRMs).⁸⁷ These maps are used an estimated 30 million times annually for enforcing State and community floodplain management regulations and planning requirements, calculating flood insurance premiums, and determining whether property owners are required by law to obtain flood insurance.⁸⁸ FEMA uses its discretion to map the floodplain and to revise flood maps to account for changing circumstances.⁸⁹ The act of designating an area within the floodplain or out of the floodplain is an affirmative action which has serious impacts on the health of a floodplain. FEMA's affirmative determination that an area is not a floodplain will then signal to third-parties that they allowed to fill-in or build in that area which will severely impact the ecosystem if that area is in fact a floodplain. FEMA therefore is carrying out an agency action that is ongoing and consultation with an expert agency under Section 7 of the ESA is required.

2. Community Rating System

The CRS is a voluntary program intended to encourage communities to go above and beyond the minimum requirements of the NFIP.⁹⁰ It uses a sliding scale to rank enrolled communities and the higher the ranking the larger reduction in flood insurance rates that community receives. FEMA uses its discretion in deciding what practices go beyond their minimum requirements and thus earn a community a higher ranking and obtain lower flood insurance. Lower flood insurance rates are an incentive for communities to take measures to preserve and protect the floodplain. Providing incentives to communities to act to better preserve the floodplain is in itself an agency action and therefore requires consultation with expert agencies.

3. Minimum Eligibility Criteria

Minimum eligibility criteria guide development in the floodplain with a focus on protecting property.⁹¹ In order for a community to be eligible for flood insurance they must adopt floodplain

⁸⁷ 42 U.S.C. § 4101.

⁸⁸ FEMA, "Mapping Flood Risks: An Overview to Floodplain Management & Flood Insurance." FEMA L-257, August 2013 (<https://www.fema.gov/media-library-data/b9bb674b6b69957399bef7ac6d6fee08/FEMA+L257.pdf>) (Accessed Jun. 5, 2017).

⁸⁹ 42 U.S.C. § 4101(e) -(f)(1).

⁹⁰ Federal Emergency Management Agency, "The Community Rating System works to Protect Natural Floodplains" (2015). (<https://www.fema.gov/media-library-data/1459276443255-663d02584edc3ac6cda2f4a7f337100b/Natural-Functions-and-CRS.pdf>). (Last accessed Jun. 6, 2017).

⁹¹ 42 U.S.C § 4102(c).

management ordinances that are consistent with FEMA's minimum eligibility criteria. FEMA has discretion to amend its regulations on minimum eligibility criteria and thus has an ongoing impact on the use of floodplains. Minimum eligibility criteria can enable development in the floodplain that can have a negative impact on threatened and endangered species and therefore the development of such criteria constitutes an agency action.

B. Implementation of the NFIP Adversely Affects Endangered Species

The NFIP should by its very nature be consistent with national laws and policies, such as the ESA, designed to prevent damage to the environment and to protect and restore the natural and beneficial functions of floodplains. A NFIP that reduces flood damages should result in less development in floodplain areas that provide multiple environmental benefits and critical habitat for endangered and threatened species. As stated above, there are multiple programs within the NFIP where FEMA has the opportunity to fully comply with the ESA. However, FEMA has failed to address the effects that their implementation of the NFIP has on threatened and endangered species and to consult with expert agencies except when compelled by lawsuits to do so. NFIP policies are encouraging development in floodplains and thus causing the destruction of wetlands and floodplains that provide a myriad benefits including flood water conveyance and habitat for threatened and endangered species.

Therefore, the NFIP can have adverse impacts on threatened and endangered species. There have been several lawsuits over the years regarding the impacts of the NFIP on threatened and endangered species and their habitat. The lawsuits allege that FEMA violated the ESA by encouraging development in floodplains that provide habitat for threatened and endangered species without proper consultation with NMFS or FWS.

- Florida Keys: Courts found that federal flood insurance encouraged development in endangered Key deer habitat in the Florida Keys and was jeopardizing the existence of the Key deer and seven other threatened plant and animal species. FEMA then implemented voluntary protection measures. However, it was determined that the voluntary protection measures did not remove the risk FEMA was placing on the Key deer and other threatened species. Thus FEMA was barred from issuing new flood insurance policies in the Florida Keys. FWS subsequently finalized a Biological Opinion (BiOp) in 2010 that outlines activities to be implemented by FEMA, FWS and the participating communities in order to protect the threatened and endangered species before new policies may be issued.⁹²
- Puget Sound: As a result of a lawsuit, NMFS issued a BiOp that determined the NFIP is jeopardizing the survival of Puget Sound Chinook, steelhead and Hood Canal summer – run chum salmon. Because Chinook salmon are the primary food source for Southern

⁹² U.S. Fish & Wildlife Service, South Florida Ecological Services Field Office. "Fish and Wildlife Conservation in the Florida Keys." <http://www.fws.gov/verobeach/ConservationintheKeys.html>

Resident Killer whales, the NFIP is also jeopardizing that species. The BiOp requires FEMA to strengthen NFIP floodplain management standards.⁹³

- Sacramento- San Joaquin River Delta: the lawsuit claimed that FEMA's implementation of floodplain management requirements encourages the placement of fill in the floodplain and that the construction of levees removes land from the floodplain, an action that destroys habitat for listed salmon, steelhead and delta smelt. In a settlement agreement FEMA agreed to consult with NMFS and FWS regarding impacts of the NFIP on multiple species within the Sacramento- San Joaquin River Delta.⁹⁴
- Oregon: NMFS issued a BiOp that concluded FEMA's NFIP violates the ESA by subsidizing development in floodplains that jeopardize the continued existence of Southern Resident killer whales and seventeen marine and anadromous species, including salmon and steelhead species, and adversely modifies the designated critical habitat of sixteen of these species in Oregon. Reasonable and Prudent Alternatives were included in the BiOp and FEMA is to start their implementation or substitute strategies immediately.⁹⁵

FEMA should rely upon its partner federal agencies with significant experience with federal environmental laws and the management of floodplain lands and threatened or endangered species. In particular, FEMA should consult with FWS and NMFS. FEMA, FWS, and NMFS should determine the scope of impacts of the NFIP on listed species and their critical habitat throughout the nation and then implement a strategy to fulfill their obligation under the ESA to carry out meaningful conservation of listed species. The alternatives listed in the NFIP draft NPEIS did not take into account threatened and endangered species. FEMA is well aware of the impact its implementation of the NFIP has on threatened and endangered species as seen by the number of lawsuits alleging just that and the fact that FEMA has had to consult with NMFS and/or FWS pursuant to settlement agreements to develop implementation plans to comply with the ESA. FEMA, FWS, and NMFS need to work together to develop new alternatives that implement higher standards that better protect floodplains and the threatened and endangered species that live there.

V. Alternatives discussion

FEMA's draft NPEIS considers modifications to the NFIP intended to meet two needs – (a) to implement the legislative requirements of Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act (HFIAA) to improve the

⁹³ *Nat'l Wildlife Fed'n v. Fed. Emergency Mgmt. Agency*, 345 F.Supp.2d 1151 (W.D. Wash. 2004).

⁹⁴ *Coal. for Sustainable Delta v. Fed. Emergency Mgmt. Agency*, 812 F.Supp.2d 1089 (E.D. Cal. 2011)

⁹⁵ Endangered Species Act Section 7(a)(2) Jeopardy and Adverse Modification of Critical Habitat Biological Opinion, ESA Section 7(a)(2) "Not Likely to Adversely Affect" Determination, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Implementation of the National Flood Insurance Program in the State of Oregon. April, 14 2016.
http://www.westcoast.fisheries.noaa.gov/publications/habitat/2016_04-14_fema_nfip_nwr-2011-3197reducedsize.pdf

financial soundness of the NFIP, and (b) to demonstrate FEMA's compliance with the ESA in implementing the NFIP. Of the four alternatives evaluated in the draft NPEIS, only Alternative 3 would begin to address FEMA's compliance with ESA Section 7. Other potential alternatives that could demonstrate compliance with the ESA and improve financial soundness of the NFIP (Sec. 2.4.5) were not fully considered in this draft NPEIS, and FEMA offers inadequate reasoning for its determination not to carry those alternatives forward in particular. The designation of Alternative 2 as the preferred alternative is poorly justified. Finally, we strongly urge FEMA to renew coordination efforts with the Services to reach concurrence on a more effective Alternative.

A. There is inadequate demonstration as to why other alternatives were not carried forward

FEMA provided a summary of proposed alternatives that were deemed unreasonable for consideration in the draft NPEIS. Two of those alternatives offer significant benefit to the protection of people and property, improved financial soundness of the NFIP, and reduced loss of critical habitat areas of ESA-listed species. Those alternatives include expanding the NFIP minimum standards beyond the 1% floodplain area, and considering future conditions in flood risk mapping. These alternatives should have been carried forward.

1. Revising the NFIP's Special Flood Hazard Area (SFHA) to a standard beyond the 1% annual floodplain –

- Using a safer a SFHA standard, such as the 0.2% floodplain (500-year event), would provide flood risk reduction to communities and cost-savings to taxpayers. However, FEMA claims there is no evidence to suggest that it would also benefit ESA-listed species or their habitat. The information needed to fully determine this lies with the Services and includes their maps of threatened and endangered species' habitat. FEMA reports to have requested these mapping data from the Services in 2014, but to never have received a response. Without these data, FEMA was unable to determine if an expanded Special Flood Hazard Area would actually include a significant number of areas in which ESA-listed species are located. This is problematic, but is nonetheless an inadequate justification to cease full consideration of this alternative, especially when the necessary maps are readily available online through the Services' websites.⁹⁶ Documentation of the Services' failure to cooperate with FEMA in this request should be included here.

⁹⁶ The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) share jurisdiction of ESA listed species and their designated critical habitat areas. Generally, the USFWS manages terrestrial and freshwater species, while the NMFS manages marine species, some of which spend a portion of their life history in freshwater systems. Spatial data for the critical habitat of ESA-listed species is available online from the USFWS at: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Equivalent data is available from the NMFS at: <http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish>

- We also question FEMA’s assertion that ESA-listed species will not demonstrably benefit from an expanded SFHA. In their evaluation of the impacts of alternatives on water resources (Sec. 4.3.3.4), FEMA cites various studies concluding that avoiding development in the floodplain maintains important natural functions benefitting water resources and supporting aquatic habitats.^{97 98} Yet FEMA also claims that there is no evidence that expanding minimum floodplain management standards, which are intended to minimize risky floodplain development, would benefit ESA-listed species in the floodplain. FEMA must address the obvious tension between these statements and reevaluate its decision to not fully consider this alternative.
- Consideration of a stronger flood standard is not new to FEMA. An EIS completed for modifications to the NFIP in 1976 examined the extreme alternative of prohibiting all development in the 1% SFHA, noting that such an act would be the most direct means to meeting the intent of the NFIP, protection of life and property in flood-prone areas, and would prevent disruption and endangerment of floodplain ecosystems. It was deemed unnecessary, however, because the no-rise regulatory requirements were expected to prevent almost all encroachment by development in the floodway. The no –rise regulatory mechanism has not worked to reduce new structures in the SFHA as predicted, and thus must be reevaluated.⁹⁹

2. Future condition flood risk guidance –

- FEMA reports to be considering modifications to the flood hazard mapping program to consider flood risk under future conditions. Hazard and risk information for future planning is of utmost importance to our nation’s citizens and economy, especially as many flood-prone areas continue to see large population growth. We support this effort. As FEMA describes, the Technical Mapping Advisory Council’s (TMAC) 2015 report provides detailed recommendations for assessing and incorporating future conditions risks in FEMA’s mapping and risk products. However, none of those recommendations have informed the alternatives considered here. While TMAC notes that current actionable science is not strong enough to support a nationwide climate informed standard, TMAC makes clear that impacts of future development, land use change, and erosion on flood risk can and should be evaluated in FEMA’s flood risk products.

⁹⁷ EPA. (2016, September 14). *Manage Flood Risk*. Retrieved from Green Infrastructure: <https://www.epa.gov/green-infrastructure/manage-flood-risk>

⁹⁸ The Nature Conservancy. (2014a). *A Flood of Benefits: Using Green Infrastructure to Reduce Flood Risks*. Retrieved from Habitat Protection and Restoration: <https://www.conservationgateway.org/ConservationPractices/Freshwater/HabitatProtectionandRestoration/Documents/A%20Flood%20of%20Benefits%20-%20J.Opperman%20-%20May%202014.pdf>

⁹⁹ Larson, L. and D. Plasencia. 2001. No Adverse Impact: A new direction in floodplain management policy. Association of State Floodplain Managers Whitepaper. <http://www.floods.org/PDF/NAIjournal.pdf>

- The first recommendation in TMAC’s report includes development of “policy and supporting standards on how to consider and determine erosion zones that are outside the SFHA, as they ultimately affect flooding and environmental conditions.”¹⁰⁰ Specific recommendations for evaluating and implementing erosion hazard zones were also detailed in the Association of State Floodplain Managers’ Riverine Erosion Hazards Whitepaper.¹⁰¹ FEMA has sufficient actionable science and mapping technologies to evaluate future growth and erosion related risks to communities, and TMAC estimates that such evaluations could be implemented in the near-term (2 years). Furthermore, considering the length of time required to draft this NPEIS, it is unreasonable to postpone evaluation of these critical risk mapping improvements until the next EIS process.

B. The ESA compliance criteria proposed in Alternative 2 will maintain status-quo, whereas the ESA performance standard (Alternative 3) is a more effective means to secure NFIP compliance with the ESA

We support implementation of legislatively required changes to insurance premium rates proposed in Alternatives 2, 3 and 4.¹⁰² However, the measures for addressing NFIP compliance with the ESA proposed in all the alternatives to be inadequate for instituting long-term solutions to conflicts between NFIP permitted development and ESA protections that have occurred nationally, and will continue to occur until fully addressed within the NFIP.

1. ESA compliance criteria proposed in Alternative 2 is ineffectual –

- Alternative 2 would clarify 44 C.F.R. 60.3(a)(2) to indicate that a “community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing permits to develop in the floodplain. Such clarification would produce no changes to current levels of ESA compliance because 44 C.F.R. 60.3(a)(2) already states that NFIP participating communities ensure “all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law”. The ESA is a Federal law and thus already applies to communities permitting development through the NFIP. Any clarifying language to 44 C.F.R. 60.3(a)(2) specifically including ESA compliance would be redundant and institute no new outcomes.

¹⁰⁰ Technical Mapping Advisory Council Report, FEMA. 2015. Future Conditions Risk Assessment and Modeling. https://www.fema.gov/media-library-data/1454954261186-c348aa9b1768298c9eb66f84366f836e/TMAC_2015_Future_Conditions_Risk_Assessment_and_Modeling_Report.pdf

¹⁰¹ Riverine Erosion Hazards Whitepaper. Association of State Floodplain Managers Riverine Erosion Hazards Working Group. Feb 2016. <https://www.floods.org/ace-images/ASFPMRiverineErosionWhitePaperFeb2016.pdf>

¹⁰² Biggert Waters Flood Insurance Reform Act of 2012, and Homeowners Flood Insurance Affordability Act

2. ESA-related performance standard proposed in Alternative 3 is stronger, but will require technical guidance from FEMA and the Services –

- We support the establishment of an ESA-performance standard in the minimum floodplain management criteria. Requiring communities to not only demonstrate ESA compliance, but to also determine whether proposed development will have adverse impacts on ESA-listed species and their habitat can more effectively address the fundamental ways in which riverine-floodplain systems function. It's well documented that flood and erosion risks are a product of activities outside the SFHA (ASFPM 2016). Similarly, natural floodplain functions are a product of processes that occur upstream, downstream, and outside the immediate floodplain area. ESA-listed species that depend on natural floodplain functions are strongly impacted by development that impairs those functions, even when that development may be appropriately permitted through the ESA. As such, simply requiring appropriate ESA permits will not, and has not, worked to alleviate degradation of habitat areas critical to success of ESA-listed species. By also documenting the impacts of proposed development on designated critical habitat, and mitigating impacts to the maximum extent possible, the NFIP can begin to address ESA conflicts.
- While a new ESA-related performance standard can be effective in reducing degradation of ESA-listed species and critical habitats, meeting that standard should be a responsibility of both participating communities and NFIP administrators. While communities may demonstrate ESA compliance independently, they are likely to lack the mapping data and methodology for documenting the potential impacts of proposed development on ESA-listed species and habitats. FEMA should work with the Services to develop technical guidance to assist communities in evaluating, documenting, and mitigating these impacts.
- While implementing an ESA-related performance standard is a complex challenge, it was at the heart of the Oregon Biological Opinion released by the National Marine Fisheries Service in 2016. In that Opinion the Services outline specific recommendations for identifying, evaluating and appropriately managing the impacts of proposed development on natural floodplain functions critical to success of ESA-listed fish in Oregon. Much of that work can inform the nationwide EIS and alternatives considered here.

C. Alternative 2 is not justified as the preferred alternative

FEMA designates Alternative 2 as the preferred alternative with the reasoning that it; (1) meets the purpose and need of the draft NPEIS, (2) causes the least environmental impact, and (3) is the only alternative within FEMA's discretion. We challenge all three reasons for this designation. Further, FEMA states that Alternatives 3 and 4 did not receive concurrence from the Services and thus could not be preferred. If this is the primary factor barring preference, we strongly support renewed attempts at concurrence for a more effective preferred alternative.

1. Alternative 2 does not meet the purpose and need of the NPEIS –

- The purpose and need for an NFIP nationwide EIS is to (a) implement the legislative requirements of BW-12 and HFIAA, and (b) to demonstrate compliance with the ESA. Alternative 2 rests on existing statute to secure community compliance with the ESA, but it does not ensure FEMA’s own compliance with the ESA.¹⁰³ Through an overly narrow interpretation of land-use authority (discussed above), FEMA inappropriately excused itself from the full ESA Section 7 (Interagency Cooperation) compliance process by abdicating any federal agency responsibility (action) for development in the floodplain.
- Alternative 2 unnecessarily clarifies 44 C.F.R. 60.3(a)(2) to specifically include ESA compliance where it already applies. This would produce no direct environmental impacts because it would maintain status-quo development compliance requirements. This is a misleading interpretation of least environmental impact. As a result, current rates of ESA-listed species loss and habitat degradation would continue.
- FEMA’s draft NPEIS rests on an overly narrow interpretation of its land-use authority, and this must be reevaluated. Alternative 2 is not the only Alternative within its discretion.

2. Lack of concurrence with the Services on Alternatives 3 and 4 should be documented, and efforts for coordination should be renewed

- FEMA states that it would prefer to coordinate with the Services to undertake program changes to meet ESA responsibilities, but without concurrence it must select Alternative 2 as preferred. A lack of concurrence with the Services is weak grounds for rejection of Alternative 3 or 4 as preferred.
- We challenge the assumption that concurrence with the Services would be time prohibitive for finalizing this EIS.

VI. Conclusion

The quality of FEMA’s draft NPEIS is severely lacking. FEMA violated NEPA by impermissibly concluding floodplain development is not an indirect effect of the NFIP without adequate evaluation, especially given the ample evidence to the contrary. FEMA also improperly concludes it lacks the ability to influence land use in the floodplains by narrowly interpreting its “land use” authority. Further, FEMA’s assessment of the NFIP’s impact on endangered species is inadequate and omits extensive findings to the contrary. Finally, FEMA’s alternatives analysis requires significant improvement to account for the improper environmental impacts analysis in the draft NPEIS. FEMA should not finalize the draft NPEIS until these issues have been resolved.

¹⁰³ 44 C.F.R. 60.3(a)(2).

We appreciate this opportunity to comment on the NFIP draft NPEIS. Please do not hesitate to contact us with any questions about our observations and recommendations.


Sincerely,



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June 6, 2017

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Re: National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement

Thank you for the opportunity to comment on the draft Nationwide Programmatic Environmental Impact Statement NPEIS) for the National Flood Insurance Program.

The Association of State Floodplain Managers (ASFPM) is a national professional organization representing 17,000 members at the local, state, regional and private sector who are dedicated to managing flood risk to reduce flood damage and taxpayer costs from flood disasters. Our members work in local, state and private sector to protect natural systems that help reduce flooding and provide our natural resources. For most, their primary function is helping in the administration of the NFIP.

The NFIP is a federal program, or federal action, that has nationwide impacts on land use development patterns, natural floodplain functions, endangered species protections, water quality and climate change. It is important to note that of the 22,000 communities that belong to the NFIP, 6,000 of those communities wouldn't have any land use regulations or building code standards if it were not required by the NFIP. While the NFIP has been promoted as being important for the economy, environment and community resilience, the environmental impacts of the program must be acknowledged and mitigated. ASFPM generally supports the affordability recommendations included in alternatives 2, 3 and 4. However, we do have concerns over the analysis of impacts to ESA species and critical habitat included in the draft NPEIS, especially the near total lack of any consideration of addressing Endangered Species Act issues programmatically versus, on a permit-by-permit, development-by-development basis. Practitioners understand the chronic understaffing of the services as well as the specialized knowledge/skills needed to address ESA compliance issues. And even with those difficult issues, a programmatic solution was found in Puget Sound. It is disappointing that FEMA rejected a programmatic approach. Therefore, the recommendations and comments that follow are intended to help improve the analysis and conclusions laid out in the current draft NPEIS in order to develop mitigation strategies that will truly provide protections for critical species and habitat.

Recommendations

1. Consider the Delay of the Final NPEIS Until After the 2017 NFIP Reauthorization by Congress

With the NFIP set to expire Sept 30, 2017, it is unclear at this time what an NFIP reauthorization will ultimately include. From the draft bills introduced, there is potential that the reauthorization bill will contain elements or changes to the current structure of the NFIP that could significantly impact the analysis and conclusion included in the draft NPEIS. If the 2017 NFIP reauthorization includes significant new circumstances or program elements, FEMA would be required to consider and evaluate these new elements. If the final NPEIS has already been issued, then a Supplemental Environmental Impact Statement would need to be issued to account for these new program elements. ASFPM recommends FEMA delays issuing the final NPEIS until the 2017 NFIP reauthorization is finalized by Congress to determine if any new analysis for the final NPEIS may be needed due to the reauthorization.

2. The NPEIS Needs to Consider and Analyze the NFIP's *De Facto* Land Use Authority through its Minimum Floodplain Management Criteria, and the Implications on Requiring ESA Consultation with the Services

Throughout the draft NPEIS, FEMA asserts that the agency is not responsible for private floodplain development, and therefore, is not responsible for ensuring floodplain development is compliant with the ESA. The draft NPEIS states that floodplain development is not a federal action under the NFIP, that the NFIP does not encourage or cause floodplain development to occur, does not have land use authority to prescribe the types of development that may take place in the floodplain, nor does it play a significant role in facilitating or encouraging floodplain development.

Page 2-2 of the draft NPEIS states that, "The regulation of land use falls under the state's police powers, which the Constitution reserves to the states, and the states delegate down to their respective political subdivisions." Although FEMA may not be issuing individual land use permits authorizing floodplain development, the original intent of the NFIP was to establish a unified national program for floodplain management. As set forth by Congress in the National Flood Insurance Act of 1968, this was to be done partly by "...encouraging sound land use by minimizing exposure of property to flood losses," and to "guide the development of proposed future construction, where practicable, away from locations which are threatened by flood hazards" (42 USC §4001 (c)(1) & (e)(2)). The original program intent, as established by Congress, clearly saw the program as a mechanism to limit local floodplain development through the establishment of the minimum floodplain management criteria. It is through the minimum criteria that the NFIP does have the authority to alter its minimum floodplain management criteria to limit the impacts on ESA-related species or other environmental impacts.

ASFPF also does not agree with the assessment that, as found on page 4-110, "the NFIP neither causes development to occur, nor is it a driver in facilitating or encouraging floodplain development." What we have seen in the 49 years since the NFIP was created is that it has become a *de facto* land use authority through the creation of minimum floodplain management criteria, and the unintended consequences of a mandatory purchase of flood insurance requirement. Unfortunately, the mandatory flood insurance purchase requirement and the minimum floodplain management criteria has resulted in driving private land use decisions and behaviors, since there is an incentive to fill floodplain lands in order to either remove the mandatory flood insurance purchase requirement, or to reduce flood insurance rates. While alternatives to filling do exist to lower flood insurance premiums, and communities are encouraged to adopt higher regulatory standards, many communities do not prohibit the use of fill or prohibit new structures located within the mapped Special Flood Hazard Area (SFHA). A quick survey of the 1,440 Community Rating System participating communities, which covers 69% of all NFIP policies and are recognized for having floodplain management programs that exceed the minimum NFIP requirements, would likely show that a significant majority of communities are not receiving credit for Activity 430 – Development limitations prohibiting fill (DL1) or prohibiting new structures (DL2).

Because the avoidance of the mandatory flood insurance purchase requirement and compliance with the minimum floodplain management criteria is often the leading driver for the use of fill in the SFHA, it is somewhat disingenuous to state that the NFIP has no influence on private land use in the floodplain. Section 4.1.1.1 discusses the low participation rates for flood insurance policies, and the draft NPEIS concludes that other factors besides the availability of flood insurance may be driving individuals to develop within the floodplain. The 2013 Congressional Research Service report, *The National Flood Insurance Program: Status and Remaining Issues for Congress*, indicates the low participation in the flood insurance market, and identifies five possible explanations for the low market penetration. Of the five possible explanations listed, at least four of those factors would indicate people generally try to avoid purchasing a flood insurance policy, despite their potential flood risk:

- (1) policy is seen as not being worth the cost,
- (2) lack of compliance with the mandatory purchase requirement or failure to ensure that property owners maintain coverage for the life of their loan,
- (3) private insurance agents do not market NFIP policies, and
- (4) many homeowners in risky areas either do not have a mortgage or have a mortgage from a lender that does not enforce the mandatory purchase requirement.

These possible explanations would seem to lend some evidence that many people located within floodplains or developing floodplain land do try to avoid the mandatory flood insurance purchase requirement. Given that FEMA will remove the mandatory purchase requirement through the use of fill to elevate properties above the Base Flood Elevation or in the construction of a levee that limits flood water access to floodplain habitat, there is an incentive to fill floodplain lands. The reality is that the minimum floodplain management criteria **does** facilitate and incentivize floodplain filling, and FEMA **does** have the authority to alter the criteria to account for the program's impacts on ESA-species or environmental considerations.

In fact, the draft NPEIS seems to acknowledge the impact that the minimum floodplain management criteria have in prohibiting or limiting local land use authority. Despite the seemingly contradictory opening sentence, the conclusion of the paragraph does demonstrate how local land use can be restricted or influenced by the established minimum floodplain management criteria.

*Although FEMA does not have the land use authority to restrict development in floodplains, the minimum floodplain management criteria (44 C.F.R. § 60.3) include certain limitations to how such development is carried out that benefit biological resources. To the extent that the FEMA requirement in 44 C.F.R. § 60.3 provides floodplain management regulations increases compliance with the CWA, this requirement benefits biological resources by providing protections for habitat, including surface and groundwater quality, floodplain functions, and aquatic ecosystems, because the CWA was promulgated to protect these resources. The minimum criteria include a requirement that, subject to limited exceptions where appropriate analysis has been conducted, encroachment in riverine floodways may not cause an increase in flood heights. This requirement helps protect biological resources within the floodplain by providing habitat protection during storm events, preventing degradation of surface and groundwater quality, and protecting aquatic ecosystems... Additionally, per 44 C.F.R. §§ 60.3(e)(3) and (e)(6), **communities cannot locate new construction seaward of mean high tide (e.g., construction cannot occur over water) or place fill within coastal velocity zones (V Zones)** (emphasis added), which provides further protections to coastal ecosystems. Zones V1-30, VE, and/or V identified on FIRMs are considered coastal high hazard areas and subject to tidal surges, wave action, and high winds from storms and hurricanes. **These minimum criteria requirements help protect against high water levels, erosion, and scour, which can undercut building foundations and cause degradation of water quality and impacts to aquatic ecosystems. Mangroves and sand dunes are also protected under FEMA's minimum floodplain management criteria** (emphasis added). Before these areas may be altered, the community or project proponent must undertake an analysis to demonstrate that the proposed development activities would not increase potential flood damage. **By limiting encroachment in mangroves and sand dunes** (emphasis added), these natural features continue to protect the shoreline from coastal storms, reduce flood damage to communities, and benefit surface and groundwater quality and aquatic ecosystems.*

Indeed, the statement points to how the criteria (44 CFR §60.3) “increases compliance with the CWA.” Despite the opening paragraph stating “FEMA does not have the land use authority to restrict development in floodplains,” the paragraph concludes by stating FEMA has, in fact, restricted development in floodplains “by limiting encroachment in mangroves and sand dunes.” This again points to the fact that FEMA does have de facto land use authority, and therefore, the minimum floodplain management criteria and the NFIP would be considered a federal nexus or federal action that would require FEMA to consult the services under Section 7 of the ESA regarding impacts related to the NFIP.

3. ASFPM Believes that the Draft NPEIS is Deficient because it Does Not Recount the History of the NFIP in Regard to ESA Compliance

The NPEIS does not include any commentary or analysis on one of the more significant controversies in recent years – lawsuits against FEMA for inadequate consultation on the ESA. In response to lawsuits brought under the ESA, FEMA has been required, either by the courts or through settlement agreements, to undertake consultations under the ESA on the implementation of the NFIP in particular communities or regions. In consultations undertaken in Monroe County, Florida, the Puget Sound region of Washington, and in Oregon, the services have found that the implementation of the NFIP in those areas was likely to jeopardize the continued existence of threatened and endangered species and adversely modify designated critical habitat.

The draft NPEIS is intended to consider changes to the NFIP to meet two needs – (a) to implement the legislative requirements of BW-12, and (b) to demonstrate FEMA’s compliance with the ESA in implementing the NFIP. However, it would seem the second need for the NPEIS should be identified to more properly address ESA coordination issues that have been identified in these lawsuits and judgements. If, at a minimum, FEMA does not think that the past lawsuits and judgements are relevant, then there should be justification of why this it reached this conclusion.

4. ASFPM Recommends the Reconsideration of what are Considered “Federal Actions” Taken by FEMA through the Administration of the NFIP, including its *De Facto* Land Use Authority

In the draft NPEIS, FEMA only acknowledges a limited number of program implementation actions that could arguably be perceived as influencing development, and arguably be considered federal actions. On page 2-8, the conclusion that “some perceive that certain actions taken under the NFIP – specifically the issuance of a certain Letter of Map Change (LOMC), mapping a levee system as meeting the requirements for accreditation, or designating a levee system in an AR or A99 Zone – encourage(s) some floodplain development.” This statement leads to the conclusion that FEMA believes that the only program implementation that may potentially be seen as a federal action would be issuing LOMCs, the mapping of accredited levees or the mapping of AR or A99 Zones.

However, FEMA does have a greater range of actions it can enact that directly influences local community land use acknowledged above, including the program’s de facto land use authority through the establishment of minimum floodplain management criteria. Other federal actions that can be taken by FEMA through the implementation of the NFIP include:

- the enrollment, probation or suspension of communities in the program,
- enacting Section 1316 of the National Flood Insurance Act of 1968 (the denial of flood insurance coverage to individual non-compliant properties),
- the admission of communities to the CRS program and the retrograding of CRS communities due to non-compliance,
- through the writing of individual flood insurance policies or backing policies written by Write-Your-Own (WYO) companies, and
- mandating that NFIP must approve any flood map changes in the community, because those changes determine if a property is subject to NFIP regulation or not, and decides specific regulations that must be met.

ASFPM urges FEMA to reconsider the direct and indirect impacts of the NFIP on land use development, and to reconsider the full suite of federal actions that FEMA may take that may influence the program’s impact on ESA-species and critical habitats.

5. Because of the NFIP’s *De Facto* Land Use Authority, the NPEIS Effects Analysis for each Alternative Should be Revisited

Throughout the alternatives analysis on the impact criteria, the draft NPEIS continues to revisit the statement that because FEMA does not have land use permitting authority, that development in the floodplain cannot be dictated from the federal level and that FEMA has no legal authority under the NFIP to prohibit development within the floodplain. As discussed above, ASFPM does not agree with this assessment, as the draft NPEIS demonstrates that the current minimum floodplain management criteria does in fact limit encroachment and development in specific habitats (mangroves and coastal dunes). Because of this, and as discussed above, ASFPM believes that FEMA has too narrowly limited its analysis of alternatives and the direct/indirect effects analysis for many of the impact criteria.

Several of the impact criteria/attributes should be thoroughly re-evaluated for the impacts that the program has on those attributes, through setting minimum floodplain management criteria and being able to limit encroachments to protect certain habitats or features, or through incentivizing the use of fill in mapped floodplains. These impact criteria include aesthetics/visual resources, climate change, infrastructure, socio-economic resources, land use planning, water resources and biological resources. ASFPM believes there are significant impacts to several of the criteria that were not

noted in the draft NPEIS. In light of the impact that the NFIP may have regarding incentivizing the use of fill in mapped floodplains, this includes assessing whether the NFIP may:

- be considered an action that is likely to adversely affect ESA-species,
- result in substantially reducing the presence of wetlands and riparian areas or other sensitive natural communities,
- substantially reduce or eliminate the suitability or eliminates the connectivity of floral/faunal habitats,
- alter functions of natural communities,
- modify surface water or groundwater quality, or
- modify unique hydrologic characteristics such as floodplain function.

6. The Preferred Alternative Does Not Adequately Address ESA Concerns and was not Adequately Justified as the Preferred Alternative

Given the history of litigation against FEMA and the NFIP resulting in determinations that the implementation of the NFIP in those locations mentioned above would likely jeopardize the threatened or endangered species in those areas, the preferred alternative is not adequate in addressing ESA concerns. As discussed above, LOMCs are only a small area where there is a federal nexus that should have some level of consultation. Also, there was no consideration of alternatives that would change basic NFIP standards of 44 CFR §60.3 on a programmatic level so that through consultation with the appropriate federal agencies, basic floodplain management standards could address ESA concerns at a regional or state level, versus burdening communities on a per development basis, also discussed above.

Based in the discussion found in Section 2.3.2, it appears the justification of how the preferred alternative was arrived at rested on the stated difficulties in consulting with the services (Alternative 3), and being able to make changes solely under its current legal authorities.

7. Alternatives 2, 3 and 4 do not account for Local and Federal Impediments to Implementation – i.e. the Burden on Local Communities and the Services, and whether a Proper Nexus for Consultation Exists

The alternatives presented do not take into account for the fact that most communities do not have the regulatory expertise to incorporate or review floodplain development proposals properly for ESA compliance. While a few larger regulatory or planning-savvy communities may have (or already) have a process for determining and documenting ESA compliance, many of the smaller rural communities that already struggle with the review and enforcement of the NFIP would have one more regulatory impediment to being able to successfully implement the NFIP at the local level, providing one more hurdle for getting communities to join the NFIP. This would also apply to a local community being able to assess whether the proposed ESA mitigation would sufficiently mitigate impacts to listed species.

In addition to the increased complexities for local communities to determine if ESA-compliance is needed, there appears to be some ambiguity as to whether individuals or communities have a true nexus for ESA consultation under Section 10 of the ESA. Section 10 consultation was originally intended for large, contiguous landscape management, not for small individual floodplain development proposals. In addition, the current process of obtaining an incidental take permit requires the development of a habitat conservation plan, which will result in a patchwork quilt of conservation plans across a landscape that may or may not be coordinated between landowners, developers or the community.

Conversely, there is no acknowledgement of the federal personnel costs associated with nationwide implementation for ESA, either through community-by-community consultation, or through consultation for each individual proposal.

Some additional discussion found in Section 4.5.3.1.3 that does acknowledge the demand on public and private resources, which includes the need to obtain local approvals. This is acknowledged, though more for the potential to pass the cost of review onto private developers. Section 4.3.1.3.3 discusses the burden and cost to communities for implementing Alternative 2, but does not discuss the burden of implementing Alternatives 3 or 4. Additionally, the discussion in Section 4.3.1.3.3 assumes there is local knowledge or expertise available to assess ESA consultation and

compliance, and only comments on the potential administrative cost. In many cases, many of the smaller, rural communities that rarely issue permits for floodplain development, basic NFIP implementation is already be a significant burden for them to adequately administer the minimum floodplain management criteria. An additional complex consultation process can result in greater non-compliance of local floodplain permitting, or lack of understanding of the ESA implications of a proposed development. If a community outsources its ESA compliance/consultation process to a consulting company, it could significantly increase the cost to the homeowner or developer, again discouraging communities from joining the NFIP, and thus having more buildings without a flood insurance policy getting flooded, burdening the federal taxpayer with more disaster assistance and resulting in less resilient communities.

As discussed above, the preferred alternative (Alternative 2) does not adequately address ESA concerns due to its limited scope and application. A more appropriate analysis of the impacts to implementation of Alternatives 3 and 4 would also likely show that addressing ESA concerns through a community-by-community approach would be unnecessarily burdensome. Perhaps a reconsideration of Alternative 3 or 4 would be for FEMA to take the lead in regions, or for specific species, to develop and consult with the services and the participating states and communities. This effort would be to develop alternative minimum floodplain management criteria in order to avoid jeopardy to ESA-listed species or in order to avoid adverse modification to designated critical habitat through the implementation of the NFIP in that community.

8. The NPEIS Analysis and Alternatives does not Adequately Account for Climate Change or other Flood Hazards such as Riverine or Coastal Erosion. FEMA should revisit the Alternatives that were not Brought Forward and Analyzed

Although FEMA presented proposed alternatives that they did not consider in Section 2.4.5 of the draft NPEIS, the discussion of why preliminary evaluations justified why these alternatives were not considered is inadequate. ASFPM believes that at least three of the alternatives presented should have been considered in the draft NPEIS. These three alternatives include changes to the LOMR-F process, expanding the applicability of the NFIP minimum standards out beyond the 1% annual chance floodplain, and better implementation of future conditions mapping.

LOMR-F Process: With more focus on potential changes to the requirement for a CLOMR-F, and a better acknowledgement that fill in the floodplain would negatively impact neighboring property owners, and water and biological resources, changes to the LOMR-F/CLOMR-F process could be a reasonable alternative. Changes to the state or local requirements where fill is the only means of properly elevating structures would seem to be no less burdensome then the process that is presented for the requirement for local communities to consult regarding ESA compliance.

Revise the 1% annual chance flood event to another standard to expand the applicability of the floodplain management criterial: FEMA discounts this as a viable alternative for ESA compliance by indicating that expansion of the regulated floodplain may not result in promoting the conservation of threatened and endangered species. However, the evidence presented throughout Section 4.3.3 and 4.3.4 indicates that the protection of floodplain habitat and functions is a beneficial effect on sensitive natural communities, water resources, etc. The recent Waters of the United States rule developed a publication titled, [*Connectivity of Streams and Wetlands to Downstream Waters: A Review & Synthesis of the Scientific Evidence*](#). In this report, there is discussion of the importance of floodplain connection to riparian habitats and species. Other existing reports also provide justification to reconsider this alternative. ASFPM urges FEMA to provide a better consideration and assessment of how the expansion of the 1% annual chance flood event may relate to better protection of threatened or endangered species, or the protection of critical habitat.

Incorporating Climate Change in Flood Maps: The 2015 TMAC [*Future Conditions Risk Assessment and Modelling Report*](#) noted there may not currently be sufficient, actionable science and mapping methodologies to implement changes to FEMA's flood hazard mapping to account for climate change in its flood maps. However, TMAC does state the impacts of future development, land use change and erosion hazards can currently be incorporated into FEMA's flood risk mapping products. ASFPM believes future sea level rise and increased storm intensity (to determine rainfall/runoff and thus flood elevations), can be readily determined if FEMA will collaborate with other key Federal agencies like USACE, USGS and NOAA and agree on an appropriate national methodology.

In addition to the two alternatives presented, expanding the NFIP minimum standards beyond the 1% annual chance flood and future conditions mapping, FEMA should also consider supporting state or local efforts to map other flood hazards such as riverine erosion. In February 2016, ASFPM issued a white paper titled [ASFPM Riverine Erosion Hazards](#). The main purpose of the paper “is to encourage state and local governments to begin mapping riverine erosion hazard areas in their communities. The mapping should be carried out using methodologies they feel are appropriate for their specific conditions and at a level of detail that meets their specific requirements.” While ASFPM does not advocate for FEMA to map erosion hazards with one set national methodology, we do encourage FEMA to consider and support the mapping efforts of state and local communities. Similar to a performance standard, FEMA can support the mapping of other flood hazards besides erosion to better identify and account for how the implementation of the NFIP can impact ESA-species or critical habitat.

ASFPM appreciates the opportunity to provide comments on this important issue. We trust that FEMA will continue to coordinate with us during this process. Please contact ASFPM Executive Director Chad Berginnis with any questions or concerns at (608) 828-3000 or at cberginnis@floods.org or ASFPM Senior Policy Advisor Larry Larson at larry@floods.org.

A handwritten signature in black ink, appearing to read 'Chad Berginnis', with a long horizontal flourish extending to the right.

ASFPM Executive Director
Chad Berginnis



June 6, 2017

Docket ID FEMA-2012-0012

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-310

Comments Submitted to: <http://www.regulations.gov>. Search for Docket ID FEMA-2012-001

Dear FEMA

Please accept the following comments from Audubon Society of Portland regarding the draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP). Audubon Society of Portland has 17,000 members in the Portland Metropolitan Region. We work actively on issues related to floodplains across the State of Oregon.

In 2009, Audubon Society of Portland, Northwest Environmental Defense Center, National Wildlife Federation and the Association of NW Steelheaders brought a lawsuit against FEMA alleging that FEMA was in direct violation of the Endangered Species Act for failing to consider the National Flood Insurance Program's role in fostering development in floodplains and thereby harming federally listed salmon and steelhead. The plaintiffs were represented by Earthrise Law Center. Under the terms of the settlement in this case, FEMA agreed to enter into consultation with the National Marine Fisheries Service (NMFS), the federal agency responsible for overseeing recovery of listed salmonid species. The BiOp determined that FEMA's flood insurance program in Oregon violates the Endangered Species Act by threatening the continued existence of federally listed salmon, steelhead, resident southern killer whales and eulachon (candlefish). It further found that FEMA's flood insurance program results in the destruction and/ or adverse modification of critical habitat for 16 listed species of salmon and steelhead. The BiOp included a lists of reasonable and prudent alternatives that FEMA should make to its flood insurance program to ensure that it remains in compliance with the Endangered Species Act.

We have significant concerns with the NPEIS for the National Flood Insurance Program. The NPEIS ignores years of precedent regarding the obligations of that NFIP to meet the requirements of the Endangered Species Act and it relies on assumptions that are not in accordance with the law. We believe that implementation of the NPDEIS as written will place the NFIP on a trajectory that will result in

continued violations of the Endangered Species Act, continued degradation of the environment, and which will continue to place people and property at unnecessary risk. It will also perpetuate a situation in which the American taxpayer is subsidizing high risk development in flood prone areas which will likely result in putting a program that is already \$24 billion in debt into even greater arrears.

The following are our recommendations regarding the NPDEIS:

1. FEMA should consider the delaying the Final NPEIS until after the 2017 NFIP reauthorization by Congress: NFIP expires on September 30th, 2017. We would urge FEMA to delay finalizing the NFIP NPDEIS until the reauthorization process is completed so that any significant new circumstances or information can be adequately incorporated into the NPDEIS. Failure to account for significant changes to the NFIP could result in a situation in which FEMA would have to produce a supplemental NPDEIS.

2. FEMA incorrectly asserts in the NPDEIS that NFIP does not encourage floodplain development: In multiple locations throughout the NPEIS, FEMA incorrectly asserts that the NFIP program does not encourage development in floodplains, ultimately concluding that floodplain development is neither a direct or indirect effect of the implementation of NFIP and therefore NFIP has minimal impact on the environment. In fact, the NFIP program was established by Congress for the express purpose of “encouraging sound land use by minimizing exposure of property to flood losses.”¹ Congress found the “availability of Federal ... insurance... [is] often [a] determining factor in the utilization of land and the location and construction of public and of private industrial, commercial, and residential facilities.”²

In reality, access to federal flood insurance through NFIP is often a critical or decisive factor in determining whether development in floodplains proceeds forward and thus can both directly and indirectly encourage floodplain development. This conclusion was affirmed by Biological Opinions produced by the National Marine Fisheries Service in Oregon and Washington, both of which concluded that the NFIP induces development in floodplains and establishes the land-use and development standards governing this development. NMFS concludes:

Through the consultation process, NOAA Fisheries’ determined that the NFIP in Oregon reduces the quantity and quality of floodplain and in-channel habitat, which will jeopardize the continued existence of 17 marine and anadromous species (including eulachon and Southern Resident killer whales, in addition to the salmon and steelhead species) and adversely modify critical habitat for 16 of these species.³

FEMA’s failure to recognize the role of NFIP in inducing or inhibiting development in floodplains represent a foundational flaw in the NPEIS. It is clear that it was Congress’ intent that the NFIP influence development in floodplains and MNFS Biological Opinions in Oregon and Washington confirm that NFIP induced development is jeopardizing species listed under the Federal Endangered Species Act. We strongly urge FEMA to revise the entire NPEIS with the foundational recognition that NFIP has significant influence on whether and how floodplains are developed and thus has significant environmental impacts including federally listed species.

¹ 42 USC § 4001(c)(1).

² *Id.* § 4002(a)(2).

³ http://www.westcoast.fisheries.noaa.gov/publications/habitat/fact_sheets/oregon_fema_biop_ganda_april2016.pdf

3. FEMA improperly asserts that it lacks land use authority to direct the type of development which is may be eligible for the National Flood Insurance Program: FEMA incorrectly asserts that it lacks land use authority to direct the type of development that occurs in floodplains and therefore FEMA is not able to regulate floodplain development to avoid and mitigate for negative impacts to the environment including impacts to species listed under the Federal Endangered Species Act.

In fact, FEMA does have the authority to establish minimum land use standards which jurisdictions must adopt in order to be eligible to participate in the National Flood Insurance Program. 42 USC 4001(e) explicitly lays out the intent of Congress that the purpose of the NFIP is to “require States or local communities, as a condition of future Federal financial assistance to participate in the flood insurance program and to adopt adequate floodplain ordinances with effective enforcement provisions.” FEMA ignores entirely in the NPEIS the clear intent of Congress to allow it to set minimum land use standards to participate in the NFIP.

FEMA appears to conflate its express authority to set minimum land use regulations with which jurisdictions must comply to be eligible for the NFIP with approving or denying specific development permits or requiring jurisdictions to adopt land use regulations, period. Ultimately, it remains up to the local jurisdictions as to whether or not to adopt specific land use regulations or issue specific development permits. FEMA is in no way usurping this authority. Jurisdictions remain free to choose not to adopt the land use regulations prescribed by FEMA. Should they choose not to do so, they simply will not be eligible for taxpayer subsidized federal flood insurance. Participation in the NFIP is entirely voluntary and regardless of the criteria set by FEMA, it remains up to the state and local jurisdictions to determine whether they want to participate. FEMA’s assertion that it lacks the land use authority to set minimum land use criteria for eligibility for NFIP is inaccurate and also represents a foundational flaw in the NPEIS.

4. FEMA must comply with the Endangered Species Act: Section 7 of the Endangered Species Act requires that all federal agencies consult with the US Fish and wildlife Service and/ or National Marine Fisheries Service if their activities jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Multiple federal court rulings and settlements in Oregon, Washington, California and Florida have required FEMA to consult with either USFWS or NMFS as a result of impacts of the NFIP on federally listed species. In each of those instances, the federal wildlife agencies found that the NFIP was jeopardizing listed species and issued reasonable and prudent alternatives to avoid violation of the Endangered Species Act. In developing the NPEIS, FEMA should consult with and accept the recommendations of the expert wildlife agencies, NMFS and USFWS, in order to ensure that the NPEIS complies with the Endangered Species Act. As currently drafted, the NPEIS flagrantly ignores the recommendations of the expert wildlife agencies.

As a result of deficiencies outlined above, none of the alternatives including the preferred alternative are adequate to comply with the Endangered Species Act. We would refer FEMA to outstanding comments submitted by American Rivers and NRDC that go into many of the issues outlined above in greater detail and incorporate those comments by reference. We respectfully urge FEMA to carefully consider these significant foundational flaws in the draft NPEIS and revise accordingly including drafting new alternatives which will comply with the Endangered Species Act.

Litigation in multiple states has determined that in fact the NFIP program does promote development in floodplains that can jeopardize listed species and adversely modify critical habitat. As a result of these lawsuits, NMFS and USFWS have issued BiOps with reasonable and prudent alternatives to ensure compliance with the ESA and states such as Oregon have been working to ensure that they will be able to comply with the new criteria that FEMA must put in place. The draft NPEIS turns its back on the legal precedents and progress that has been made as a result. Rather than charting a new and legally untenable course forward, we urge FEMA to produce a NPEIS that complies with its obligations under the Endangered Species Act. This represents the most prudent course forward to protect our environment, our communities and the American taxpayer.

Thank you for your consideration of these comments.

Respectfully,

A handwritten signature in black ink that reads "Bob Sallinger". The signature is written in a cursive, flowing style with a long, sweeping underline.

Bob Sallinger
Conservation Director
Audubon Society of Portland

CALIFORNIA COASTAL COMMISSION

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June 6, 2017

Regulatory Affairs Division, Office of Chief Council
Federal Emergency Management Agency
8 NE, 500 C Street SW
Washington, DC 2015

RE: FEMA Docket ID FEMA-2012-0012; Coastal Commission Staff Comments on the National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

To Whom It May Concern:

Thank you for the opportunity to comment on the National Flood Insurance Program (NFIP) draft nationwide programmatic environmental impact statement. As explained in the Draft NPEIS, the proposed action will implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014 and will demonstrate compliance with the Endangered Species Act. Namely, the proposed action will phase out subsidies for pre-FIRM properties in order to alleviate some of the NFIP's debt by eliminating artificially low insurance premiums that do not capture the true risks associated with certain development in flood hazard areas.

Given the California Coastal Commission's role and jurisdiction, as explained below, our comments focus on how the proposed action relates to our ongoing efforts to address coastal hazards and sea level rise. We would also like to note that through adherence to the Coastal Act, all development within the coastal zone must also protect environmental sensitive habitat areas (PRC Section 30240). Where development may occur in floodplain areas, the Coastal Act requires development to proceed in a way that protects sensitive habitats.

With the looming threat of sea level rise, which could put an estimated \$100 billion worth of property at risk by 2100 (based on 1.4 meters of sea level rise plus a 100-year storm event¹), the Commission applauds efforts to better ensure that the public fully understands the risks associated with living and owning property along a dynamic coastline. To that end, we support that all the proposed alternatives phase out subsidies to properties that were grandfathered into the NFIP so that insurance premiums will more accurately reflect the inherent risks of living along low-lying shorelines and floodplain areas, particularly since these risks will be even greater as sea levels rise along the coast. In addition, beyond the scope of the current action, we urge FEMA to enhance efforts to better communicate both current coastal flood risks as well as likely future risks associated with sea level rise, especially in areas like estuaries where riverine systems meet the ocean or bays. With programs such as the NFIP Community Rating System and

¹ Heberger et al., 2009. The Impacts of Sea-Level Rise on the California Coast. Prepared by the Pacific Institute for the California Climate Change Center.

various Hazard Mitigation Assistance programs, FEMA is well-placed to ensure that communities are resilient to both current and future flood risks.

California Coastal Act and Coastal Hazards

The California Coastal Act of 1976 (Public Resources Code (PRC), § 30000 et seq.) was enacted to “protect, maintain, and, where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources” (PRC, § 30001.5), and applies to the coastal zone of California. This zone is a 1.5 million-acre area stretching 1,270 miles along the state’s mainland coastline from Oregon to Mexico, and around nine offshore islands (333 miles of island shoreline). It extends 3 miles out to sea and that varies in width on land from several hundred feet in urban areas to up to five miles in rural areas. Within this zone, the Coastal Commission, in partnership with coastal cities and counties, plans and regulates the use of land and water to ensure that resources are protected and that development is safe. In particular, the California Coastal Act requires that new development, including development that is substantially improved, is required to be sited and designed to minimize risks associated with coastal hazards like flooding over its anticipated lifetime.

The Coastal Commission has long worked with local governments and project applicants in the coastal zone of California to ensure that the risks associated with developing in an area subject to coastal flooding are analyzed, minimized to the greatest extent feasible, and well-understood by the property owners. FIRMs and the NFIP play an important role in understanding these current-day risks. By putting a price tag on an individual’s decision to live in a flood hazard area, the NFIP allows the property owner to understand and internalize the risks associated with their choice. If this price tag is artificially low, however, it gives property-owners a false sense of security, thus encouraging development in high risk areas. Therefore, it is critical that insurance premiums accurately reflect the risks associated with coastal flooding, and we support FEMA’s efforts to phase out subsidies to the pre-FIRM properties.

Sea Level Rise

Importantly, it should be noted that along our nation’s coasts, sea level rise will exacerbate the existing flood risks of development on and adjacent to the shoreline. Sea level rise increases the risk of coastal erosion, wave attack, temporary flooding, and permanent inundation, all of which will increase the risks associated with living and owning property along the shoreline.

A large body of work at the federal, state, and local levels has acknowledged the need to plan for the impacts of sea level rise due to the magnitude of its potential impacts. Because most development types covered by NFIP have long expected lifetimes (e.g., 75-100 years), the land use decisions made today could have implications on what becomes at risk long into the future. Thus, proactively planning for sea level rise can reduce future risks related to coastal hazards while maximizing the protection of coastal resources, consistent with the Coastal Act. With this in mind, the Coastal Commission has been actively working with local governments and project applicants to address the impacts associated with sea level rise. This includes the development of the agency’s Sea Level Rise Policy Guidance, which includes recommendations for how to address sea level rise within the context of the Coastal Act, as well as a grant program to support local governments in their efforts to update Local Coastal Programs (the land use planning documents that implement the Coastal Act at the local level) to adapt to sea level rise.

Throughout this work, Commission staff has recognized the importance of ensuring that citizens understand the risks associated with sea level rise. Wide public support of various adaptation strategies will be necessary to ensure that actions are taken that will protect coastal resources and ensure resilient development. Without a clear understanding of the range of hazards related to sea level rise, it is unlikely that there will be buy-in for what could be difficult decisions regarding how to address these risks. Again, FIRMs and the NFIP are important tools for communicating risks to the general public. In a sense, these tools, which are based on past events to give a picture of the current flood risks at a specific location, already underestimate the future risks. Thus, it is more critical than ever that insurance premiums provide an accurate accounting of the current flood risk and that flood maps are updated regularly to account for changes in flood risk. We support FEMA's efforts to work towards this.

Finally, we urge FEMA as a whole to enhance efforts related to communicating the risks associated with sea level rise. As stated above, it is critical that communities begin planning and adapting to sea level rise. The NFIP CRS and FEMA hazard mitigation assistance programs in particular are well designed to ensure that communities have the resources to more proactively address sea level rise, and we encourage FEMA to help local jurisdictions address sea level rise impacts through these and other programs.

With regards to the Draft NPEIS alternatives and mechanisms to ensure compliance with Endangered Species Act (ESA), as stated above, the Coastal Act requires that development in the coastal zone be protective of environmentally sensitive habitat areas, including habitat for rare, threatened and endangered species. Where these areas may occur in floodplains, Commission staff notes that proposals for new development must demonstrate that environmentally sensitive habitats and resources are protected. Therefore, Commission staff encourages FEMA to provide adequate information in implementation of the NFIP program that allows for local communities to make well-informed land use decisions based on both the hazard risk of flooding and the impacts that development in a floodplain may have on environmentally sensitive resources.

Again, thank you for the opportunity to comment. Coastal Commission staff is available to discuss these comments.

Sincerely,

Michelle Jesperson
Federal Programs Manager
California Coastal Commission



CALIFORNIA FARM BUREAU FEDERATION

OFFICE OF THE GENERAL COUNSEL

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May 31, 2017

Via eRulemaking Portal
www.regulations.gov

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW.
Washington, DC 20472.

Re: Request to Extend Comment Period for Docket ID FEMA-2012-0012

Dear Mr. Fenton:

The California Farm Bureau Federation (Farm Bureau) respectfully requests an extension the public comment period for the Federal Emergency Management Agency (FEMA) draft nationwide programmatic environmental impact statement (NPEIS) evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program (NFIP) of at least 120 days. The 60-day comment period was not sufficient to allow for adequate review.

Farm Bureau is a non-governmental, non-profit, voluntary membership California corporation whose purpose is to protect and promote agricultural interests throughout the state of California and to find solutions to the problems of the farm, the farm home, and the rural community. Farm Bureau is California's largest farm organization, comprised of 53 county Farm Bureaus currently representing more than 48,000 agricultural, associate, and collegiate members in 56 counties. Farm Bureau strives to protect and improve the ability of farmers and ranchers engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of California's resources. For the reasons listed below, we believe it is important for the comment period to be extended.

The NPEIS proposes significant changes to the NFIP related to both a) implementation of recent statutory changes and b) demonstration of compliance with the Endangered Species Act (ESA). The implications of these changes for agriculture, particularly those related to compliance with the ESA, are very complicated and require more time for adequate analysis by Farm Bureau and other stakeholders. The proposed alternative will impose significant costs on local jurisdictions and have significant impacts to agriculture which we have not been able to fully analyze.

NFIP Reauthorization

In addition to the need for sufficient time for stakeholder review, FEMA may consider withholding any action on proposed changes to the NFIP because the program is set for reauthorization this year. At a minimum the comment period should be extended for 120 days, which would provide sufficient time for Congress to act, should it choose to do so, on reauthorization, and thereby allow comments to reflect those changes.

ESA Compliance

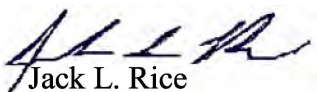
The most significant topic for agriculture that requires further time for proper analysis is ESA compliance. While the NPEIS properly explains that FEMA has no land use authority, the approach in the preferred alternative of clarifying that a community must comply with the ESA locally may expand the local community's obligations under the ESA beyond what would exist without this "clarification."

Regulations Should Clarify that Discretion be Limited to Risk Assessment

Another concept that requires additional time for development as an alternative is how FEMA might clarify that its discretion is limited to assessing risk of property damage due to flooding. This type of approach would avoid expanding the costs to local communities beyond mitigating the insurable risks associated with flooding.

Thank you for considering Farm Bureau's comments. Please contact Jack Rice with any questions at jrice@cfbf.com or (916) 561-5667.

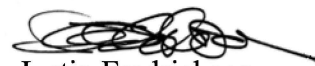
Very truly yours,



Jack L. Rice
Associate Counsel



Erin Huston
Federal Policy Consultant



Justin Fredrickson
Environmental Policy Analyst

cc:



Comments submitted electronically via <http://www.regulations.gov>

June 6, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel, FEMA
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Washington, DC 20472-3100

Re: Comments on the Federal Emergency Management Agency's Draft Programmatic Environmental Impact Statement on the National Flood Insurance Program [Docket ID FEMA-2012-0012]

On behalf of the Center for Biological Diversity ("Center"), we thank you for the opportunity to provide comments on the Federal Emergency Management Agency's ("FEMA") draft Programmatic Environmental Impact Statement ("PEIS") evaluating the impacts of the National Flood Insurance Program ("NFIP" or "Program") on the quality of the human environment as it is currently implemented, and regarding potential future changes to the Program. The Center is a national, nonprofit organization whose mission is to protect and restore endangered species and wild places through science, policy, education, advocacy, and law. The Center has over 1.3 million members and on-line activists, many of whom are affected by the implementation of the NFIP.

Congress has delegated FEMA the authority to develop comprehensive criteria for land use and management that constricts development of land exposed to flood risk, guides development away from lands threatened by flood hazards, assists in reducing damage caused by floods, and improves the long-range land management and use of flood prone areas. Part of this process can be achieved by a community's voluntary participating in the NFIP, adopting land use and control measures to obtain lower cost flood insurance.¹ An overarching purpose of the NFIP is to keep development out of flood prone areas; however, this goal has yet to be achieved.

The purpose of the proposed modification to the NFIP is to implement legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 ("BW-12") and the Homeowner Flood Insurance Affordability Act of 2014 ("HFIAA"), and to come into compliance with the Endangered Species Act ("ESA"). Since Congress established the NFIP, flooding has only

¹ 42 U.S.C. § 4012(a).

become more common and more expensive. In order for the NFIP to continue to function fiscally and reasonably, there must be a new structure that reflects the actual effects of flooding, both monetarily and environmentally.²

BW-12 requires that FEMA phase out subsidies for certain pre-FIRM (“flood insurance rate map”) properties, establish a Reserve Fund, and create a Technical Mapping Advisory Council (“TMAC”) to develop recommendations (the “TMAC Report”) for FEMA’s flood mapping program.³ The phase out of subsidies requirement is applicable to properties that are a non-primary residence, business, substantially improved or damaged, or those in which the payout exceeds the fair market value. These premium rates must be increased by 25% each year until the risk rate is met.⁴ In addition to implementing BW-12, FEMA must come into compliance with the ESA in its implementation of the NFIP.

HFIAA repeals and modifies certain provisions of BW-12. HFIAA also makes program changes that are not covered by BW-12. HFIAA removes some of the BW-12 provisions that require a phase out of subsidies on pre-FIRM properties; requires the application of full risk rates to policies renewed after a lapse, excluding certain policies; requires a phase out of subsidies on all pre-FIRM properties at a rate of no less than 5% but not more than 15% per year, subject to exceptions established by statutes including BW-12; and at a quicker phase out for certain pre-FIRM properties, with all to be phased out within 15 to 20 years. HFIAA implements a new surcharge for all new and renewed policies to be assessed at \$25 for primary residences and \$250 for all other policies, with all funds from the surcharge being deposited into the Reserve Fund discussed in BW-12. Under HFIAA, FEMA is to set premium rates for newly-mapped Special Flood Hazard Area (“SFHA”) properties at the same rate as Preferred Risk Policies.⁵

Although, as discussed below, many improvements to the PEIS are necessary to bring it into compliance with NEPA, the Center generally supports FEMA’s Alternative 3 (legislatively required changes, proposed ESA regulatory changes, and Letter of Map Change (“LOMC”) clarification), provided that FEMA also:

- (1) Incorporates any ESA-required Reasonable and Prudent Measures (“RPMs”) or Reasonable and Prudent Alternatives (“RPAs”) that result from ESA Section 7 consultation with the U.S. Fish and Wildlife Service (“FWS”) or National Marine Fisheries Service (“NMFS”) (collectively “Services”); and
- (2) Adds ESA regulatory changes (at 44 C.F.E. 60.3) stating that:

² Draft National Programmatic Environmental Impact Statement, FEMA-2012-0012-0047 (April 7, 2017), *hereinafter* Draft PEIS.

³ Draft PEIS at 2-1, 2-2.

⁴ *Id.* at 2-2.

⁵ Draft PEIS at 1-4.

- a. FEMA retains discretionary control such that ESA compliance at the community level shall proceed via Section 7 consultation with FEMA; and
- b. SFHA property owners who elevate properties must still comply with 44 C.F.R. 60.3's ESA regulations.

Our support for Alternative 3 is also contingent upon FEMA complying with federal laws that require it take into account climate change and sea level rise and that it use the best available science. For example, as discussed below, we urge FEMA to incorporate sea level rise and climate change impacts into flood map revisions going forward, rather than continuing to ignore those impacts in making those revision decisions.

I. The Draft PEIS does not comply with the National Environmental Policy Act

The purpose of the National Environmental Policy Act ("NEPA") is "[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation." "[I]t is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."⁶

NEPA requires federal agencies to take into consideration environmental consequences of proposed actions and consider the impacts of those choices. The goal of NEPA is to ensure that an "agency will not act on incomplete information only to regret its decision after it is too late to correct."⁷ When preparing environmental impact statements, agencies have an affirmative duty to obtain the information necessary to evaluate significant environmental impacts when obtaining such information is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant."⁸

⁶ 42 U.S.C. § 4321.

⁷ *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1990).

⁸ 40 C.F.R. § 1502.22.

A. FEMA’s alternatives analysis fails to offer alternatives that will bring the agency into compliance with applicable federal laws

As the Draft PEIS explains, NEPA “requires that any agency proposing a major Federal action . . . must consider a range of reasonable alternatives.”⁹ Recognizing that “[i]dentifying and analyzing alternatives is an essential part of the NEPA decision-making process,” the Draft PEIS explains that any “reasonable” alternative “warrant[s] detailed evaluation.”¹⁰

In selecting an alternative, FEMA must consider a no action alternative; other reasonable courses of action; and mitigation measures not otherwise analyzed in the proposed action.¹¹ The agency must not only identify and study reasonable alternatives on its own initiative, but also analyze and consider significant alternatives that are submitted by other agencies, organizations, communities, and members of the public.¹² Reasonable alternatives to the proposed action are those that meet the agency’s purpose and need.¹³ The purpose for this decision making on changes to the NFIP is to implement the legislative requirements of the BW-12 and HFIAA and to demonstrate compliance with the ESA. Therefore, the alternatives must provide a means to incorporate climate change impacts into flood map revisions and any reasonable and prudent measures or reasonable and prudent alternatives that result from Section 7 consultation.

1. FEMA must offer an alternative in which climate change impacts and sea level rise are incorporated into flood map revisions

FEMA has refused to include an alternative incorporating climate change and sea level rise (“SLR”) into flood map revisions based on the false premise that the TMAC Report concluded that it would be inappropriate to do so. In our scoping comments on the PEIS we urged FEMA to fully consider an alternative in which the scientific consensus regarding climate change and its impacts are incorporated into FEMA flood map revisions.¹⁴ Rather than follow that recommendation, in the Draft PEIS FEMA identifies “incorporating climate change in flood maps” as an alternative “considered *but not carried forward*.”¹⁵ The Draft PEIS states that, although FEMA “considered modifications related to climate change,” it decided not to explore this alternative in light of recommendations from the TMAC.¹⁶

⁹ Draft PEIS at 2-1.

¹⁰ *Id.*; see also 40 C.F.R. §1502.14 (explaining that the consideration of alternatives is “the heart of the environmental impact statement”); *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228-29 (9th Cir. 1988) (“[C]onsideration of alternatives is critical to the goals of NEPA”).

¹¹ *Id.*

¹² *Id.* at 4.

¹³ *Id.*

¹⁴ See Center’s July 16, 2012 comments (*hereinafter* , Center Comments) at 5.

¹⁵ Draft PEIS at 2-13 – 2-16 (emphasis added).

¹⁶ *Id.*

According to the Draft PEIS, the TMAC concluded that “there is not sufficient, actionable science for addressing climate change impacts to watershed hydrology and hydraulics,” and, on that basis, “it would be inappropriate for FEMA to make regulatory changes to its national program that would require the mapping of climate change.”¹⁷ As discussed below, contrary to this conclusion, neither TMAC Report, nor the Draft PEIS, supports the agency’s refusal to fully and fairly develop an alternative incorporating climate change and SLR into flood map revisions for coastal and inland areas. Accordingly, in the Final PEIS FEMA must fully explore this alternative in *all* areas covered by the flood insurance program, *all* of which will continue to be concretely and adversely affected by climate change and sea level rise.

a. Statutory framework

The National Flood Insurance Act directs FEMA to “identify and publish information with respect to all flood plain areas, including coastal areas located in the United States, which has special flood hazards,”¹⁸ and directs that at least once every five years, “or more often as the Administrator determines necessary, the Administrator shall assess the need to revise and update” the flood maps “based on an analysis of all natural hazards affecting flood risks.”¹⁹ A special flood hazard area or SFHA is defined as “the land within the flood plain within a community subject to a 1 percent or greater chance of flooding in a given year.”²⁰ FEMA puts data regarding the locations of SFHA and regulatory floodways on Flood Insurance Rate Maps (“FIRMs”). The FIRMs then provide the basis both for the requirement that a developer obtain flood insurance as well as the calculation of the actual flood insurance rate for any new construction.

BW-12 established the TMAC – an advisory committee of government and non-governmental members – and directed the TMAC to make recommendations concerning, *inter alia*, (1) the “accuracy [and] general quality . . . of flood insurance rate maps and risk data”; (2) “performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States”; and (3) “guidelines for (A) flood insurance rate maps; and (B) data accuracy, data quality, data currency, and data eligibility.”²¹ In addition, of particular relevance here, Congress directed the TMAC:

consult with scientists and technical experts, other Federal agencies, States, and local communities to (A) develop recommendations on how to (i) ensure that flood insurance rate maps incorporate the *best available climate science to assess flood risks*; and (ii) ensure that the Federal Emergency Management Agency uses

¹⁷ *Id.* at 2-16.

¹⁸ 42 U.S.C. § 4101(a).

¹⁹ *Id.* § 4101(e).

²⁰ 44 C.F.R. § 59.1.

²¹ 42 U.S.C. § 4101a.

the best available methodology to consider the impact of (I) *the rise in the sea level*; and (II) future development on flood risk; and (B) not later than 1 year after the date of enactment of this Act, prepare written recommendations in a future conditions risk assessment and modeling report and to submit such recommendations to the Administrator.²²

Congress further directed that FEMA “shall incorporate” these recommendations into its update and revisions of the NFIP,²³ and report annually to Congress on its recommendations and FEMA actions to address those recommendations.²⁴ BW-12 also directed FEMA to “review, update, and maintain” its rate maps by including, *inter alia*, “any relevant information or data of the National Oceanic and Atmospheric Administration and the United States Geological Survey relating to *the best available science regarding future changes in sea levels, precipitation, and intensity of hurricanes . . .*.”²⁵

b. The TMAC Report supports fully analyzing an alternative incorporating climate change and sea level rise

In December, 2015 TMAC issued its BW-12 recommendations regarding issues to consider in flood map revisions.²⁶ The Report explains that, to date, “FEMA does not consider SLR in a prospective manner (future conditions) in flood hazard mapping,” but rather only “in a retrospective manner.”²⁷ In particular, the Report details that “[w]ithin the context of the NFIP, both SLR and long-term erosion have been politically controversial,” and that “[i]t wasn’t until passage of [BW-12] that FEMA was *authorized to incorporate SLR and long-term coastal erosion into flood mapping*.” TMAC Rep. at 2-12 (emphasis added).²⁸

Recognizing that, “flood damages are increasing due to sea level changes [and] changing climatological patterns,” while most maps “are a snapshot in time, showing only the *current* flood risk,” the TMAC began its report with the laudable goal of providing recommendations “intended to counsel FEMA on the utilization and incorporation of *best available climate science and methodology* to assess possible future flood risk.”²⁹

²² *Id.* at § 4101a(d)(1)(A) (emphasis added).

²³ *Id.* at § 4101a(d)(1)(b).

²⁴ *Id.* at § 4101a(l).

²⁵ *Id.* at § 4101b (emphasis added).

²⁶ TMAC Future Conditions Risk Assessment And Modeling Report (TMAC Report) (Dec. 2015).

²⁷ TMAC Report at 2-10.

²⁸ Although we do not agree that FEMA lacked this authority prior to BW-12, for present purposes that it is irrelevant since it is now absolutely clear that FEMA has such authority; TMAC Rep. at 2-12 (emphasis added).

²⁹ *Id.* at 1 (emphasis added); *id.* at 2 (summarizing TMAC’s mandate to “develop recommendations for incorporating the best available climate science in flood insurance studies and maps and using the best available methodology when considering the impacts of sea level rise and future development on flood risk.”).

The TMAC Report frankly acknowledges the overwhelming scientific consensus regarding climate change, stating that the Third National Climate Assessment “was very clear in stating that the climate is changing, will continue to change for the foreseeable future, and may accelerate in the future if global greenhouse gas emissions continue.”³⁰

The Report also recognizes that climate change leads to SLR, stating that “[r]ecords from various sources show that there has been a long-term trend in rising global sea levels, with an increasing rate of change since the 1800’s,” and noting that NOAA’s “tide gauges, which measure local relative sea level, and also report on current trends,” show that “SLRs are increasing.”³¹ The Report further summarizes SLR modeling, concluding they “suggest a range of additional SLR from about 2 feet to as much as 6 feet by 2100, depending on the emissions scenario,” and that, even if the modeling is not entirely accurate, “SLR is expected to continue well beyond this century as a result of both past and future emissions from human activities.”³²

The TMAC Report also summarizes the 2013 AECOM Report, *Impact of Climate Change and Population Growth on the National Flood Insurance Program*, which considered the impacts of climate change on the NFIP. As the TMAC Report explains, the 2013 AECOM Report found, *inter alia*:

- By 2100, the 1-percent-annual-chance flood depth and flood hazard areas are expected to increase on average by about 45 percent in riverine areas.
- In the populated areas of most interest to the NFIP, about 30 percent may be attributed to increased runoff caused by growth of impervious land area caused by population growth/development, while the remaining 70 percent represents the influence of climate change.
- By 2100, coastal SFHAs may increase anywhere from zero percent to 55 percent depending on type and scale of shore protection measures.
- By 2100, the total number of NFIP insurance policies is likely to increase by approximately 80 percent to 100 percent, with 70 percent of this increase attributable to growth of floodplains caused by climate change and 30 percent attributable to population growth.
- Individual premiums per policy are projected to increase by 10 percent to 70 percent in 2010 dollars by 2100 in order to offset the projected increase in flood losses.³³

³⁰ TMAC Rep. at 3-23; *see also id.* (“These changes are evident in many places, and are becoming increasingly disruptive.”).

³¹ *Id.* at 3-24.

³² *Id.* at 3-30; *see also id.* (“in general, higher emissions scenarios that lead to more warming would be expected to lead to higher amounts of SLR.”).

³³ *See* TMAC Rep. at 2-16.

In light of these findings, Recommendation Three of the TMAC Report calls on FEMA to “[p]rovide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise.”³⁴ One of the sub-recommendations under Recommendation Three calls on FEMA to rely on the 2012 NOAA Technical Report “Global Sea Level Rise Scenarios for the United States National Climate Assessment,” or “similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level)” in order “to determine future coastal flood hazard estimates.”³⁵ The Report explains that FEMA should consult with other agencies “to provide a set of regional sea-level rise scenarios, based on [the 2012 NOAA Report] scenarios, for the coastal regions of the U.S. out to the year 2100 that can be used for future coastal flood hazard estimation.”³⁶ Based on those estimates, the TMAC Report recommends that “[c]ommunities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.”³⁷

With respect to riverine flood hazards, the TMAC Report recommends that FEMA “[p]rovide future conditions flood risk products and information for riverine areas that include the impacts of: future development, land use change, erosion, and climate change, as actionable science becomes available.”³⁸ The TMAC Report purports to find that “[a]ctionable science supporting the future impacts of climate change on hydrology is still evolving.”³⁹ Based on this premise, the TMAC Report determines that “at the current time, available and actionable science does not support the development of a *single, nationwide method for determining future riverine flood risk* boundaries based on projected future changes to the watershed due to geomorphological or climate changes.”⁴⁰

However, the TMAC Report qualifies its determination regarding the appropriateness of “a single, nationwide method” by encouraging FEMA to develop regional methods for determining riverine flood risk boundaries, based on demonstration projects: “Therefore, as outlined in Recommendations 6 and 7, FEMA should build on the current science, support research and innovation, and inform the process with best practices and lessons learned from demonstration projects and information.”⁴¹ The TMAC makes a number of recommendations on how FEMA can develop regional approaches to mapping riverine flood risk by providing a decision process

³⁴ *Id.* at 10 (Recommendation 3).

³⁵ TMAC Report at 11.

³⁶ *Id.*; *see id.* at 25 (“Future flood hazard calculation and mapping methods and standards should be updated periodically as we learn more through observations and modeling of land surface and climate change, and as actionable science evolves.”).

³⁷ *Id.*; *see also id.* at 5-16.

³⁸ *Id.* at 16, Recommendation 4.

³⁹ *Id.* at 5-45.

⁴⁰ *Id.* at 19 (emphasis added).

⁴¹ *Id.* at 19.

flowchart for calculating future flood risk based on climate-informed science,⁴² and suggesting interim science-based approaches: “interim efforts to incorporate climate change impacts in flood risk products and information should be based on existing methods, informed by historical trends, and incorporate uncertainty based upon sensitivity analyses” and “[w]here sufficient data and knowledge exist, incorporate future riverine erosion (channel migration) into flood risk products and information.”⁴³

As for the Great Lakes, the Report recommends that FEMA “[p]rovide flood hazard products and information for coastal and Great Lakes areas that include the future effects of long-term erosion and sea/lake level rise.”⁴⁴

In our July, 2012 Scoping Comments we explained that FEMA must consider an alternative in which climate change impacts in general, and SLR in particular, are incorporated into FEMA flood map revisions. As we explained:

The effects of climate change including sea level rise, increased storms, storm surge, and flooding activity threaten coastal ecosystems. In the coming decades, our shorelines will continue to change – through these natural systems and through human-made response to these changes – and these changes will impact coastal species. FEMA must use the best available science in anticipating these changes and mapping areas that will be increasingly vulnerable to flood damage.⁴⁵

As we also explained, the best available science indicates that higher rates of global sea level rise of 1 to 2 meters by 2100 are likely, rather than the more modest SLR predictions discussed in the TMAC Report, and larger rates are possible.⁴⁶ Similarly, we explained that climate change is leading to increased severe weather and flooding.⁴⁷

As noted above, the TMAC Report recognizes some of the threats from climate change, including SLR, even if it underestimates the risks. It also properly recommends that FEMA rely on SLR scenarios in making flood hazard estimates for coastal areas and the Great Lakes. The Report further recommends regional approaches for incorporating climate change into maps of riverine flood risk boundaries.. Accordingly, FEMA has no basis to rely on the TMAC Report as a reason not to include an alternative incorporating climate change and SLR into flood mapping.

⁴² *Id.* at 5-47, Figure 5-38.

⁴³ *Id.* at 16.

⁴⁴ *Id.* at 10 (Recommendation 3).

⁴⁵ Center Comments at 5.

⁴⁶ *Id.* at 6.

⁴⁷ *Id.* at 7.

However, after referring to the TMAC conclusion that “there is not sufficient, actionable science for addressing climate change impacts to watershed hydrology and hydraulics,” the Draft PEIS states that it would be “inappropriate for FEMA to make regulatory changes to its national program that would require the mapping of climate change without sufficient, actionable science and mapping methodologies to implement these changes and deliver consistent, credible results.”⁴⁸ The Draft PEIS continues:

FEMA is not currently positioned to be an authoritative body to establish actionable science and mapping methodologies to implement changes to its flood hazard mapping to incorporate climate change into its flood maps. FEMA currently relies on consensus from the scientific and engineering communities for the standards and methodologies to carry out the mapping program. Once such standards and mapping methodologies have been developed by an authoritative body and accepted by the scientific community, and once additional input is provided by the NFIP stakeholders, such as the TMAC, FEMA will be better positioned to implement changes to the mapping program to incorporate climate change into its flood maps.⁴⁹

This rationale fails on multiple levels. First and foremost, contrary to what the Draft PEIS suggests, the TMAC Report does not find a lack of “actionable science” to incorporating climate change and SLR into FEMA flood map revisions. To the contrary, as noted, the TMAC report – relying on other studies – details the firm science on both climate change and SLR, and recommends that FEMA incorporate that science into its decision-making. In particular, one of the Report’s specific “short-term” recommendations is that:

FEMA should use [published studies], adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) *to determine future coastal flood hazard estimates*.⁵⁰

The Report also specifically recommends that “[f]uture flood hazard calculation and mapping methods and standards should be updated periodically as we learn more through observations and modeling of land surface and climate change and as actionable science evolves.”⁵¹

This conclusion is consistent with an earlier FEMA study also relied on in the Draft PEIS, *The Impact of Climate Change and Population Growth On The National Flood Insurance Program Through 2100*.⁵² As that study concluded, climate change and SLR will have concrete impacts on flood hazard risks and the location of SFHAs, information which there is no reason to ignore in

⁴⁸ Draft PEIS at 2-16.

⁴⁹ *Id.*

⁵⁰ TMAC Report at 11.

⁵¹ *Id.* at 25.

⁵² 2013 AECOM Report.

considering Draft PEIS alternatives.⁵³ Therefore, FEMA cannot hide behind the TMAC Report as an excuse to avoid considering an alternative whereby climate change and SLR is incorporated into flood map revisions for coastal areas.

Second, as the 2015 TMAC Report found, and as additional scientific developments since that time have only further confirmed, there is more than sufficient “actionable science” for FEMA to at least consider an alternative whereby climate change and SLR are affirmatively incorporated into the flood mapping revisions process.

Contrary to the Draft PEIS’s assertion, scientific research advances in modeling climate change impacts on riverine systems on a national and regional scale are more than sufficient to allow FEMA to incorporate climate change into flood map revisions for these systems.⁵⁴ As the 2003 AECOM Report recognized, climate change will have significant impacts on riverine areas, finding that climate change will be responsible for almost a third of the increased growth “in the 1% annual chance floodplain.”⁵⁵

In addition to the information detailed in the TMAC Report, as detailed in these comments, there is a large body of scientific research on observed and projected coastal and inland flooding risks from climate change that can inform the robust incorporation of climate change and SLR into flood map revisions.

Finally, even if one were to erroneously assume that FEMA presently lacked sufficient information to decide precisely how to incorporate climate change and SLR into flood map revisions, the agency’s refusal to include an alternative addressing this issue fundamentally misapprehends the purpose of the NEPA process, which is precisely to allow the agency to examine an issue and consider whether and how to proceed going forward. Put simply, it predetermines the NEPA process for FEMA to announce, without even having included such an alternative, that it is unable to do so.⁵⁶

⁵³ *E.g. id.* at 5-12 (table showing “growth in Special Flood Hazard Area due to climate change and population”).

⁵⁴ See for example, recent studies: Berghuijs, W.R. et al. 2016. Dominant flood generating mechanisms across the United States. *Geophysical Research Letters* 43: 4382–4390; Mallakpour, I. and G. Villarini. 2015. The changing nature of flooding across the central United States. *Nature Climate Change* 5: 250-254; Naz, B.S. et al. 2016. Regional hydrologic response to climate change in the conterminous United States using high-resolution hydroclimate simulation. *Global and Planetary Change* 143: 100-117; Safeeq, M. et al. 2015. Predicting landscape sensitivity to present and future floods in the Pacific Northwest, USA. *Hydrological Processes* 29: 5337-5353; Slater, L. J. and G. Villarini. 2016. Recent trends in U.S. flood risk. *Geophysical Research Letters* 43: 12,428–12,436; Stewart, I.T. et al. 2015. 21st century increases in the likelihood of extreme hydrologic conditions for the mountainous basins of the Southwestern United States. *Journal of Hydrology* 529: 340-353; Stone, M.H. and S. Cohen. 2017. The influence of an extended Atlantic hurricane season on inland flooding potential in the southeastern United States. *Natural Hazards Earth Systems Science* 17: 439-447.

⁵⁵ AECOM Report at ES-7.

⁵⁶ The CEQ Guidance On Considering Climate Change in NEPA Reviews recognized this specific NEPA obligation, explaining that in preparing NEPA documents “agencies should take into account increased risks

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Indeed, NEPA contemplates an agency considering an alternative may have to *collect* data necessary to examine alternatives. Thus, the CEQ regulations provide that where an agency:

is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information [that is] essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency *shall include the information in the environmental impact statement*.⁵⁷

Moreover, even where the costs are exorbitant, the agency still must evaluate the alternative, by including “a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment [and] the agency’s evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.”⁵⁸

Nor can FEMA assert that this alternative is not central to the purposes of the PEIS. One of the express purposes of the PEIS is to carry out “the legislative requirements” of BW-12.⁵⁹ That statute, in turn, specifically directs FEMA to “review, update and maintain” its rate maps by relying on “the best available science regarding future changes in sea levels, precipitation, and intensity of hurricanes.”⁶⁰ It also directs that FEMA “shall incorporate” the TMAC’s recommendations concerning “the best available science to assess flood risks” and “the best available methodology to consider the impact of” SLR,⁶¹ recommendations that include calling on FEMA to incorporate climate change and SLR data into “future coastal flood hazard estimates.”⁶² Accordingly, it could not be clearer that FEMA must include such an alternative to carry out the PEIS’s stated purposes, and a purported lack of “actionable science” cannot serve as a basis for not doing so.

associated with development in floodplains ” from climate change. CEQ Guidance at 23; *see also id.* at 24 (“Climate change effects on the environment and on the proposed project should be considered in the analysis of a project considered vulnerable to the effects of climate change such as increasing sea level, drought, high intensity precipitation events, increased fire risk, or ecological change. In such cases, a NEPA review will provide relevant information that agencies can use to consider in the initial project design, as well as alternatives with preferable overall environmental outcomes and improved resilience to climate impacts”).

⁵⁷ 40 C.F.R. §1502.22; *see, e.g., Or. Env’tl. Council v. Kunzman*, 817 F.2d 484, 495 (9th Cir. 1987) (NEPA “imposes a duty on federal agencies to gather information and do independent research when missing information is important, significant, or essential to a reasoned choice among alternatives.”).

⁵⁸ 40 C.F.R. §1502.22(b).

⁵⁹ Draft PEIS at 1-5.

⁶⁰ 42 U.S.C. § 4101b.

⁶¹ *Id.* § 4101a(d)(1)(A).

⁶² TMAC Report at 11.

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In examining this alternative, however, we caution that we do not concur with the TMAC Report's recommendation that communities have complete discretion to decide whether, or how, SLR and climate change impacts are incorporated into mapping based on their "risk tolerance."⁶³ At a minimum, flood risk mapping should consistently use the most scientifically up-to-date and robust SLR and climate change scenarios available that capture the full range of risk, including high greenhouse gas emissions scenarios (e.g., the IPCC RCP 8.5 scenario) and high and extreme SLR scenarios (e.g., 2.0 and 2.5 meters of SLR by 2100 included the 2017 inter-agency Technical Report on SLR⁶⁴). Development decisions made by communities based on the flood risk mapping will be long-lived, with most infrastructure design lifetimes intended to last for many decades. Therefore, the flood risk mapping must include SLR and climate change scenarios that encompass an appropriate time frame (i.e., through at least 2100) and that represent the plausible range of conditions that the infrastructure will experience over its design lifetime, including higher impact climate change scenarios.

2. *FEMA must integrate any reasonable and prudent measures or reasonable and prudent alternatives that result from Section 7 of the Endangered Species Act consultation with the FWS or NMFS in the selected alternative*

In the draft PEIS, FEMA states that the current NFIP is in compliance with the ESA.⁶⁵ However, the agency fails to provide robust reasoning for this, and instead makes the unsupported assertion that both the no action alternative (the current NFIP) and the preferred alternative will have "no effect" on the significance criteria of "caus[ing] jeopardy for ESA listed and or other special status species."⁶⁶

The only reasoning FEMA provides for this conclusion is the repeated defensive argument that the NFIP does not include floodplain development, and thus actions of floodplain development are not subject to ESA Section 7 consultation:

As stated above, private floodplain development is not FEMA's action, in that FEMA does not authorize, fund, or carry out private floodplain development (except pursuant to the grants programs, which are not within the scope of this NPEIS). *Because private floodplain development is not FEMA's action, Section 7 would be inapplicable to these actions.* As such, FEMA uses Sections 9 and 10 of the ESA as the authority for requiring participating communities to ensure that

⁶³ TMAC Report at 25; *see also id.* at 5-16 (suggesting that each "coastal community could determine which SLR scenarios to use in future conditions mapping . . . based on a community's risk tolerance and desired future planning horizons (2020, 2050, and 2100)").

⁶⁴ Sweet, W.V. et al. 2017. Global and Regional Sea Level Rise Scenarios for the United States. National Oceanic and Atmospheric Administration, Silver Spring, Maryland, January 2017.

⁶⁵ Draft PEIS at 1-5.

⁶⁶ See Table 4-16, at Draft PEIS at 4-108.

project proponents have assessed, and appropriately addressed, any adverse effects of development in the SFHA on ESA-listed species and designated critical habitat, thereby ensuring there is no "take" in violation of Section 9 of the ESA.⁶⁷

In addition, FEMA asserts:

Floodplain development itself is not an action under the NFIP, and FEMA does not control the rate or quantity of development in floodplains or the effects those development activities may have on ESA species, designated critical habitats, or EFH. The ESA implementing regulations define indirect effects as those that are "caused by the Proposed Action and are later in time, but are still reasonably certain to occur" (50 C.F.R. § 402.02). The NFIP does not cause development to occur, nor does it play a significant role in facilitating or encouraging floodplain nor does it play a significant role in facilitating or encouraging floodplain development. *As such, the No Action Alternative would have no effect on ESA-listed or other special status species, and NFIP actions would have no effect on a jeopardy decision under the ESA.*⁶⁸

In an exercise of punting ESA compliance to state and local authorities, FEMA declares that "Section 60.3(a)(2) of the NFIP requires that Floodplain Management Administrators review proposed development to assure that all necessary permits have been received from the governmental agencies from which approval is required by Federal or State law. This assertion of authority would include permits required pursuant to the ESA and CWA, among other laws and regulations that are pertinent to biological resources,"⁶⁹ thus again pointing the responsibility of ESA compliance with State and local authorities.

Further, FEMA also excuses itself from ESA compliance due to the fact that the EIS is programmatic. FEMA states that "[b]ecause this is a programmatic evaluation, site- and species-specific issues associated with individual projects or the effects of the Preferred Alternative when combined with future actions that may be taken by other Federal agencies are not assessed in detail."⁷⁰

With respect to the preferred alternative, FEMA states that because "FEMA does not authorize, fund, or carry out floodplain development. . . .[,] any potential effects of the Proposed Action *would necessarily be indirect.*"⁷¹ "If the legislatively required aspects of Alternative 2 were to have an effect on development decisions, it could result in indirect effects to biological

⁶⁷ Draft PEIS at 3-113—3-114.

⁶⁸ *Id.* at 4-109 – 4-110.

⁶⁹ *Id.* at 4-109.

⁷⁰ *Id.* at 4-1.

⁷¹ *Id.* at 4-109.

resources.”⁷² The draft PEIS goes onto to say that the Preferred Alternative “will have no impacts on biological resources, including ESA-listed and special status species, *beyond those associated with implementation of the No Action Alternative.*”⁷³ In sum, its position is that any impacts that the NFIP in its current form or as the Proposed Action would be indirect.

In analyzing the alternatives in the PEIS, there are potential direct and indirect impacts each alternative would have on the affected environment. Direct effects are caused by the action and occur at the same time and place; indirect effects are caused by the action later in time but are still reasonably foreseeable. Indirect effects include “growth inducing effects and other effects related to induced changes in land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”⁷⁴ FEMA claims that because it does not fund, authorize, or carry out floodplain development with the implementation of the NFIP, it does not play a significant role in facilitating or encouraging floodplain development. It further claims that any evidence to the contrary is merely anecdotal.⁷⁵

However, it is beyond dispute that NFIP incentivizes habitat destruction. FEMA identifies maps and flood hazards for the purpose of providing insurance to those policyholders with structures in the SFHAs. FEMA allows landowners to remove their flood-prone lands from regulated special flood hazard areas by filling-in the floodplain above the base flood elevation. By filling in those floodplains, landowners are able to escape the FEMA’s development regulations. FEMA must strengthen restrictions in floodways to inhibit development, prohibit fill in floodplains, and account for the impacts of floodplain development on the natural and beneficial functions of floodplains to include endangered and threatened species.

Further, FEMA argues that the availability of NFIP flood insurance does not influence the development of floodplains based on findings from two studies. The first study is a 1982 U.S. Government Accountability Office (“GAO”) study that concluded, based on interviews with 115 people, that flood insurance cannot be attributed to the increase in housing development.⁷⁶ In the second study, the American Institute for Research in 2006 found that floodplain development is a result of both State and local government incentives and market forces.⁷⁷ However, while the NFIP was intended to discourage development in flood-prone areas, Congress and the Department of the Interior have found that the availability of federal flood insurance is often the determining factor in development of flood prone areas.⁷⁸

⁷² *Id.* at 4-112.

⁷³ *Id.* at 4-113.

⁷⁴ 44 CFR § 60.3(a)(2).

⁷⁵ Draft PEIS at 4-4.

⁷⁶ Draft PEIS at 4-6.

⁷⁷ Draft PEIS at 4-6, 4-7.

⁷⁸ See Coastal Barrier Resources System Report, DOI 1988, and 42 U.S.C. § 4002.

As global sea level is projected to rise by 1 to 2 meters within this century, and storm surge only exacerbating the sea level rise, many coastal species will face habitat loss and be forced upland. These species are facing being trapped between the rising seas and areas of human development. Human development has removed their chance to flee the rising coast in shelter of upland habitat. FEMA must work with FWS and NMFS to identify the upland areas that will become important habitat for the landward migration of these imperiled species as the coasts are inundated by sea level rise and intensified storm surge resulting from climate change. FEMA has an obligation to refrain from taking or funding actions that are likely to “destroy or adversely modify” species habitat. Once these upland habitat areas are identified, FEMA must not provide flood insurance for new development as to not fatally impact listed species. This evidence of sea level rise and storm surge resulting in the loss of critical habitat and affecting ESA-listed species is beyond anecdotal. Allowing the continued development of floodplain areas further increases the chance that listed species will be significantly affected, an indirect consequence of not strengthening restrictions on floodplain development. Contrary to FEMA’s assumptions, the NFIP need not develop land itself; allowing landowners to easily degrade the coastal habitats is enough to show the link between the NFIP and danger to the listed species and critical habitats.

B. The Draft PEIS fails to meaningfully address the impacts of the NFIP on climate change, and the effects of climate change on the NFIP

The Draft PEIS says very little about climate change. Although it contains several pages discussing the impacts of climate change generally,⁷⁹ it concludes that the NFIP has *no* impact on greenhouse gas (“GHG”) emissions and *no* impact on climate change.⁸⁰ The Draft PEIS must include a robust discussion of climate change as part of the affected environment, must recognize and explore the contribution of the NFIP to climate change, and must meaningfully evaluate mitigation measures to ameliorate those impacts.

Section 3.13 of the Draft PEIS addresses the current state of climate change science.⁸¹ The discussion begins with FEMA recognizing the link between increasing GHG emissions by human activities and climate change.⁸² FEMA notes that atmospheric concentrations of GHG have increased from 280 ppm in 1750 to 399 ppm in 2014. *Id.* It also explains that the climate changes caused by these increasing GHG levels will continue to result in temperature changes, SLR, changes in streamflow, and extreme weather events, leading to flooding or drought.⁸³ The Draft PEIS also briefly discusses other ways in which climate change is changing our environment, such as the fact that “warmer temperatures may increase the proliferation of

⁷⁹ See Draft PEIS at 3-318 to 3-334.

⁸⁰ *Id.* at 4-31 to 4-35.

⁸¹ Draft PEIS at 3-318 – 3-334.

⁸² *Id.* at 3-318.

⁸³ *Id.* at 3-320.

insects,” which can devastate forests and vegetation, and how rising ocean temperatures can “influence atmospheric circulation patterns and availability of moisture in the air, thereby altering precipitation patterns.”⁸⁴

Regarding SLR in particular, the Draft PEIS summarizes the variables leading to SLR, including glacial melt and thermal expansion from increasing ocean temperatures.⁸⁵ According to the Draft PEIS, sea levels have risen 7.5 inches since 1870, and the rate is increasing, with an average increase of 0.11 to 0.13 inches per year from 1993 to 2011.⁸⁶ It also discusses some of the regional variations, including, for example, the Gulf of Mexico, where some areas have seen 8 inches of SLR between 1960 and 2011.⁸⁷ It also notes that “the magnitude of 100-year floods is projected to grow by about 45 percent by 2100,” with 70 percent of this growth due to climate change.⁸⁸

The Draft PEIS also briefly discusses other regional variations in climate change impacts, such as the substantial increase in average temperatures in the northeastern United States (up to 3 degrees) and north central Dakotas and surrounding states (up to 4 degrees); increased temperatures and extreme weather in Florida; increased flooding and lake effect snow in the great lakes region.⁸⁹

In terms of the impacts of the NFIP on climate change, however, the Draft PEIS purports to conclude that *there are no such impacts*.⁹⁰ FEMA reaches this conclusion by relying on the fact that “FEMA has no land use authority,” and claiming that, as a result, it has no impact on the actual development that occurs as a result of the NFIP.⁹¹

As a result of this unreasonably restrictive approach, FEMA fails to identify *any* differences among the proposed alternative’s impacts associated with climate change. Indeed, in the Draft PEIS FEMA takes the absurd position that the *only* climate change impact associated with carrying out the legislatively required changes to the NFIP could be “the use of general office

⁸⁴ *Id.* at 3-322.

⁸⁵ *Id.* at 3-326.

⁸⁶ *Id.*

⁸⁷ *Id.* at 3-327.

⁸⁸ *Id.* at 3-328.

⁸⁹ *Id.* at 3-31- 3-34.

⁹⁰ *Id.* at 4-31 – 4-35.

⁹¹ *Id.* at 4-31 – 32 (claiming that because “[f]loodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP,” and because “FEMA has no role in the issuance, denial, or enforcement of individual permits,” the floodplain development that occurs as a direct result of the NFIP is “not included in the” analysis because “these actions are not taken under the NFIP.”).

equipment such as computers or printers” to make the legislatively required changes to insurance policies.”⁹²

Finally, although the Draft PEIS contains a section on cumulative impacts, that discussion does not at all address climate change.⁹³

1. Statutory framework

Recognizing “the profound impact of man’s activity on the interrelations of all components of the natural environment,”⁹⁴ NEPA was enacted to “promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man.”⁹⁵ Accordingly, as the Council on Environmental Quality (“CEQ”) recognized in its recently promulgated Guidance on considering climate change in NEPA reviews “[c]limate change is a fundamental environmental issue, and its effects fall squarely within NEPA’s purview.”⁹⁶

In systematically and comprehensively addressing all of the relevant environmental impacts of the NFIP, FEMA must therefore consider climate change impacts.⁹⁷ NEPA defines environmental impacts broadly to include not only ecological effects, such as physical, chemical, radiological and biological effects, but also aesthetic, historic, cultural, economic, and social effects.⁹⁸ With regard to “ecological effects” in particular, they include “effects on natural resources and the components, structures, and functioning of affected ecosystems,” including “effects on air and water and other natural systems.”⁹⁹ Moreover, a PEIS must consider not only the “direct” effects of an action, but also “indirect” effects – those “caused by the action [but that] are later in time or farther removed in distance, but are still reasonably foreseeable.”¹⁰⁰ Indirect effects include “growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”¹⁰¹ A PEIS must also consider “cumulative” effects – *i.e.*, “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes

⁹² *Id.* at 4-33; Taking this completely irrelevant point to truly ridiculous ends, the Draft PEIS continues: “However, these operations would not require additional use of this equipment outside of daily operations, and therefore would not impact climate change.” *Id.* at 4-33.

⁹³ Draft PEIS at 4-117- 4-132.

⁹⁴ 42 U.S.C. § 4331(a).

⁹⁵ 42 U.S.C. § 4321.

⁹⁶ Guidance at 2.

⁹⁷ 40 C.F.R. § 1502.16 (defining environmental effects).

⁹⁸ *Id.* § 1508.8.

⁹⁹ *Id.* § 1508.8(b).

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

such other actions.”¹⁰² Finally, a PEIS must also consider “[e]nergy requirements and conservation potential of various alternatives and mitigation measures.”¹⁰³

The CEQ regulations also mandate that agencies rely on “high-quality” scientific information in preparing an EIS.¹⁰⁴ And where necessary scientific information does not already exist, if the data is “essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant,” the agency is required to collect the information to include in the EIS.¹⁰⁵

In August, 2016, CEQ issued a final Guidance on considering climate change in NEPA reviews (“GHG Guidance”).¹⁰⁶ Recognizing that many federal actions have the potential to facilitate emissions of GHGs, and can also be affected by climate change, the Guidance provides considerations to inform choices among alternatives that could lead to differing levels of GHG emissions or reduce climate change impacts. In issuing the Guidance CEQ stated that it did not change the nature of an agency’s pre-existing obligations under NEPA and its implementing regulations.¹⁰⁷

The Guidance directs agencies to, among other things:

- quantify a proposed agency action’s projected direct and indirect GHG emissions;
- use projected GHG emissions as a proxy for assessing potential climate change effects;
- where quantifying projected GHG emissions is not possible, include a qualitative analysis and explain the basis for determining that quantification is not reasonably available;
- analyze reasonably foreseeable direct, indirect, and cumulative GHG emissions and climate effects;

¹⁰² *Id.* § 1508.7.

¹⁰³ *Id.* §1502.16(e).

¹⁰⁴ *Id.* §§ 1500.1(b); 1502.24 (directing agencies to “insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements”).

¹⁰⁵ *Id.* § 1502.22(a).

¹⁰⁶ See 81 Fed. Reg. 51,866 (Aug. 5, 3026); The Final Guidance is available at:

https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

¹⁰⁷ *Id.* at 51,866; Although EPA recently issued a notice purporting to “withdraw” this Guidance, 82 Fed. Reg. 16576 (Apr. 5, 2017), to the extent the Guidance itself did not change existing requirements under NEPA or CEQ’s implementing regulations, that withdrawal does not impact FEMA’s obligations here. Moreover, the CEQ’s Guidance on Cumulative Impacts, which has not been withdrawn, also calls on FEMA to address climate change in the PEIS. See *Considering Cumulative Effects Under the National Environmental Policy Act* (1997) at 13 (describing the “release of greenhouse gases resulting in climate modification” as a cumulative effect that must be addressed) (available at https://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf).

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- consider alternatives to make the actions and affected communities more resilient to the effects of a changing climate;¹⁰⁸

The Guidance also makes clear that agencies may not ignore the role of their activities on climate change on the grounds that the contribution is too small or insignificant to warrant consideration. As the Guidance explains:

a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.¹⁰⁹

Finally, as the Guidance recognizes, among the reasons it is vital to explore the GHG emissions and climate change impacts associated with federal projects is to be in a position to consider appropriate mitigation measures “to avoid, minimize, and compensate for the adverse environmental effects.”¹¹⁰ As the Guidance outlines, those mitigation measures “could include enhanced energy efficiency, lower GHG-emitting technology, carbon capture, carbon sequestration (e.g., forest, agricultural soils, and coastal habitat restoration), [and] sustainable land management practices.”¹¹¹ The Guidance also emphasizes the need for appropriate monitoring tools to “confirm the effectiveness of mitigation” approaches.¹¹²

2. The PEIS must include a robust discussion of climate change

In terms of the affected environment, the final PEIS must incorporate the latest science on climate change and its impacts, which is highly relevant to the NFIP modifications under consideration.

First, in the climate change summary in the Draft PEIS on 3-318 to 3-334, we note several corrections:

¹⁰⁸ GHG Guidance at 4-6.

¹⁰⁹ *Id.* at 11.

¹¹⁰ *Id.* at 18.

¹¹¹ *Id.* at 19.

¹¹² *Id.* at 19-20.

- The Draft PEIS heavily cites the 2009 report from the U.S. Global Change Research Program and information from EPA webpages. While these are important sources, the Draft PEIS should also incorporate the updated, best available scientific information on observed and projected climate change in the 2014 Third National Climate Assessment, which provides climate change summaries at national and regional levels.¹¹³
- The Draft PEIS states: “The Intergovernmental Panel on Climate Change (“IPCC”) is now 95 percent certain that humans are the main cause of current global warming.”¹¹⁴ However, this statement should be changed to “The Intergovernmental Panel on Climate Change (IPCC) is now *95 to 100* percent certain that humans are the main cause of current global warming (IPCC, 2013).” The IPCC 2013 Summary for Policymakers states: “It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century”¹¹⁵ where “extremely likely” in IPCC terminology means between 95 and 100 percent.¹¹⁶
- The Draft PEIS states: “Atmospheric concentrations of CO₂ increased from 280 ppm of carbon in 1750 to 399 ppm of carbon in 2014.”¹¹⁷ This should be updated to “Atmospheric concentrations of CO₂ increased from 280 ppm of carbon in 1750 to 404 ppm of carbon in 2016.”¹¹⁸ The last time that the Earth passed the 400 ppm CO₂ threshold was three to four million years ago during the mid-Pliocene warm period, when sea levels were up to 65 feet higher than they are today.¹¹⁹
- The Draft PEIS states: “The warmest year on record since 1990 was 2012 (EPA, 2016h).”¹²⁰ However, the warmest year on record in the United States *since 1895* was 2012.¹²¹ 2016 was the second warmest year on record in the U.S.¹²²
- The Draft PEIS states: “The year 2015 was the warmest on record by the widest margin on record (NOAA, 2015f).” This should be updated. 2016 was the warmest year on record globally, and it was the third year in a row that record was broken.¹²³

¹¹³ Melillo, J.M. et al. (Eds.). 2014. Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp.

¹¹⁴ Draft PEIS at 3-318; IPCC. 2013. 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F. et al. (Eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA,.

¹¹⁵ IPCC. 2013 at 17.

¹¹⁶ IPCC. 2013, at 4, footnote 2.

¹¹⁷ Draft PEIS at 3-318.

¹¹⁸ NOAA. 2017. Trends in Atmospheric Carbon Dioxide, Earth System Research Laboratory, ftp://aftp.cmdl.noaa.gov/products/trends/co2/co2_annmean_mlo.txt.

¹¹⁹ NOAA. 2016. Carbon dioxide races past troubling milestone. September 30, 2016, <http://www.noaa.gov/stories/carbon-dioxide-levels-race-past-troubling-milestone>.

¹²⁰ Draft PEIS at 3-320.

¹²¹ NOAA. 2017. 2016 was the second warmest year on record for U.S. <http://www.noaa.gov/news/2016-was-2nd-warmest-year-on-record-for-us>.

¹²² NASA. 2017. NASA, NOAA data show 2016 warmest year on record globally. <https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

In addition, the Draft PEIS must include additional, highly relevant information about climate change and its impacts, particularly recent scientific literature addressing climate change impacts that affect the risk of coastal and inland flooding in the US. The climate change sections in the Draft PEIS at 3-318 to 3-334 that address sea level rise and changes in precipitation, extreme weather events, streamflow, and storm intensity are missing critical information, as summarized below.

The Draft PEIS's summary of sea level rise fails to include essential information on regional rates of sea level rise and projections of future sea level rise. The PEIS should incorporate the findings of the 2017 inter-agency technical report "Global and Regional Sea Level Rise Projections for the United States," authored by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force to inform the Fourth National Climate Assessment and government decision-making.¹²⁴ This technical report by Sweet et al. (2017) reviews the latest scientific research and provides gridded relative sea level¹²⁵ projections for the United States and an updated set of global mean sea level (GMSL) rise scenarios. Sweet et al. (2017) serves as a replacement for the Parris et al. (2012) sea level rise assessment¹²⁶ that informed the Third National Climate Assessment and was referenced by the 2015 TMAC report.

Based on scientific advances, Sweet et al. (2017) revise sea level rise projections upward, adding an "extreme" upper-bound scenario for GMSL rise of 2.5 m by the year 2100, which is 0.5 m higher than the upper bound scenario from Parris et al. (2012), and revising the lower-bound scenario to 0.3 m by the year 2100, rather than the 0.1 m in Parris et al. (2012). Sweet et al. (2017) provide six emissions-based, probabilistic GMSL rise scenarios for 2100: Low (0.3 meters or 1 foot), Intermediate-Low (0.5 meters or 1.6 feet), Intermediate (1.0 meters or 3.2 feet), Intermediate-High (1.5 meters or 5 feet), High (2.0 meters or 6.6 feet), and Extreme (2.5 meters or 8.2 feet).

On a regional level, Sweet et al. (2017) provide relative sea level rise (RSL) projections for the coastlines and tide gauges of the U.S. mainland, Alaska, Hawaii, the Caribbean, and the Pacific island territories. As noted by the report, "these scenario-based RSL values fill a major gap in climate information needed to support a wide range of assessment, planning, and decision-making processes."¹²⁷ Sweet et al. (2017) also project that, at most locations examined, with only about 0.35 m (<14 inches) of local relative sea level rise, the annual frequencies of disruptive and

¹²³ NASA. 2017. NASA, NOAA data should 2016 warmest year on record globally. <https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>.

¹²⁴ Sweet, W.V. et al. 2017. Global and Regional Sea Level Rise Scenarios for the United States. National Oceanic and Atmospheric Administration, Silver Spring, Maryland, January 2017.

¹²⁵ Relative Sea level (RSL) projections include both ocean-level change and vertical land motion.

¹²⁶ Parris, A. et al. 2012. Global Sea Level Rise Scenarios for the US National Climate Assessment. NOAA Technical Report OAR CPO-1.

¹²⁷ Sweet, W.V. et al. 2017, at vi-vii.

damaging flooding will increase 25-fold as early as 2030 under the Intermediate-High SLR scenario, and as early as 2040 under the Intermediate scenario.

Another important reference that should be incorporated into the PEIS is California's 2017 sea level rise guidance document authored by Griggs et al. (2017).¹²⁸ This state-wide guidance highlights the potential for extreme sea level rise based on recent scientific research, and adds a scenario of 8 feet by 2100. The report notes several important new conclusions stemming from scientific advances:

- Previously underappreciated glaciological processes, examined in the research of the last five years, have the potential to greatly increase the probability of extreme global sea-level rise (6 feet or more) within this century if emissions continue unabated.
- The processes that could drive extreme Antarctic Ice Sheet retreat later in this century are different from those driving Antarctic Ice Sheet changes now, so the fact that the current rise in global sea level is not consistent with the most extreme projections does not rule out extreme behavior in the future.
- An aggressive reduction in greenhouse gas emissions substantially reduces but does not eliminate the risk of extreme global sea-level rise driven by Antarctic ice loss.
- Once marine-based ice is lost, the resulting global sea-level rise will last for thousands of years.¹²⁹

Notably, the report warns that “waiting for scientific certainty is neither a safe nor prudent option” and recommends the consideration of high and extreme sea level rise scenarios in decisions with implications past 2050: “[h]igh confidence in projections of sea-level rise over the next three decades can inform preparedness efforts, adaptation actions and hazard mitigation undertaken today, and prevent much greater losses than will occur if action is not taken. Consideration of high and even extreme sea levels in decisions with implications past 2050 is needed to safeguard the people and resources of coastal California.”¹³⁰

The best available science makes clear that the impacts of sea level rise will be long-lived. A recent study estimated that we lock in 8 feet of sea-level rise over the long term for every degree Celsius of warming. Under all IPCC emissions scenarios, sea level rise will continue beyond 2100 for many centuries, as summarized by the Third National Climate Assessment:

¹²⁸ Griggs, G. et al. (California Ocean Protection Council Science Advisory Team Working Group). 2017. Rising Seas in California: An Update on Sea-Level Rise Science. California Ocean Science Trust, April 2017.

¹²⁹ *Id.* at 60.

¹³⁰ *Id.* at 4.

Sea level rise will not stop in 2100 because the oceans take a very long time to respond to warmer conditions at the Earth's surface. Ocean waters will therefore continue to warm and sea level will continue to rise for many centuries at rates equal to or higher than that of the current century. In fact, recent research has suggested that even present day carbon dioxide levels are sufficient to cause Greenland to melt completely over the next several thousand years.¹³¹

The Draft PEIS must also include the best available science demonstrating that climate change is imposing an increasing flood risk by heightening coastal exposure to high-tide flooding, storm surge, and wave run-up. As sea levels rise, high tides, storm surge, and large waves ride on a higher sea surface which pushes water further inland and creates more flooding of coastal habitats.¹³²

Nuisance flooding, also called "sunny day flooding," occurs when high tide conditions are exacerbated by sea level rise. Nuisance flooding has increased substantially on the East, Gulf and West coasts by 300 to 925 percent since the 1960s, primarily due to sea level rise.¹³³ In Florida and Virginia, the significant increase in nuisance flooding due to sea level rise has already resulted in severe property damage and social disruption.¹³⁴ Scientific studies project that nuisance flooding will continue to become much more frequent and severe in the next few decades.¹³⁵ For example, an analysis by Dahl et al. (2017) projected that tidal flooding will increase substantially in the near-term at all 52 study locations along the East and Gulf coasts: "long before areas are permanently inundated, the steady creep of sea level rise will force many communities to grapple with chronic high tide flooding in the next 15 to 30 years."¹³⁶

The frequency of high-severity Atlantic hurricanes is increasing,¹³⁷ which results in more frequent and severe storm-generated surge events and wave heights.¹³⁸ Large storm surge events

¹³¹ Melillo, J.M. et al. (Eds.). 2014, at 45.

¹³² Tebaldi, C. et al. 2012. Modelling sea level rise impacts on storm surges along US coasts. *Environmental Research Letters* 7: 014032; Griggs, G. et al. (California Ocean Protection Council Science Advisory Team Working Group). 2017; Sweet, W.V. et al. 2017.

¹³³ NOAA. 2014. Sea Level Rise and Nuisance Flood Frequency Changes around the United States. NOAA Technical Report NOS CO-OPS 073; Sweet, W.V. and J. Park. 2014. From the extreme to the mean: Acceleration and tipping points of coastal inundation from sea level rise. *Earth's Future* 2: 579-600; NOAA [National Oceanic and Atmospheric Administration], What is nuisance flooding (2016), <http://oceanservice.noaa.gov/facts/nuisance-flooding.html>.

¹³⁴ Atkinson, L.P. et al. 2013. Sea Level Rise and Flooding Risk in Virginia. CCPO Publications, Paper 102, http://digitalcommons.odu.edu/ccpo_pubs/102; Wdowinski, S. et al. 2016. Increasing flooding hazard in coastal communities due to rising sea level: Case study of Miami Beach, Florida. *Ocean & Coastal Management* 126: 1-8.

¹³⁵ Moftakhari, H.R. et al. 2015. Increased nuisance flooding along the coasts of the United States due to sea level rise: Past and future, *Geophysical Research Letters* 42: 9846-9852; Dahl, K.A. et al. 2017. Sea level rise drives increased tidal flooding frequency at tide gauges along the U.S. East and Gulf Coasts: Projections for 2030 and 2045. *PLoS ONE* 12(2): e0170949.

¹³⁶ Dahl, K.A. et al. 2017, at 1.

¹³⁷ Elsner, J.B. et al. 2008. The increasing intensity of the strongest tropical cyclones. *Nature* 455: 92-95; Bender, M.A. et al. 2010. Modeled impact of anthropogenic warming on the frequency of intense Atlantic hurricanes.

of Hurricane Katrina magnitude have already doubled in response to warming during the 20th century.¹³⁹ A recent study projected a twofold to sevenfold increase in the frequency of Atlantic hurricane surge events for each 1°C in temperature rise.¹⁴⁰ Another study projected that, under the RCP 4.5 emissions scenario which the world is exceeding, the intensity of Atlantic hurricanes will increase, accompanied by a median increase in storm surge of 25 percent to 47 percent.¹⁴¹ The study highlighted that the risks to coastal populations are highly non-linear, with the population at risk from storm surge flooding increasing by a median of 30 to 154 percent, and up to 434 percent. A study that accounted for the combined effects of sea level rise and changes in storm intensity projected substantial increases in flooding risk along the East Coast.¹⁴² Another recent study examined the compound coastal flooding risk when storm surge and heavy precipitation co-occur, and found that the “number of compound events has increased significantly over the past century at many of the major coastal cities.”¹⁴³

Numerous studies have highlighted the vulnerability of coastal populations to increasing flood risk due to climate change.¹⁴⁴ Hauer et al. (2016) forecast that 13.1 million people in coastal areas of the US would be at risk of flooding from sea level rise by 2100, which would drive mass human migration.¹⁴⁵ In an analysis of recent and future flood losses for 136 of the world’s largest coastal cities, Hallegatte et al. (2013) estimated that global flood losses of US\$6 billion per year in 2005 would increase to US\$1 trillion or more per year by 2050 when accounting for the combined effects of climate change, subsidence, and socio-economic change.¹⁴⁶ The study highlighted the United States as particularly vulnerable, since three US cities—Miami, New York, and New Orleans—would account for more than 30 percent of global aggregate losses.

Science 327: 454-458; Kishtawal, C.M. et al. 2012. Tropical cyclone intensification trends during satellite era (1986–2010). *Geophysical Research Letters* 39:L10810; Melillo, J.M. et al. (Eds.). 2014., at 41.

¹³⁸ Grinsted, A. et al. 2012. Homogeneous record of Atlantic hurricane surge threat since 1923. *PNAS* 109:19601-19605; Komar, P.D. and J.C. Allan. 2008. Increasing hurricane-generated wave heights along the U.S. east coast and their climate controls. *Journal of Coastal Research* 24: 479-488.

¹³⁹ Grinsted, A. et al. 2013. Projected hurricane surge threat from rising temperatures. *PNAS* 110: 5369-5373.

¹⁴⁰ *Id.*

¹⁴¹ Balaguru, K. et al. 2016. Future hurricane storm surge risk for the U.S. gulf and Florida coasts based on projections of thermodynamic potential intensity. *Climatic Change* 138: 99-110.

¹⁴² Little, C.M. et al. 2015. Joint projections of US East Coast sea level and storm surge. *Nature Climate Change* 5: 1114-1121.

¹⁴³ Wahl, T. et al. 2015. Increasing risk of compound flooding from storm surge and rainfall for major US cities. *Nature Climate Change* 5: 1093-1098.

¹⁴⁴ Weiss, J.L. et al. 2011. Implications of recent sea level rise science for low-elevation areas in coastal cities of the coterminous U.S.A. *Climatic Change* 105:635-645; Strauss, B.H., et al. 2012. Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States. *Environmental Research Letters* 7: 014033.

¹⁴⁵ Hauer, M.E. et al. 2016. Millions projected to be at risk from sea-level rise in the continental United States. *Nature Climate Change* 6: 691-695.

¹⁴⁶ Hallegatte, S. et al. 2013. Future flood losses in major coastal cities. *Nature Climate Change* 3: 802-806.

The Draft PEIS must also include the best available science on inland flooding risk due to climate change. The Third National Climate Assessment summarizes scientific research on observed and projected regional changes in precipitation, drought, storms and flooding, with key findings as follows:

- Average U.S. precipitation has increased since 1900, but some areas have had increases greater than the national average, and some areas have had decreases. More winter and spring precipitation is projected for the northern United States, and less for the Southwest, over this century.
- Heavy downpours are increasing nationally, especially over the last three to five decades. Largest increases are in the Midwest and Northeast. Increases in the frequency and intensity of extreme precipitation events are projected for all U.S. regions.
- There have been changes in some types of extreme weather events over the last several decades...There have been regional trends in floods and droughts.
- Winter storms have increased in frequency and intensity since the 1950s, and their tracks have shifted northward over the United States.¹⁴⁷

Other important recent research related to regional inland flooding risk in the US includes Berghuijs et al. (2016) which characterized the primary drivers of flooding across the contiguous United States, including the dominant flood-generating processes in 420 catchments¹⁴⁸; Mallakpour and Villarini (2015) which reported strong evidence for an increasing frequency of flooding in the central United States resulting primarily from changes in seasonal rainfall and temperature¹⁴⁹; and Slater and Villarini (2015) which examined regional patterns of changing flood risk across the US.¹⁵⁰

3. The PEIS must examine the contribution of the NFIP to climate change, and approaches to mitigate that adverse impact

As noted, in the Draft PEIS FEMA refuses at all to address the impacts of the NFIP on GHG emissions, and climate change, on the spurious ground that the program has no impact on development. This approach is inconsistent with both NEPA's requirements and with the actual role the NFIP plays in promoting development that increases GHG emissions.

¹⁴⁷ Melillo, J.M. et al. (Eds.). 2014., at 20.

¹⁴⁸ Berghuijs, W.R. et al. 2016. Dominant flood generating mechanisms across the United States. *Geophysical Research Letters* 43: 4382–4390.

¹⁴⁹ Mallakpour, I. and G. Villarini. 2015. The changing nature of flooding across the central United States. *Nature Climate Change* 5: 250-254.

¹⁵⁰ Slater, L. J. and G. Villarini. 2016. Recent trends in U.S. flood risk. *Geophysical Research Letters* 43: 12,428–12,436.

NEPA requires agencies to evaluate not only the *direct* effects of their activities, but indirect effects as well – *i.e.*, those that come “later in time” than the actual agency activity, but which are “still reasonably foreseeable,” including, *e.g.*, “*growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate.*”¹⁵¹

As the GHG Guidance makes clear, the growth-inducing effects of the NFIP, which in turn lead to greater GHG emissions and thus impact climate change, must be considered in the FEMA PEIS. Thus, the Guidance calls on FEMA to quantify the *indirect* GHG emissions associated with the NFIP and use projected emissions to assess potential climate change impact – or, at minimum, if FEMA concludes that such quantification is not practicable, to at least conduct a *qualitative* analysis.¹⁵² Moreover, of particular relevance here, as noted above the Guidance explains that FEMA may not ignore climate change impacts as too small or speculative.¹⁵³ Accordingly, FEMA’s refusal to address the climate change impacts of the NFIP is inconsistent with NEPA. It also runs contrary to the fact that, contrary to FEMA’s presumption, the NFIP *does* impact development decisions in coastal areas, thereby affecting GHG emissions and climate change. Indeed, as one Report found, “[a] *majority* of community developers, floodplain administrators and homeowners consider[] property characteristics *and flood insurance availability* to be among the most important factors in decisions about floodplain property ownership.”¹⁵⁴

Numerous analyses have pointed out that the artificially low insurance rates of the NFIP act as a subsidy to encourage unsustainable development in high-risk areas and ecologically sensitive areas, externalizing the inherent risks of building in flood zones and eroding natural defenses to flooding risks. As explained by Bagstad et al. (2007):

Subsidized insurance allows landholders to develop areas that the market alone might otherwise deem too risky for construction — floodplains, coastal zones, and areas prone to earthquakes, mudslides, or wildfire. Government-subsidized insurance, through the National Flood Insurance Program, was originally intended to reduce flood zone development and risk. It has instead encouraged risky

¹⁵¹ 40 C.F.R. § 1508.8(b) (emphasis added).

¹⁵² GHG Guidance at 4-6.

¹⁵³ *Id.* at 11; As noted, if FEMA concludes it needs additional information to conduct this analysis, it must collect that information, or explain why it cannot do so. 40 C.F.R. 1502.22; *Or. Envtl Council v. Kunzman*, 817 F.2d 484, 495 (9th Cir. 1987) (NEPA “imposes a duty on federal agencies to gather information and do independent research when missing information is important, significant, or essential to a reasoned choice among alternatives.”).

¹⁵⁴ *The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report* (American Institutes for Research Oct. 2006) at xi (emphasis added); *see also id.* (“Property characteristics and the availability of flood insurance were more important than other factors in decisions about purchasing floodplain property”).

development while providing a subsidy to coastal and floodplain developers, repetitive loss property owners, and the private insurance industry.

[P]erhaps the largest fault of the NFIP is that it encourages development in environmentally sensitive areas, decreasing the likelihood of development at a sustainable scale. The program externalizes the risk associated with building while imposing the added social cost of foregone ecosystem services. In providing flood protection, even the best structural measures usually fail as sufficient substitutes for intact natural capital.¹⁵⁵

Another analysis concluded that “[t]he program encourages building in floodplains by providing insurance policies that private insurers find too risky to write. The less expensive it is to insure a property in the floodplain against loss, the stronger the incentive to build in that floodplain and the more risk becomes concentrated in areas covered by the NFIP.”¹⁵⁶ Similarly, as another explained, “cheap flood insurance and a period of relatively few hurricanes, have contributed to billions of dollars’ worth of real estate development in high-risk and environmentally fragile coastal areas.”¹⁵⁷

In the Final PEIS, therefore, FEMA must meaningfully address the contribution made by NFIP to development, and therefore to GHG emissions. For example, without necessarily concluding that *no* development would occur without the NFIP, FEMA should evaluate the development likely to occur with SFHA’s in the coming decades, and model the likely GHG emissions associated with that development. Unlike evaluating the electricity used by office equipment such an analysis would meet NEPA’s twin goals of helping to inform FEMA and the public about the environmental impacts of its program.

Only once those impacts are meaningfully analyzed can FEMA also undertake the vital task of exploring approaches to *mitigating* these impacts, and monitoring the effectiveness of those mitigation efforts. For example, recognizing the role of the NFIP in coastal development, FEMA should consider adding regulatory and/or incentive programs to the requirements associated with the NFIP in order to reduce the GHG emissions associated with the development undertaken in SFHAs. To provide just a few – non-exhaustive – examples:

¹⁵⁵ Bagstad, K. J. et al. 2007. Taxes, subsidies, and insurance as drivers of United States coastal development. *Ecological Economics* 63: 285-298.

¹⁵⁶ Institute for Policy Integrity. 2010. Flooding the Market: the Distributional Consequences of the NFIP, Holladay, J.S. and J.A. Schwartz, Policy Brief No. 7, April 2010.

¹⁵⁷ America’s Living Oceans (Pew Oceans, May 2003) at 53; *see also infra* at 29-30 (further discussing the influence of the NFIP on coastal development)

- Require building codes to include certain basic energy efficiency requirements that would reduce emissions associated with heating and cooling, such as, for example, insulation standards;
- Allow building codes to encourage practices generating fewer emissions, such as siting homes near schools and shopping to reduce driving distances, and development of apartment buildings and other dwellings that generate fewer emissions per occupant;
- Encourage homeowners and businesses to improve their energy efficiency through energy audits, incentives for energy efficient appliances, and other measures to reduce energy usage, and therefore GHG emissions;
- Incentivize development of, and reliance on, renewable (GHG-free) energy resources, such as rooftop and community solar development, community wind power, and battery storage capacities, all of which can reduce GHG emissions.

These and similar approaches are precisely the kinds of measures called for by NEPA, as detailed in the GHG Guidance.¹⁵⁸ Finally, as also called for in the Guidance, in proposing various mitigation approaches, FEMA must also explore the *monitoring* tools it will rely on to gauge their success in actually reducing the GHG emissions associated with the NFIP.¹⁵⁹

In sum, while FEMA will not be in a position to mandate most of these measures, in the PEIS it must explore various options for using these and related mechanisms to meaningfully mitigate the impacts of the NFIP on GHG emissions, and for monitoring the success of those mechanisms.

II. FEMA is not complying with Endangered Species Act

FEMA asserts that the NFIP “is currently in compliance with the ESA, but recognizes the need to make program changes that demonstrate ESA compliance to the public.”¹⁶⁰ This claim relies heavily on FEMA’s November 2016 Biological Evaluation (“BE”), which concluded that FEMA’s Proposed Action (or preferred alternative in the draft PEIS) had “no effect on species listed as threatened or endangered under the ESA or on the designated critical habitat of such species.”¹⁶¹ To the contrary, the current implementation of the NFIP does not comply with the ESA because FEMA has failed to undertake formal consultation of its implementing agency actions with FWS and NMFS that would result in a biological opinion on the Program’s effects

¹⁵⁸ See GHG Guidance at 19 (explaining appropriate mitigation may include “enhanced energy efficiency [and] lower GHG-emitting technology,” as well as “sustainable land management practices.”); 40 C.F.R. § 1502.16(h).

¹⁵⁹ *Id.* at 19-20.

¹⁶⁰ Draft PEIS at 1-5.

¹⁶¹ BE at xi.

on listed species and their habitats, as required under Section 7 of the ESA. Moreover, the proposed program changes reviewed in the PEIS also constitute several discretionary agency actions that “may affect” listed species and their critical habitat under the ESA, undermine FEMA’s “no effect” determinations on components of the NFIP, and trigger consultation under the Section 7 of the ESA.

The ESA is “the most comprehensive legislation for the preservation of endangered species ever enacted by any nation.”¹⁶² It reflects “an explicit congressional decision to require agencies to afford *first priority* to the declared national policy of saving endangered species” and “a conscious decision by Congress to give endangered species priority over the ‘primary missions’ of federal agencies.”¹⁶³ It was enacted by Congress to “halt and reverse the trend toward species extinction, whatever the cost.”¹⁶⁴ Agencies are to prioritize saving endangered species and critical habitat over all other considerations and goals of the agency action. The duty arises whenever a federal agency proposes to take discretionary action that may affect threatened or endangered species, either through indirect or direct action. FEMA has discretion over the NFIP, and it is therefore subject to ESA consultation. This is shown through the identification of flood hazards on maps, floodplain management requirements, and federal-backed mortgages, flood insurance, and federal disaster assistance for NFIP communities.

A. Legal and Regulatory background

The ESA requires all federal agencies to “conserve” threatened and endangered species,¹⁶⁵ and to utilize their authorities in furtherance of the purposes of the Act.¹⁶⁶ “Conserve” is defined to mean “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary”¹⁶⁷

To effectuate these outcomes, the “heart of the ESA” is the interagency consultation requirements of Section 7 of the ESA.¹⁶⁸ Section 7(a)(2) requires federal agencies to “insure that *any action* authorized, funded, or carried out by” the agency “is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction

¹⁶² *TVA v. Hill*, 437 U.S. 153, 180 (1978).

¹⁶³ *Id.* at 185 (emphasis added).

¹⁶⁴ *Id.*

¹⁶⁵ The statute defines “endangered species” as “any species which is in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 16 U.S.C. § 1532(6), (20).

¹⁶⁶ 16 U.S.C. § 1531(c)(1).

¹⁶⁷ 16 U.S.C. § 1532(3).

¹⁶⁸ *Western Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 495 (9th Cir. 2011); 16 U.S.C. § 1536.

or adverse modification” of the designated critical habitat of such species.¹⁶⁹ To achieve this substantive goal, Section 7(a)(2) imposes procedural duties on the action agency to consult with the Services before engaging in any discretionary “agency action” that “may affect” a listed species or its critical habitat.¹⁷⁰ The “agency action” that triggers Section 7 consultation is broadly defined to include “all activities or programs of any kind authorized, funded, or carried out, in whole or in part” by federal agencies.¹⁷¹

To initiate these consultation duties, an “agency shall . . . request” from the Services information regarding whether any listed species “may be present” in a proposed action area.¹⁷² However, if an agency determines that an action “may affect” a listed species or critical habitat, the agency must consult, either formally or informally, with the appropriate Services agency.¹⁷³ Importantly, the “may affect” standard broadly includes “[a]ny possible effect, whether beneficial, benign, adverse or of an undetermined character.”¹⁷⁴ Once a “may affect” determination is made, the agency must either request concurrence from the Services with a “may affect, but not likely to adversely affect” finding or request initiation of formal consultation.¹⁷⁵ Both require a written analysis typically in the form of a biological evaluation (or biological assessment if the project involves major construction), the purpose of which is to evaluate the potential effects of the agency action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action.¹⁷⁶

In the biological evaluation, if the agency determines that the proposed action will have “no effect” in the biological evaluation, then concurrence from the Services is not necessary (though still recommended for administrative record purposes), and no further action is warranted.¹⁷⁷ A “no effect” determination means “there will be no impacts, positive or negative, to listed or proposed resources. . . . [which] means *no listed resources will be exposed to action and its environmental consequences.*”¹⁷⁸ In the alternative, an agency may find that the agency action “may affect but is not likely to adversely affect any listed species or critical habitat,” and the

¹⁶⁹ 16 U.S.C. § 1536(a)(2).

¹⁷⁰ *Turtle Island Restoration Network v. Nat'l Marine Fisheries Serv.*, 340 F.3d 969, 974 (9th Cir. 2003).

¹⁷¹ 50 C.F.R. § 402.02.

¹⁷² 16 U.S.C. § 1536(c).

¹⁷³ *Karuk Tribe of Cal. v. U.S. Forest Service*, 681 F.3d 1006, 1027 (9th Cir. 2011) (“*Karuk Tribe*”).

¹⁷⁴ 51 Fed. Reg. 19,926 (June 3, 1986).

¹⁷⁵ 50 § CFR 402.14.

¹⁷⁶ Biological Assessments (BA) are only required for “major construction activities.” See Fish and Wildlife Service, Guidance on Biological Assessments, *available at*:

<https://www.fws.gov/midwest/endangered/section7/pdf/BAGuidance.pdf> (“FWS BA Guidance”). Both the biological assessment and biological evaluation seek to evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action.

¹⁷⁷ *Sw. Ctr. for Biological Diversity v. U.S. Forest Serv.*, 100 F.3d 1443, 1447-48 (9th Cir. 1996).

¹⁷⁸ FWS BA Guidance, at 3.

agency may request concurrence from the Services and complete the informal consultation.¹⁷⁹ Finally, if the agency determines that the proposed action “may affect and is likely to adversely affect species,” the agency requests formal consultation. The Services may issue letters of non-concurrence if the Services do not agree with the action agency's determination of effects or if there is not enough information to adequately determine the nature of the effects.¹⁸⁰

Formal consultation under Section 7(a)(2) results in the preparation of a biological opinion by FWS that determines if the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify the species' critical habitat.¹⁸¹ If so, the opinion may specify reasonable and prudent alternatives (“RPAs”) that avoid such jeopardy.¹⁸² If FWS concludes that the action or the RPAs will not cause jeopardy, but will result in the take of a listed species, FWS will issue an incidental take statement (“ITS”) as part of the biological opinion that specifies “the impact, i.e., the amount or extent, of . . . incidental taking” that may occur, and any measures necessary or appropriate to minimize such impact on the listed species.¹⁸³ The take of a listed species in compliance with the terms of a valid ITS is not prohibited under Section 9 of the ESA.¹⁸⁴

In November 2016, FEMA issued its BE pursuant to Section 7 of the ESA to evaluate the effects of the proposed action—“which is the current implementation of the NFIP, as modified by recent legislation and other proposed program changes”—on “ESA-listed species and designated critical habitats within floodplains across the nation.”¹⁸⁵ The BE concludes that “the Proposed Action will have no effect on species listed as threatened or endangered under the ESA or on the designated critical habitat of such species.”¹⁸⁶

FEMA's arguments for the no effect determination are several. First and foremost, FEMA states that its NFIP implementation does not include the action of floodplain development, and thus the implementation of the NFIP with respect to floodplain development does not constitute an agency action implicating the ESA.¹⁸⁷ According to the agency, “FEMA has no compliance responsibilities under the ESA with respect to private floodplain development.”¹⁸⁸ Second, for the agency actions that FEMA asserts are within the NFIP, those components also have no effect

¹⁷⁹ *Id.* (citing 50 C.F.R. § 402.14(b)(1).)

¹⁸⁰ FWS Section 7 Handbook at 3-31.

¹⁸¹ 16 U.S.C. § 1536(b).

¹⁸² 16 U.S.C. § 1536(b); 50 C.F.R. 402.14(h)(3).

¹⁸³ 50 C.F.R. § 402.14(h)(3), (i).

¹⁸⁴ 16 U.S.C. §§ 1536(b)(4), (o)(2); 50 C.F.R. § 402.14(i)(5).

¹⁸⁵ Biological Evaluation (*herinafter*, BE) at ii.

¹⁸⁶ BE at xi.

¹⁸⁷ BE at iv; see also NOAA Fisheries, Biological Opinion for FEMA's NFIP In the State of Oregon: FAQs (November 2016), available at: http://www.westcoast.fisheries.noaa.gov/publications/habitat/fact_sheets/7.13.2016_oregon_fema_biop_qa.pdf (“2016 Oregon BiOp FAQs”).

¹⁸⁸ *Id.*

on listed species and their critical habitat, according to FEMA.¹⁸⁹ These components are categorized into three large categories, each consisting of multiple agency actions: (i) floodplain management, which includes setting building and development standards for those flood risk areas; (ii) flood insurance, which provides subsidized insurance for communities adopting those standards; and (iii) flood hazard mapping, which identifies flood risks and maps them.¹⁹⁰ Finally, FEMA asserts that the cumulative effects of the NFIP “cannot be reasonably quantified” because of the scope of the effects; “the reasonably foreseeable future actions are those State, Tribal, and local development projects in the SFHAs nationwide likely to occur within the next 20-30 years” and involve more than 22,000 NFIP-participating communities.¹⁹¹ FEMA states that “[w]hile it is reasonably foreseeable that there will be private floodplain development in the [a]ction [a]rea within the next 20 to 30 years, the extent and the impacts of such development is not reasonably foreseeable.”¹⁹²

B. The NFIP is and will influence floodplain development and impact listed species

The NFIP impacts and influences floodplain development which may affect listed species, and therefore triggers Section 7 consultation under the ESA. Section 7 consultation is legally required for all federal activities that may impact plants and animals that are listed as threatened or endangered under the ESA. FEMA repeatedly argues that the “NFIP does not cause development to occur, nor does it play a significant role in facilitating or encouraging floodplain development. As such, floodplain development is neither a direct, nor an indirect, effect of the implementation of the NFIP.”¹⁹³ It also argues that “[b]ecause this is a programmatic evaluation, site- and species-specific issues associated with individual projects or the effects of the Preferred Alternative when combined with future actions that may be taken by other Federal agencies are not assessed in detail,”¹⁹⁴ implying that ESA consultation must be completed at a site- and project-specific levels instead of national levels. These arguments all fail as they are contravened by case law and the spirit of the ESA.

1. The NFIP affects species by enabling floodplain development

In spite of FEMA’s claims, the fundamental administrative query at issue here is whether the NFIP “may affect” listed species to trigger Section 7 consultation. An agency has a duty to consult under Section 7 of the ESA for *any discretionary agency action* that “*may affect*” a listed species or designated critical habitat.¹⁹⁵ The “may affect” threshold is very low and includes

¹⁸⁹ BE at vii-x. (See Table ES-1.).

¹⁹⁰ *Ibid.*

¹⁹¹ *Id* at x.

¹⁹² *Id* at xi.

¹⁹³ *Id* at 80.

¹⁹⁴ Draft PEIS at 4-1.

¹⁹⁵ *Karuk Tribe*, 681 F.3d at 1027.

“[a]ny possible effect, whether beneficial, benign, adverse or of an undetermined character.”¹⁹⁶ Whether the NFIP is required to undergo Section 7 consultation is a matter of meeting the low “may affect” threshold; it is irrelevant as to the extent or directness or exact proof of the Program’s effects on the listed species. The indirect or weight of influence of the NFIP on floodplain development are not relevant factors in this narrow Section 7 consultation query. Further, as FEMA fully recognized that “any effects of the NFIP on biological resources would also necessarily be indirect,”¹⁹⁷ indirect effects are still subject to ESA formal consultation.

Numerous lawsuits, biological opinions, and other sources provide firm evidence that NFIP’s provision of flood insurance and other components affirmatively do, as a whole, influence floodplain development and impact species, thereby triggering formal consultation under Section 7 of the ESA. For example, as found most recently in the 2016 biological opinion on Oregon’s NFIP implementation (“2016 Oregon Biological Opinion”), NMFS concluded that FEMA’s implementation of the NFIP in Oregon affects the survival of at least 17 species and their critical habitat because the NFIP results in floodplain development that “reduces the quantity and quality of floodplain and in-channel habitat.”¹⁹⁸ Similarly, FWS “has made numerous factual and policy determinations, at the highest level of the [FWS], representing the agency’s best professional judgment, based on the views of experts on its staff and a review of available information, *that implementation of the NFIP by FEMA facilitates and encourages new development in undeveloped areas.*”¹⁹⁹ As cited in *Florida v. Stickney*, an associate solicitor of the U.S. Department of Interior who found that FEMA is obligated to initiate formal consultation if the NFIP may affect a listed species stated:

Thus, in making its decisions on whether to determine eligibility for particular communities to participate in the flood insurance program, FEMA must follow the provisions of the National Flood Insurance Act, and it must also insure that its actions that indirectly or directly authorize or subsidize construction or acquisition in flood plain areas are not likely to jeopardize listed species or result in the destruction or adverse modification of critical habitat. *The implicit approval of construction or acquisition and the issuance of flood insurance to make available needed financing for such projects clearly involve the de facto authorization of such actions by FEMA; “but for” the all pervasive activities of FEMA, development in flood plains would probably not take place. Therefore, the activities of that agency are covered by Section 7(a)(2) of the Act.*”²⁰⁰

¹⁹⁶ *Id.* (internal quotation marks and italics omitted).

¹⁹⁷ Draft PEIS at 4-110.

¹⁹⁸ *Ibid.*

¹⁹⁹ *Florida Key Deer v. Stickney*, 864 F.Supp. 1222, 1231 (S.D. Fl. 1994).

²⁰⁰ *Ibid.*

The fact that individual biological opinions have been undertaken on NFIP implementation proves that the NFIP as currently implemented is a discretionary agency action that may affect species and is thus subject to Section 7 consultation.

Further, the proposed changes to the NFIP, as outlined in the draft PEIS, also may affect listed species due to impacts on floodplain development. As a direct result of the BW-12 and HFIAA, FEMA is required to phase out subsidies on pre-FIRM properties on a tiered basis. “Some subsidies must be phased out immediately, some will be phased out a rate of 25 percent premium rate increases per year, and the rest will be phased out at a rate of 5-15 percent premium rate increases per year.”²⁰¹ This insurance phase out may similarly affect species in either adverse or beneficial ways. Removing subsidies from properties in the floodplain may lessen floodplain development overall, which may benefit species, but it could also adversely affect species if such limited proceeds from insurance induce worse structures and less precautions to protect species with property development. Overall, though the precise types of impacts may be unclear, it is apparent that the tiered shut-down of subsidized flood insurance may affect listed species in some capacity, and this triggers, at the very least, ESA Section 7 consultation.

2. FEMA cannot rely on the programmatic nature of the NFIP to justify evasion of Section 7 consultation

The programmatic nature of an agency action does not relieve it from formal ESA consultation. Just the opposite: courts have “rejected the argument that the programmatic nature of the plan development rule necessarily means that it will have no effect on the environment or protected species.”²⁰² In the 2016 Oregon NFIP Biological Opinion, NMFS found that, “The BA did not provide individual determinations of effect by species or their associated critical habitats. Instead, the BA provided a general determination for all ESA-listed species and any associated critical habitats. At a program level, FEMA concluded that the implementation of the NFIP may affect, but is not likely to adversely affect ESA-listed species and their designated critical habitat. However, FEMA requested formal consultation for the site-specific effects associated with the issuance of floodplain development permits by NFIP participating communities. At the project

²⁰¹ BE at 37.

²⁰² See *Florida Key Deer v Brown*, 386 F. Supp. 2d 1281, 1290-91 (S. D. Fla. 2005) (holding “[although] FEMA has no discretion when it comes to the provision of flood insurance to persons in NFIP-eligible communities, it has discretion to act in a manner that could benefit [protected species]...in mapping the floodplains, in developing and promulgating the minimum eligibility criteria, and in implementing the CRS [Community Rating System]. Accordingly, ... FEMA’s implementation of the NFIP, with the exception of the actual sale of flood insurance, is a discretionary ‘agency action’ for the purpose of Section 7(a)(2) of the ESA”) *aff’d Florida Key Deer v. Paulison*, 522 F.3d 1133, 1153 (11th Cir. 2008) (holding “ESA § 7(a)(2) requires a federal agency to consult with FWS when any action authorized, funded, or carried out by the agency may affect a listed species”); *Citizens for a Better Forestry*, 632 F. Supp. 2d 968, 982 (Cal. N.D. 2009) (omitting internal quotations).

scale, FEMA determined that ESA-listed species, and presumably their associated designated critical habitats, would be adversely affected.”²⁰³

Moreover, the failure to undertake biological opinions for the entire program risks unequal coverage of thorough ESA evaluation across the country, diluting the obligations of FEMA officials across the country. FEMA is required to ensure that it is not jeopardizing the survival or recovery of imperiled species through the adverse modification of their critical habitat. However, by failing to do an equal and thorough consultation on all sites and only undertaking thorough review for those communities who are politically empowered to demand it, FEMA is failing its ESA obligations. The NFIP covers over 22,000 communities in all 50 states and U.S. territories. Failure to offer thorough coverage—and at the very least, coherent ITS limits—fails to ensure that species are not being jeopardized. Overall, FEMA lacks legal justification to argue that the programmatic nature of NFIP allows the agency to skip ESA review at this time.

Moreover, FEMA’s failure to undergo formal Section 7 consultation with the Services will lead to a waste of public and judicial resources in the aggregate. FEMA has faced numerous ESA-based lawsuits, which have resulted in FEMA’s obligation to undertake formal Section 7 consultation with the Services with respect to a state-wide or local species impacted by NFIP implementation.²⁰⁴ The fact that FEMA has been compelled to undertake legally mandated ESA consultation on NFIP implementation with respect to localized programs demonstrates a severe waste of judicial and public resources. In order to conserve these resources and for the sake of efficiency—in addition to thorough coverage—FEMA should undergo Section 7 consultation of the entire NFIP at the programmatic level.

C. FEMA’s no effect determination of the NFIP in the biological evaluation is arbitrary and capricious

FEMA’s conclusion that the NFIP will have no effect on listed species is unsupported by the evidence presented in the BE, rendering the conclusion arbitrary and capricious in violation of the ESA.

1. FEMA’s provision of floodplain insurance under the preferred alternative constitutes discretionary agency action that may affect listed species

FEMA’s “non-discretionary” and “no effect” determinations with respect to the provision of floodplain insurance are unsupported and disingenuous.

²⁰³ 2016 Oregon NFIP BiOp, at 2.

²⁰⁴ See, e.g., *Wildearth Guardians v. United States Fed. Emergency Mgmt. Agency*, 2011 U.S. Dist. LEXIS 31017 (Court approved a stipulated agreement requiring FEMA to initiate a formal consultation with FWS over NFIP’s impacts in New Mexico).

In Section 6.1.3 of the BE, FEMA claims that it has “no discretion over the provision of flood insurance,” and that “all components under the NFIP’s flood insurance program area are administrative in nature and would, therefore, have no effect on ESA species, designated critical habitats, or EFH.”²⁰⁵ However, this conclusion defies common sense.²⁰⁶ FEMA’s provision of insurance policies to certain communities, the development of insurance rates, and insurance policy management are all activities that require FEMA employees’ discretion and decision-making power. Moreover, the provision of these insurance policies and programs, as held in lawsuits and biological opinions, is the subsidization of the risk of living in a floodplain, and has paradoxically encouraged floodplain development over the last fifty years.²⁰⁷ This type of discretionary agency action meets, at base, the Section 7 consultation “may affect” threshold.

In Sections 6.1.3.2 and 6.1.3.3 of the BE, FEMA argues that increases in flood insurance premium rate increases and changes in premium installment rates also have “no effect” on ESA species, critical habitats, or essential fish habitat (“EFH”) because of the limited effects of these programs on influencing people’s choices in terms of property development on the floodplain.²⁰⁸ However, even if the changes in premium installment “is unlikely to encourage development because it is unlikely that an individual or family with the affordability issues . . . would have the disposable income to use for financing new floodplain development,” again, the administrative query is whether these actions “may affect” species—and not the chances or the odds. The “may affect” threshold is purposefully low, and FEMA’s own acknowledgment that, despite low odds, both premium rate increases and changes in premium installment rates could affect species undermines the “no effect” determination.

Finally, the effects section of the BE fails to examine the precise impacts of the Proposed Action on insurance policies. Specifically, this insurance subsidy phase out may affect species in either adverse or beneficial ways. Removing subsidies from properties in the floodplain may lessen floodplain development overall, which may benefit species, but it could also adversely affect species if such limited proceeds from insurance induce worse structures and less precautions to protect species with property development. Overall, though the precise types of impacts may be unclear, it is apparent that the tiered phase out of subsidized insurance may affect listed species in some capacity, and this triggers at the very least ESA Section 7 consultation.

²⁰⁵ BE at 204.

²⁰⁶ *Ibid.*

²⁰⁷ See Anna Steel, “NFIP v. ESA” (March 7, 2016), available at <http://www.naturesconfluence.com/blog/nfip-vs-esa-fema-vs-fwsnoaa>.

²⁰⁸ BE at 204-05.

2. Floodplain management under the preferred alternative constitutes discretionary agency action that may affect listed species

While FEMA admits that primary floodplain management components—the implementation of minimum floodplain management criteria and the administration of the community response program (“CRS”)—are discretionary agency actions that may affect species, FEMA’s conclusion that the actions will have “no effect” on species is unsupported and contravened.

FEMA admits that both the implementation of minimum floodplain management criteria and the administration of the CRS are discretionary agency actions,²⁰⁹ but the agency offers no convincing reasoning as to why these actions have “no effect” on species. Specifically, with respect to the management criteria, FEMA acknowledges that “there is strong evidence to suggest that the minimum floodplain criteria act to restrain floodplain development,” but that the agency “has no data or studies to support when and where . . . floodplain development is being restrained, or whether the floodplain development in question would have otherwise adversely impacted ESA-listed species or designated critical habitat.”²¹⁰ Likewise, for CRS administration, FEMA states, “while there is strong evidence to suggest that CRS incentivizes communities to undertake actions that benefit ESA species and designated critical habitat . . . , FEMA has no data or studies to support when and where potentially beneficial actions will take place or which CRS activities the community will undertake.”²¹¹ Essentially, FEMA argues that the lack of data on where criteria and CRS are used by communities somehow equates to the agency actions having “no effect” on listed species.

This argument does not withstand scrutiny. First, the fact that there may be lack of data on the exact locations where floodplain management criteria and CRS are adopted does not mean that an agency action has “no effect” on species. According to the FWS Section 7 Handbook, the “no effect” determination is justified only when “the proposed action and its interrelated and interdependent actions will not directly or *indirectly affect listed species or destroy/adversely modify designated critical habitat.*” Further, courts have held that “[a]ny possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement.”²¹² This “low” standard “allow[s] Federal agencies to satisfy their duty to insure under section 7(a)(2) [that species are not jeopardized].”²¹³ For FEMA to recognize that the

²⁰⁹ BE at 196-97.

²¹⁰ *Id.* at 196.

²¹¹ *Id.* at 198.

²¹² *Ctr. for Biological Diversity v. U.S. Bureau of Land Mgt.*, 698 F.3d 1101, 1122 (9th Cir. 2012) (emphasis in original; internal quotation marks and citation omitted); *Cal. ex rel. Lockyer*, 575 F.3d at 1018-19 (citing 51 Fed. Reg. 19926, 19949); *see also* Final ESA Section 7 Handbook, 3-12 (“Is not likely to adversely affect [is] the appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial.”).

²¹³ *Ctr. for Biological Diversity*, 698 F.3d at 1122.

floodplain management criteria and CRS program may “potentially” “benefit ESA species”²¹⁴ and then conclude that these actions will have “no effect” is arbitrary and capricious. Also, the lack of evidence that listed species are definitively affected also does not mean that the “may affect” threshold is not met.

As a practical matter, FEMA’s claims of lack of data on these criteria’s effects on species are contravened by the actual existence of biological opinions in Oregon and Washington which were able to assess the effect of management criteria on species at state or site-specific levels of NFIP implementation. In those biological opinions, the Services found that the management criteria and CRS adoption had some effect on species and specifically provided reasonable and prudent alternatives that could mitigate impact on listed species through changes to the management criteria and CRS programs. These examples provide concrete evidence that, at the site-specific level, FEMA admitted that floodplain management criteria could affect species. That same logic applies at the programmatic level of review.

3. Flood hazard mapping under the preferred alternative constitutes a discretionary agency action that may affect listed species

FEMA’s “no effects” determination for components of flood hazard mapping are also erroneous and unsupported. First, in Sections 6.1.2.1 and 6.1.2.2 of the BE, FEMA asserts that both the decision to publish FIRMs and the provision of non-regulatory products and features do not affect species because FEMA “has no data or studies to support when and where such actions have taken place or will take place.”²¹⁵ However, as discussed with respect to the management criteria, these actions do in fact meet the “may affect” threshold, thus triggering Section 7 consultation. Specifically, FEMA itself acknowledges that the decision to publish FIRMs “provides a number of benefits that can positively affect ESA-listed species and designated critical habitat” through providing communities information that can “guide future decision-making regarding floodplain development and can discourage continued development in flood hazard areas.” FEMA’s recognition that these actions can bring about positive effects on listed species undermines the “no effect” determination, and meets the “may affect” threshold is very low and includes “[a]ny possible effect, whether beneficial, benign, adverse or of an undetermined character.”²¹⁶ Likewise, FEMA also acknowledges that its agency action of providing non-regulatory flood risk products also can “help guide development away from flood hazard areas” and thereby lead to benefits for listed species. Such beneficial impacts, as acknowledged by FEMA directly, also meet the “may affect” threshold, rendering FEMA’s “no effect” determination defunct.

²¹⁴ *Ibid.*

²¹⁵ BE at 200.

²¹⁶ *Karuk Tribe*, 681 F.3d at 1027.

D. FEMA must fulfill its affirmative ESA obligations to conserve listed species

FEMA has failed to fulfill its ESA obligations to “utilize [its] authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered species and threatened species.”²¹⁷ FEMA possesses discretionary authorities under the NFIP that would not be used to conserve species under the preferred alternative. Because FEMA has failed to undergo formal consultation of NFIP, it has evaded the key actions of implementing the reasonable and prudent measures that minimize adverse impacts to affected species and their habitats (in the case where an agency action will not likely jeopardize a species or its habitat) or the reasonable and prudent alternatives that mitigate harm to affected species and their habitats (in the case where an agency action will likely jeopardize a species and habitat).

As a matter of law, courts have recognized that ESA Section 7(a)(1) imposes an affirmative obligation on all federal agencies to conserve threatened and endangered species.²¹⁸ The term “conserve” and “conservation” as used in the ESA means “to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary.”²¹⁹ Importantly, to trigger the ESA consultation requirement, the discretionary control retained by the federal agency must have the capacity to inure to the benefit of a protected species.²²⁰ If an agency cannot influence a private activity to benefit a listed species, there is no duty to consult because “consultation would be a meaningless exercise.”²²¹ The relevant question is whether the agency *could* influence a private activity to benefit a listed species, not whether it *must* do so.²²²

FEMA has failed these obligations in the areas over which it has discretionary control. In Table ES-1 in the BE, FEMA states it exercises discretion over at least 60% of the actions in the NFIP.²²³ FEMA has broad discretion—and acknowledges as such—to implement minimum floodplain management criteria that participating communities are obligated to follow in order to receive the other benefits of the NFIP. These criteria may be maximized to ensure the minimization or mitigation of floodplain development on species and their critical habitats. In

²¹⁷ 16 U.S.C. § 1536.

²¹⁸ See *Pyramid Lake Paiute Tribe v. U.S. Dept. of Navy*, 898 F.2d 1410, 1416-17 (9th Cir. 1990); *Carson-Truckee Water Conservancy Dist. v. Clark*, 741 F.2d 257, 261-62 & n.3 (9th Cir. 1984), *cert. denied*, 470 U.S. 1083, 85 L. Ed. 2d 141, 105 S. Ct. 1842 (1985).

²¹⁹ 16 U.S.C. § 1532(3).

²²⁰ *Turtle Island*, 340 F.3d at 974-75; *Ground Zero Ctr. for Nonviolent Action v. U.S. Dep't of the Navy*, 383 F.3d 1082, 1092 (9th Cir. 2004) (no duty to consult where Navy lacked discretion to cease missile operations for the protection of listed species).

²²¹ *Sierra Club*, 65 F.3d at 1508-09 (no duty to consult for approval of logging roads where, pursuant to a prior right-of-way agreement, BLM retained discretion over only three specified criteria, none of which related to protecting listed species); *Env'tl. Prot. Info. Ctr. v. Simpson Timber Co.*, 255 F.3d 1073, 1081-82 (9th Cir. 2001) (no duty to reinstate consultation for previously issued permits where Fish and Wildlife Service lacked discretion to add protections for newly listed species).

²²² *Turtle Island*, 340 F.3d at 977.

²²³ *Florida Key Deer v. Stickney*, 864 F. Supp. 1222, 1239 (S.D. 1994).

addition, FEMA acknowledges its discretion with respect to crafting flood hazard maps, which provides to communities “accurate flood hazard and risk data to guide then to mitigation actions.”²²⁴ These two actions alone afford FEMA the discretion and ability to fulfill its ESA conservation obligations.

The recent biological opinions and lawsuits illustrate the type of approaches to minimizing adverse impacts to affected species and their habitats, including the monitoring of these efforts. These are illustrative of the measures that FEMA should be implementing but are not in the NFIP, thereby violating its basic mandate under the ESA. These examples, as outlined in the Biological Opinion done for NFIP’s implementation in Oregon in 2016,²²⁵ include:

- Interim measures that FEMA and NFIP-participating communities can promptly implement to reduce the impacts of floodplain development on natural floodplain functions needed to support certain listed species. Interim measures can be implemented in anticipation of FEMA’s separate completion of mapping updates and modifications to NFIP’s minimum criteria and reporting requirements.
- Revised mapping protocols to improve the identification of special hazard areas, including channel migration zones and areas of future risk for listed species and their habitats.
- Revised floodplain management criteria to provide greater certainty that the impacts of development in area of high hazard will be avoided, minimized, and mitigated to protect natural floodplain functions to support any affected listed species and their habitats.
- Data collection and reporting requirements needed to accurately track floodplain development impacts and these reasonable and prudent measures’ implementation.
- Compliance and enforcement strategies to ensure that effects of floodplain development pursuant to the NFUP are avoided or reduced throughout the action area.²²⁶

These and similar approaches are precisely the kinds of measures that the ESA calls for—and obligates agencies to undertake. Further, FEMA has the discretion to implement these measures by including them in the flood management criteria, and monitoring them accordingly. Similarly, the Puget Sound Biological Opinion made very strict recommendations for alternatives to the current approach to issuing federal flood insurance. Possibly the most influential element of the opinion was a statement that required any development in the 100 year floodplain to be mitigated

²²⁴ BE at 31.

²²⁵ NMFS, ESA Section 7(a)(2) Jeopardy and Adverse Modification of Critical Habitat Biological Opinion for the Implementation of the NFIP in Oregon, dated April 14, 2016 (“Oregon NFIP BiOp”).

²²⁶ *Id.*

elsewhere, and that the development itself must meet low-impact standards to reduce problems of run-off and pollution. Overall, FEMA's failure to implement reasonable and prudent alternatives to the Proposed Action also illustrates the agency's non-compliance with the ESA.

E. FEMA must implement Endangered Species Act regulatory changes at 44 CFR § 60.3

Under the ESA Regulatory Changes, FEMA would establish performance standards in the minimum floodplain management criteria at 44 CFR § 60.3. Communities would be required to obtain and maintain documentation to show mitigation to the maximum extent possible from any impacts caused by floodplain development. FEMA states that because FWS and NMFS have never formally reviewed what it would take to comply with Sections 9 and 10 of the ESA, it cannot reasonably ascertain whether this would increase the levels of ESA compliance.²²⁷

Under Alternative 3, the ESA Regulatory Changes have the potential to reduce flood heights and velocities, and support fisheries, open space, and recreation, among other benefits to water resources.²²⁸ Restoring essential habitat through the required mitigation would benefit the terrestrial and aquatic species by reestablishing the natural environment and floodplain functions.²²⁹ FEMA further states, in the analysis of the chosen alternative, that there would be no change to existing legal compliance requirements associate with permits to develop the floodplain, but merely documents that compliance is occurring.²³⁰ This follows the admission in the beginning of the EIS that there needs to be changes to show that there is ESA compliance.²³¹

FEMA acknowledges that the placement of fill to remove a property from SFHA requirements may trigger the ESA if it caused adverse impacts to ESA-listed species or designated critical habitat. Under Alternative 3, a community that is not in compliance with the ESA would be required to mitigate the impacts to the maximum extent possible. Communities would be monitored for compliance, which would allow FEMA to make sure the changes are adhered to. This requirement would be in addition to FEMA's existing mandate to consult programmatically on the implementation of the NFIP.

Conclusion

Overall, the Center supports Alternative 3 provided that FEMA complies with federal laws that require it take into account climate change and sea level rise and that it use the best available science, and that it:

²²⁷ FEMA at 4-104.

²²⁸ *Id.* at 4-104.

²²⁹ *Id.* at 4-105.

²³⁰ *Id.* at 1-3.

²³¹ *Id.* at 1-5.

- (1) Incorporate any ESA-required RPMs or RPAs that result from ESA Section 7 consultation with the Services; and
- (2) Add ESA regulatory changes (at 44 C.F.E. 60.3) stating that:
 - a. FEMA retains discretionary control such that ESA compliance at the community level shall proceed via Section 7 consultation with FEMA; and
 - b. SFHA property owners who elevate properties must still comply with 44 C.F.R. 60.3's ESA regulations

Please contact me at 727-490-9190 or jlopez@biologicaldiversity.org with any questions or to discuss this matter.

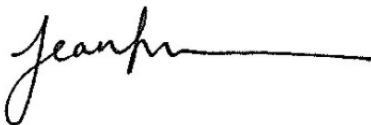
Sincerely,



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June 6, 2017

Via Electronic Docket
Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency, 8NE
500 C St. SW.
Washington, DC 20472

Re: Draft Nationwide Programmatic Environmental Impact Statement (NPEIS),
Docket ID FEMA-2012-0012

To Whom It May Concern:

The City of New York ("City") submits the following comments on the Federal Emergency Management Agency's ("FEMA") draft NPEIS evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program ("NFIP"). The draft NPEIS considers proposed modifications to the NFIP to (a) implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014; and (b) to demonstrate compliance with the Endangered Species Act ("ESA"). The City has no comment on FEMA's implementation of the changes to the NFIP because they are legislatively required. While the City believes that additional NFIP reform is needed to make the NFIP better suited to the needs of cities and their residents, it is advocating for relevant legislation. The City's comments on the draft NPEIS thus focus on the proposed alternatives for ESA compliance.

In terms of the proposed alternatives for ESA compliance, the City objects to the proposed requirements in Alternatives 2, 3 and 4 requiring a community to obtain and maintain documentation with respect to any floodplain development's compliance with ESA. This requirement is overly burdensome on both the local community and individual property owners. Currently, in 44 CFR 60.3(a)(2), FEMA requires that:

(a)...the community shall:

...

(2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1334;

If a proposed development requires federal permits, under the current regulations the applicant would have to demonstrate ESA compliance to the federal permitting agency, not the local community. If a proposed development does not require federal permits, would not constitute a “taking” under the ESA, nor is otherwise subject to environmental review under the National Environmental Policy Act, a demonstration of ESA compliance is not currently required in the development approval process. Adding this requirement for all proposed floodplain development is overly burdensome. The City agencies that review development applications, DOB and the New York City Department of Small Business Services (“SBS”), do not have the staff or resources to affirmatively engage in the correspondence needed to document ESA compliance on behalf of a private applicant for all floodplain development, nor to maintain records of this documentation. In fiscal year 2015 DOB received around 7,500 applications for construction in a floodplain, and in fiscal year 2016 DOB received around 8,500 applications.¹ Likewise, individual property owners should not be subject to a requirement to correspond with federal agencies and impose any requested mitigation if those property owners are not otherwise triggering the requirements of ESA.

In addition to the City’s substantive objection to the proposed ESA compliance requirements, the City objects to FEMA’s method of imposing such requirement in Alternative 2, FEMA’s preferred alternative. While Alternatives 3 and 4 propose imposing the proposed requirements through new regulations, Alternative 2 proposes interpreting the new ESA compliance requirements into 44 CFR 60.3(a)(2). As quoted above, section 60.3(a)(2) is limited to ensuring permit compliance and cannot be used to require a community, or an individual applicant, to document ESA compliance and maintain records of that documentation when a federal permit is not otherwise required. If FEMA imposes new ESA compliance documentation and recordkeeping requirements, and it should not, FEMA must impose them by duly promulgating new regulations instead of the method contemplated in Alternative 2.

¹ In New York City waterfront development must receive permits from SBS, not DOB, and so these figures do not capture the total number of construction permit applications from the flood zone that would be subject to the proposed ESA compliance requirements.

Thank you for the opportunity to comment.

Sincerely,

/s/

Sarah Kogel-Smucker
Susan E. Amron
Assistant Corporation Counsels

cc:

Daniel A. Zarrilli, Chief Resilience Officer, New York City Office of the Mayor
Robin Levine, Senior Environmental Counsel, New York City Department of
Environmental Protection

Andrew Schwartz, Deputy Commissioner, Department of Small Business Services

Mona Sehgal, General Counsel, New York City Department of Buildings



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June 6, 2017

Submitted via regulations.gov and via email to Bret.Gates@fema.dhs.gov only

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW
Washington, DC 20472

Re: Docket ID FEMA-2012-0012

To Whom It May Concern:

The City of Portland's inter-bureau staff team responsible for managing Portland's response to FEMA guidance on the National Marine Fisheries Service's (NMFS) Biological Opinion on FEMA's National Flood Insurance Program in Oregon (Oregon BiOp) would like to thank FEMA for the opportunity to comment on its National Flood Insurance Program (NFIP) Draft Programmatic Environmental Impact Statement (PEIS).

Please note that this response to the PEIS is limited, and narrowly focuses on the elements of the PEIS that relate to Endangered Species Act (ESA) compliance. In addition, the comments provided in this memo are high-level, and do not address the details of the implications of the proposed alternatives. The City staff working on the Oregon BiOp, in coordination with FEMA and NMFS, did not receive official direct notification of the PEIS release in March, and was only made aware of this process in May; and therefore was unable to take advantage of the full 60-day review period. Timely notification of the release of the PEIS would have allowed the team to review the implementation implications of each alternative in detail, and to assess descriptions of environmental conditions and potential impacts in Oregon, and to review other elements of the PEIS, as appropriate.

Relationship to the Oregon NFIP Biological Opinion – Communities in Oregon are currently awaiting guidance from FEMA on NMFS' Biological Opinion for FEMA's NFIP in Oregon (Oregon BiOp). The PEIS does not address how changes implemented under any of the proposed alternatives would relate to, influence, or otherwise interact with the Oregon BiOp. The omission of information related to the Oregon BiOp creates uncertainty. We urge you to provide clarity around the interaction between programmatic changes to the NFIP and the Oregon BiOp, as that will help us create a better, more informed and thorough response.

Provide Local Flexibility and Strong Policy Support – Given the wide variation in local environmental conditions, and regulatory structures—Oregon has a complicated statewide land use planning system and jurisdictions have different listed species with different needs—local flexibility built on minimum performance standards will provide agencies with a better opportunity

to meet their specific local needs, while meeting the intent of the ESA. Performance standards ought to be crafted in such a way that local permitting authorities can develop a well-functioning system that builds on existing practices, while meeting ESA goals and protecting species and habitat. Clear and instructive federal policies that direct local agencies to ensure ESA compliance will improve the ability of local agencies to successfully implement ESA-compliant regulations.

Funding and Technical Assistance for Program Start-up – Addressing ESA compliance at the local level will be costly and challenging. It will require new review procedures, ensuring staff has the appropriate knowledge and skills to review application materials for compliance with federal rules, in addition to local and state rules; and it will require applicants to invest notably more time, money, and effort in their projects. Federal funding to support this work at the municipal level, and technical assistance for applicants and City staff, would significantly aid the process and outcomes at the community level.

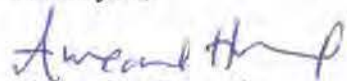
Coordinated Federal Process and On-going Consultation Assistance – Similarly, if the City is to be responsible for reviewing for ESA compliance, assurance that federal experts will be available for informal and formal discussions on an on-going basis would be greatly appreciated.

Communications and Notification – To improve local tracking and communications, and regional coordination, please provide the City of Portland with a list of contacts and departments that received notification of the PEIS in Oregon. City staff working on the Oregon BiOp did not receive direct notification of the PEIS. Please add me to your contact list.

With numerous projects related to flooding and flood protection, including the recertification of Columbia River Levees, expansive and frequent communication with local governments would be greatly appreciated and would help ensure a more productive process, and ensure that the implications to a variety of programs are thoughtfully addressed.

I look forward to continued collaboration with FEMA on the response to the BiOp and on the further development of the PEIS and guidance regarding updates to the NFIP.

Thank you,



Alexandra Howard
FEMA BiOp Program Manager
Office of Management and Finance

CC: FEMA BiOp Staff Team, City of Portland



June 1, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

**Re: National Flood Insurance Program Draft Nationwide Programmatic
Environmental Impact Statement**

Dear Federal Emergency Management Agency (FEMA):

Thank you for this opportunity to comment on the draft Nationwide Programmatic Environmental Impact Statement (DNPEIS) for the National Flood Insurance Program (NFIP). The Sabin Center for Climate Change Law at Columbia Law School recognizes the critical importance of the flood insurance to many Americans' decisions about where to live and to invest their money and resources and submits the following observations about and recommendations for the DNPEIS's approach to climate change:

- (1) The DNPEIS impermissibly ignores the NFIP's effect on floodplain development:** One of the stated goals of the NFIP Act is to "drive development away from" flood prone areas. Whether the NFIP has in fact deterred – or conversely, induced – floodplain development should be explored both as a policy matter and because it has critical implications for the environmental outcomes of the program. FEMA stated that it would analyze this issue in the scoping documents for this review, but has summarily dismissed the issue in the DNPEIS. This violates the requirement of the National Environmental Policy Act (NEPA) to evaluate indirect effects, including growth-inducing effects.
- (2) The DNPEIS impermissibly ignores how climate change may exacerbate the environmental impacts and public health risks associated with induced floodplain development and fails to explore alternatives or mitigation measures that might address risks that are compounded by climate change:** The DNPEIS contains an extensive discussion of how climate change will affect floodplains and coastlines as part of the discussion of the "affected environment" for this program. However, because FEMA has ignored the impacts of the NFIP on floodplain development, it has also ignored the ways in which climate change will exacerbate risks associated with induced floodplain development (and correspondingly, whether and to what extent the program is increasing human exposure to climate-related risks). The DNPEIS also fails to consider potential alternatives and mitigation measures that could mitigate these risks.

- (3) The DNPEIS’s reasoning fails to adequately explain FEMA’s decision to not incorporate climate change impacts in flood maps:** In the section titled, Incorporating Climate Change in Flood Maps, the DNPEIS states that FEMA will make no changes to its regulatory program involving “the mapping of climate change” because currently available technical methodologies cannot provide “consistent, credible results.” But if “credible” results are FEMA’s aim, then the NFIP *must* provide policyholders and communities with information about future climate change-related impacts based on the latest science. As indicated in section 5, there are multiple credible sources of data on downscaled sea level rise projections that could be incorporated into flood maps’ advisory layers.
- (4) The DNPEIS should draw on what the Technical Mapping Advisory Committee’s report on future conditions actually said:** The DNPEIS refers to the Technical Mapping Advisory Committee (TMAC)’s 2015 report on future conditions and flood risk, but fails to take up that report’s recommendations and instead announces a decision that runs contrary to them.
- (5) FEMA should be aware of the numerous high-quality sea level rise and flood risk projections developed for downscaled applications.**

These observations and recommendations are discussed in greater detail below.

1. The DNPEIS impermissibly ignores the NFIP's effect on floodplain development.

When Congress established the NFIP in 1968, it noted that one objective of the program was to discourage new development in areas susceptible to flooding.¹ Congress therefore explicitly recognized that the implementation of the NFIP would have some effect on floodplain development. At the same time, Congress recognized that “many factors have made it uneconomic for the private insurance industry alone to make flood insurance available to those in need of such protection” and thus a federal flood insurance scheme was needed to help mitigate flood-related losses.² In the years since then, the availability of publically subsidized federal flood insurance has benefitted NFIP participants, but many commentators are concerned that it has also had the unintended effect of encouraging floodplain development, thus undermining a core goal of the statute.³

¹ 42 U.S.C. § 4001(e) (recognizing that the NFIP could be used to “guide the development of proposed future construction... away from locations which are threatened by flood hazards”).

² 42 U.S.C. § 4001(b).

³ See Walter A. Rosenbaum & Gary Boulware, American Institutes for Research, *The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report*, prepared for FEMA as part of the 2001-2006 Evaluation of the National Flood Insurance Program (2006); Beth Davidson, *How Quickly We Forget: The National Flood Insurance Program and Floodplain Development in Missouri*, 19 WASHINGTON UNIVERSITY JOURNAL OF LAW & POLICY 365 (2005).

The question of whether and to what extent the NFIP is inducing or discouraging floodplain development should be central to this environmental review, both as a policy matter (to determine whether the program is fulfilling statutory objectives) and because induced floodplain development is the primary channel through which the NFIP affects the environment. Indeed, FEMA even cited this issue as one of the driving forces behind its decision to prepare a full programmatic EIS.⁴ But FEMA has apparently reversed course since the scoping phase of this environmental review: the DNPEIS ignores the effects of the NFIP on floodplain development, and as a result, it contains almost no analysis of the program's environmental impacts.⁵ FEMA has justified this omission by asserting that induced development is neither a direct nor indirect effect of the NFIP. For the reasons that follow, we believe that induced development is precisely the sort of indirect effect that must be analyzed in the DNPEIS.

In its NEPA analysis, FEMA is required to consider "indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."⁶ Such effects "may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems."⁷ If an action undergoing NEPA review is likely to significantly affect development in a particular area, that effect is almost always treated as an indirect effect in NEPA documents.⁸ Where there are uncertainties about the effect of a proposed action on development, but that effect may nonetheless be significant, the agency must disclose this uncertainty and include available information about the impact in the EIS.⁹ Moreover, the degree to which an effect is "highly uncertain or involve[s] unique or unknown risks" is one of the factors that would support a finding that the effect is significant.¹⁰

FEMA asserts that the causation and foreseeability elements are lacking in this context, specifically that the "linkage between the availability of flood insurance and resulting impacts on development or the environment is tenuous" and that the NFIP "does not cause development to occur, and does not play a significant role in facilitating or encouraging floodplain development."¹¹ But FEMA fails to cite any authority to support these assertions, and ignores congressional recognition and other existing evidence of the relationship between the availability of subsidized flood insurance and floodplain development.

⁴ FEMA, *NFIP Programmatic Environmental Impact Statement: Proposed Areas for Analysis* (2012); FEMA, *National Flood Insurance Program (NFIP) Programmatic EIS (PEIS): The Environmental Impact Statement Process* (2012).

⁵ FEMA, *National Flood Insurance Program Draft NPEIS* (2017) at ES-8 (Table ES-2 shows no adverse environmental effects).

⁶ 40 C.F.R. § 1508.8(b).

⁷ *Id.*

⁸ *See, e.g., City of Davis v. Coleman*, 521 F.2d 661, 675 (9th Cir. 1975); *Nat. Res. Def. Council, Inc. v. Dep't of Energy*, No. C-04-04448 SC, 2007 WL 1302498, at *16 (N.D. Cal. May 2, 2007), amended, No. C-04-04448 SC, 2007 WL 2349288 (N.D. Cal. Aug. 15, 2007); *W. Land Exch. Project v. U.S. Bureau of Land Mgmt.*, 315 F. Supp. 2d 1068, 1089 (D. Nev. 2004).

⁹ 40 C.F.R. § 1502.22.

¹⁰ 40 C.F.R. § 1508.27.

¹¹ NPEIS at 4-4.

As noted above, the primary way in which the NFIP affects floodplain development is through the provision of subsidized flood insurance. There are two types of subsidies offered through the program. The first is a dedicated subsidy for properties that were “grandfathered” into the program¹² – FEMA explicitly recognizes that these rates are “subsidized” and contemplates different strategies for rolling back these subsidies in the DNPEIS (and yet fails to consider how rolling back subsidies may affect floodplain development).¹³ The second is a more general subsidy that applies to many other NFIP participants: these property owners are able to obtain federal insurance even where private insurance would be prohibitively expensive.¹⁴ As a result of these subsidies, the program has been operating at a massive deficit.¹⁵ This was precisely what drove Congress to enact the Biggert-Waters Flood Insurance Act, which was aimed at phasing out the subsidies and increasing flood insurance premiums.¹⁶ While many provisions of that Act were later repealed, the underlying concern about federal flood insurance subsidies remains.

The provision of subsidized flood insurance creates an incentive for development in floodplains. A 2006 study commissioned by FEMA confirmed this fact. The authors of that study acknowledged that the NFIP’s influence on floodplain development was “nuanced” but nonetheless found ample evidence that the program does “reduce barriers to development by reducing economic and flood risk to property owners.”¹⁷ The study also found that: (i) the availability of flood insurance is one of the two most significant factors driving decisions to develop, buy or build in flood risk areas (the other factor being the property characteristics), and (ii) the NFIP’s influence on floodplain development “appears to be greatest in coastal states and communities.”¹⁸

At the same time, the study recognized that the NFIP can also “encourage floodplain conservation and the protection of environmental values,” primarily through flood risk management requirements.¹⁹ This is another way in which the NFIP can affect floodplain development and the corresponding environmental outcomes, and is therefore another issue that should be considered in the DNPEIS.

In sum: Congress intended for the NFIP to affect floodplain development patterns when it first introduced the program, and empirical studies have found that the NFIP does indeed affect

¹² U.S. Government Accountability Office (GAO), *Flood Insurance: Public Policy Goals Provide a Framework for Reform*, GAO-11-670T (2011).

¹³ See, e.g., NPEIS at 4-11.

¹⁴ GAO (2011), *supra* note 12; Omri Ben-Shahar & Kyle Logue, *The Unintended Effects of Government-Subsidized Weather Insurance*, REGULATION (Fall 2015); Sarah Fox, *This is Adaptation: The Elimination of Subsidies Under the National Flood Insurance Program*, 30 COLUMBIA JOURNAL OF ENVIRONMENTAL LAW 205 (2014); Scott Gabriel Knowles & Howard C. Kunreuther, *Troubled Waters: The National Flood Insurance Program in Historical Perspective*, 26 JOURNAL OF POLICY HISTORY 327 (2014).

¹⁵ Knowles & Kunreuther (2014), *supra* note 14.

¹⁶ Ben-Shahar & Logue (2015), *supra* note 14.

¹⁷ Rosenbaum & Boulware (2005) at ix.

¹⁸ *Id.*

¹⁹ *Id.*

development – although perhaps not in the ways that Congress initially intended. There are still many unanswered questions about the nature of this effect,²⁰ and FEMA has explicitly recognized a need to conduct a more in-depth assessment on this topic.²¹ FEMA’s new position (that the NFIP does not affect floodplain development) conflicts with its prior statements as well as Congress’s vision of what the program should achieve. FEMA has already dedicated considerable time and resources to this review: rather than ignoring what is arguably the most significant environmental question pertaining to the program, FEMA must use this opportunity to conduct a meaningful review of how the NFIP affects floodplain development and the corresponding environmental outcomes.

2. The DNPEIS impermissibly ignores how climate change may exacerbate the environmental impacts and public health risks associated with induced floodplain development and fails to explore alternatives or mitigation measures that might address risks that are compounded by climate change.

To comply with NEPA, federal agencies must evaluate an action in relation to foreseeable future baseline environmental conditions.²² That is, agencies like FEMA must define the timeframe appropriate for the action—in this case, the next fifty years or more²³—and define an environmental baseline that incorporates conditions anticipated to be relevant to the action and its impacts over that timeframe.²⁴ In instances like the present action, where materially different future environmental conditions are foreseeable and highly relevant to the goals of the lead agency for the action at issue, this amounts to a requirement that an agency consider how environmental conditions may change over the duration of the project. In other words, FEMA must account for the effects of climate change in the area affected by the NFIP.²⁵

²⁰ NFIP Evaluation Final Report Working Group, *An Evaluation of the National Flood Insurance Program: Final Report*, prepared for FEMA as part of the 2001-2006 Evaluation of the National Flood Insurance Program (2006) at 39.

²¹ FEMA, *NFIP Programmatic Environmental Impact Statement: Proposed Areas for Analysis* (2012); FEMA, *National Flood Insurance Program (NFIP) Programmatic EIS (PEIS): The Environmental Impact Statement Process* (2012).

²² See CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* 29, 41, 42, 50 (1997) [hereinafter “Considering Cumulative Effects Under NEPA”], available at <https://perma.cc/X3E8-KDR8>; 40 C.F.R. 1502.15 (defining “affected environment”); see also *California ex rel. Imperial Cty. Air Pollution Control Dist. v. U.S. Dept. of Interior* (9th Cir. 2014) (agency properly considered future conditions when establishing “no action” alternative); *Or. Nat. Resources Council Fund v. Brong* (9th Cir. 2007) (agency failed to consider future effects of other actions in cumulative effects analysis); *Klamath-Siskiyou Wildlands ctr. v. Bureau of Land Management* (9th Cir. 2004) (agency failed to consider future effects of other actions in cumulative effects analysis); *Am. Canoe Ass’n v. White* (N.D. Ala., 2003) (agency failed to consider future condition of project).

²³ FEMA has not specified a timeframe for the duration of the NFIP, but the buildings that are constructed as a result of the program could very well remain in place for fifty years or more.

²⁴ *Supra* note 22. See also *California ex rel. Imperial Cty. Air Pollution Control Dist. v. U.S. Dept. of Interior* (9th Cir. 2014) (agency properly considered future conditions when establishing “no action” alternative); *Or. Nat. Resources Council Fund v. Brong* (9th Cir. 2007) (agency failed to consider future effects of other actions in cumulative effects analysis); *Klamath-Siskiyou Wildlands ctr. v. Bureau of Land Management* (9th Cir. 2004) (agency failed to consider future effects of other actions in cumulative effects analysis); *Am. Canoe Ass’n v. White* (N.D. Ala., 2003) (agency failed to consider future condition of project).

²⁵ This is sometimes referred to as a “reverse” environmental impact analysis. See Michael Gerrard, *Reverse Environmental Impact Analysis: Effect of Climate Change on Projects*, 247(45) *New York Law Journal* (2012);

The critical question is whether climate change will exacerbate environmental risks associated with the NFIP and vice versa. There are several ways in which the NFIP and climate change may compound risks associated with flooding:

- First, there is the possibility of induced development: if the NFIP does indeed encourage development in floodplains due to lower insurance costs, then the program is increasing the exposure of people and property to flood risks that will be exacerbated by sea level rise and extreme precipitation events. FEMA should account for this when evaluating the extent to which the program induces floodplain development and the corresponding environmental impacts.
- Second, there is the transfer of information about flood risk and risk reduction practices: the NFIP translates estimates of flood risk for a given area into mapping data and provides information about how to mitigate flood risk to residents and localities. If the maps and information provided are not updated to reflect the possibility of increased flooding due to sea level rise and heavy precipitation events, then FEMA will be providing inaccurate information that could lead to maladaptive choices.
- Third, the NFIP establishes specific requirements for construction and development in floodplains. Again, if these requirements do not reflect the possible effects of climate change on flood risk, then they may result in maladaptation, including investments in flood protection measures that will ultimately prove inadequate.

An analysis of climate change impacts is also necessary in order to fulfill the stated purpose of the DNPEIS, which is “to evaluate proposed modifications to the National Flood Insurance Program” in conformity with the requirements of the National Environmental Policy Act of 1969 (NEPA).²⁶ Underlying that purpose is the fact that, “[f]or the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure must reflect the true risks and costs of flooding.”²⁷ FEMA cannot determine the “true risks and costs of flooding” without accounting for how climate change may affect those risks and costs.

By evaluating how climate change may exacerbate flood risks, FEMA will be in a better position to review potential alternatives and mitigation measures to help reduce those risks. For example, one alternative proposed by FEMA would be to phase out flood insurance subsidies. FEMA may find that a more expedient phase out of such subsidies is warranted in order to remove incentives for floodplains development in certain high-risk areas, such as low-lying coastlines. FEMA could also use data about the effects of climate change to introduce more protective flood risk management standards. Finally, FEMA should consider how updating the Flood Insurance Rate Maps (FIRMs) to account for climate change impacts would reduce flood risk and incentives for

Teresa Parejo Navajas, *Reverse Environmental Assessment Analysis for the Adaptation of Projects, Plans, and Programs to the Effects of Climate Change in the EU: Evaluation of the Proposal for an EIA Directive* (Columbia Public Law Research Paper No. 14-445, 2015).

²⁶ NPEIS at 1-1.

²⁷ *Id.* at 1-4.

floodplains development. As discussed below, TMAC has recommended that FEMA inform participants in the NFIP about how sea level rise will affect flood risk, and FEMA has a legal obligation to incorporate TMAC's recommendations into FIRM and flood insurance study updates. FEMA could fulfill its obligation by adding an advisory map layer to FIRMs showing the effects of sea level rise—an action that should be evaluated in the DNPEIS. FEMA should also consider the option of incorporating sea level rise projections into the FIRMs such that those projections would influence insurance rates and what effect this action would have on floodplain development.

3. The DNPEIS's reasoning does not adequately support FEMA's decision to not incorporate climate change impacts in flood maps.

FEMA indicates in its DNPEIS that it will not incorporate climate change impacts into floodplain maps on a programmatic basis. It does so in the paragraph captioned "Incorporating Climate Change in Flood Maps," which responds to commenters who encouraged FEMA to incorporate climate change impacts into its maps. That DNPEIS paragraph states in pertinent part as follows:

The TMAC 2015 Future Conditions Risk Assessment and Modelling [sic] Report . . . note[s] that there is not sufficient, actionable science for addressing climate change impacts to watershed hydrology and hydraulics. At this time, it would be inappropriate for FEMA to make regulatory changes to its national program that would require the mapping of climate change without sufficient, actionable science and mapping methodologies to implement these changes and deliver consistent, credible results.²⁸

To begin, this excerpt's reference to the 2015 TMAC report is selective and misleading. The report does state that "[n]o actionable science exists at the current time to address climate change impacts to watershed hydrology and hydraulics,"²⁹ but only in reference to *riverine* watersheds. The DNPEIS nonetheless reproduces that language in a way that wrongly implies that the TMAC report used it to describe the state of the science with respect to coastal floodplains as well as riverine ones. The paragraph's next sentence uses the same key language—"actionable science"—and implies that its point builds on a purportedly general conclusion of the TMAC. As explained further in part four, below, this was not a general conclusion and the DNPEIS's implication is at odds with what TMAC actually recommended in its 2015 report.

There are two further problems with FEMA's reasoning: an incorrect implicit assumption and an important omission. The assumption is that current flood maps, which ignore climate change and sea level rise, are "credible," and that incorporating the downscaled projected impacts of climate change into flood maps' regulatory component would undermine that credibility. Even allowing that downscaled projections of sea level rise and other climate change impacts are generally

²⁸ NPEIS at 2-16.

²⁹ Technical Mapping and Advisory Council, Future Conditions Risk Assessment and Modeling 16 (Dec. 2015) [hereinafter "TMAC (2015)"].

imprecise at the local level, this assumption gets things backwards. The DNPEIS's own thorough description of climate change and sea level rise³⁰—as well as TMAC's 2015 report, AECOM's 2013 report,³¹ and other resources cited in the DNPEIS³²—all make plain that current maps are credible only if one reads them as *not* describing the foreseeable future, because the climate and coastlines will be different in future decades than they are according to existing flood maps. As noted in parts 1 and 2 of these comments, however, policyholders and communities rely heavily on these maps to make decisions about investments whose life will span decades. Indeed, as the DNPEIS itself states, “[t]he FIRM and FIS report provide States and communities with the information needed for land use planning and to reduce risk to floodplain development.”³³ In addition to all these points—which draw on the DNPEIS's own contents and citations—it should also be noted that New York State, for example, by issuing sub-regional sea level rise projections through 2100, has taken steps that belie FEMA's suggestion that downscaling projected climate change and sea level rise impacts cannot improve flood mapping at the present time.³⁴

The important omission in FEMA's reasoning relates to the *nonregulatory* aspects of flood maps. The DNPEIS's explanation of why climate change should be ignored only refers to “regulatory changes,” and fails to mention the advisory components of flood maps, such as future conditions layers, which do not prescribe anything to policyholders or communities but only supply them with information about salient risks. This omission should be corrected because incorporating climate change impacts into advisory mapping information would be the best means of achieving the DNPEIS's stated goal of ensuring that the NFIP “deliver[s] consistent, credible results.”³⁵

4. Contrary to statements and implications in the DNPEIS, TMAC's recommendations encourage FEMA to integrate climate change and SLR considerations into NFIP materials, including flood maps.

FEMA's DNPEIS points to the TMAC 2015 report on future conditions and flood risks as a basis for its conclusion that climate change projections should not inform FEMA flood mapping products “at this time.”³⁶ This conclusion is contrary to several recommendations in TMAC's future conditions report, however, and FEMA should revise its DNPEIS to more closely conform to what the TMAC report actually recommends. Generally speaking, those recommendations encourage FEMA to provide individuals and communities participating in the NFIP with

³⁰ NPEIS § 3.13.

³¹ See AECOM, The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100 (June 2013) (anticipating that the special flood hazard area in coastal areas will grow 55% on average by 2100 and by 45% in riverine areas; and further that roughly 30% of this change will owe to population growth and 70% to climate change), <http://bit.ly/2qRR9GH>.

³² See, e.g., EPA, Climate Change Indicators in the United States (2012), <http://bit.ly/1ISjIIs>.

³³ NPEIS at 1-8.

³⁴ See 6 NYCRR 490 (Projected Sea Level Rise – Express Terms), available at <http://www.dec.ny.gov/regulations/103877.html> (listing expected sea levels for different regions in New York State at intervals stretching to 2100); Radley Horton et al., New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms, 1336 Ann. N.Y. Acad. Sci. 36 (2015).

³⁵ NPEIS at 2-16.

³⁶ *Id.*

mapping layers and other forms of nonregulatory information about flood risks arising from climate change impacts, sea level rise chief among them.³⁷

The following list of selected recommendations from TMAC's 2015 report is not exhaustive, but serves to highlight several points that FEMA should consider and incorporate in some fashion in the final version of its DNPEIS:

- Sub-Recommendation 4-4: FEMA should develop guidance for how local zoning and land use planning can be used to identify where and how land use will change in the future, and incorporate that into local hazard and risk modeling.
- Sub-Recommendation 5-2: FEMA should use a scenario approach for future conditions flood hazards calculation and mapping that will allow users to evaluate the robustness of proposed solutions to a range of plausible future conditions including uncertain land use and climate change impacts.
- Sub-Recommendation 5-4: FEMA should use Parriss, et. al., 2012,^[38] or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.
- Sub-Recommendation 5-5: FEMA should work with other federal agencies (e.g., NOAA, USACE, USGS), the U.S. Global Change Research Program (USGCRP), and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parriss, et al., 2012 scenarios, for the coastal regions of the United States out to the year 2100 that can be used for future coastal flood hazard estimation.
- Sub-Recommendation 5-12: FEMA should incorporate Local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process in one of the following ways:
 - Direct Analysis – Incorporate sea level rise directly into process modeling (i.e., surge, wave setup, wave runoff, overtopping, and erosion) for regions where additional sea level is determined to impact the Base Flood Elevation non-linearly (for example, where a 1-foot sea level rise equals a two-foot or more increase in the base flood).
 - Linear Superposition – Add sea level to the final calculated total water level and redefine the Base Flood Elevation for regions where additional sea level is determined to impact the base flood linearly (for example, 1 foot of sea level rise equals a 1-foot increase in the base flood). Wave effects should be calculated based on the higher Stillwater, including sea level rise.
- Sub-Recommendation 5-13: Maps displaying the location and extent of areas subject to long-term coastal erosion and future sea level rise scenarios should be advisory (non-regulatory) for Federal purposes. Individuals and jurisdictions can use the

³⁷ See TMAC (2015) at 7 (“The TMAC recommends that all future conditions flood risk information be non-regulatory.... However, communities should be allowed—and encouraged—to adopt the future conditions flood hazard products, tools, and information for local regulatory purposes and decision-making on the local level.”).

³⁸ Adam Parriss et al., Global Sea Level Rise Scenarios for the United States National Climate Assessment, NOAA Technical Report OAR CPO-1 (Dec. 2012), <http://bit.ly/2qSAC56>.

information for decision-making and regulatory purposes if they deem appropriate. [As noted in TMAC's report, this can be accomplished by adding advisory layers to the FIRMs that reflect sea level rise.]

- Recommendation 7: Data and analysis used for future conditions flood risk information and products should be consistent with standardized data and analysis used to determine existing conditions flood risk, but also should include additional future conditions data, such as climate data, sea level rise information, long-term erosion data....

As these recommendations and sub-recommendations make clear, TMAC has encouraged FEMA to incorporate climate change impacts into the information—including maps—provided to participants in the NFIP, albeit in an advisory rather than regulatory fashion. FEMA is legally required to incorporate TMAC's risk assessment and recommendations into its ongoing review and update of the FIRMs.³⁹ This obligation extends to TMAC's recommendations to incorporate Local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process and to provide advisory maps showing how sea level rise and erosion will affect flood risk.

5. FEMA should be aware of the numerous high-quality sea level rise and flood risk projections developed for downscaled applications.

The following projections of sea level rise and flood risk were developed by various entities for use in downscaled applications. The resources below are listed in reverse-chronological order and include items that are several years old to illustrate that the task of developing and applying downscaled sea level rise-related flood risk projections is not a new one. The footnote for each resource provides a stable internet link.

- Resources created and maintained by the National Oceanic and Atmospheric Administration (NOAA):
 - Global and Regional Sea Level Rise Scenarios for the United States (Jan. 2017) (including, for the first time, regional projections);⁴⁰
 - A survey of tidal flooding in numerous cities published in 2015;⁴¹
 - NOAA's digital coast website,⁴² which has supported the development of multiple sea level rise vulnerability assessments for specific localities and assets;⁴³
- Climate Central's Surging Seas website.⁴⁴
- County of San Mateo, Sea Level Rise Vulnerability Assessment, Draft Report (Apr. 2017);⁴⁵

³⁹ 42 U.S.C. § 4101a(d)(2).

⁴⁰ <https://perma.cc/N9AG-8Y6S>.

⁴¹ <https://perma.cc/9PHH-2ZJ6>.

⁴² <https://coast.noaa.gov/digitalcoast/tools/slr>.

⁴³ See, e.g., Shirley Qian, Capitol Corridor Joint Powers Authority Sea Level Rise Vulnerability Assessment (Aug. 2014), <https://perma.cc/Z7YE-3C2J>.

⁴⁴ <http://sealevel.climatecentral.org/>.

⁴⁵ <http://bit.ly/2qk21gq>.

- Monterey Bay Sea Level Rise Vulnerability Assessment, Technical Methods Report (June 2014).⁴⁶
- Delaware Department of Natural Resources and Environmental Control, Preparing for Tomorrow's High Tide: Sea Level Rise Vulnerability Assessment for the State of Delaware (July 2012),⁴⁷ and Delaware Department of Natural Resources and Environmental Control, Preparing for Tomorrow's High Tide: A Mapping Assessment (July 2012).⁴⁸

The following are examples of resources that highlight the ready availability of data on sea level rise and the absurdity of the premise that coastal flood risk projections are more credible if they ignore sea level rise:

- Scott Kulp & Benjamin H. Strauss, *Rapid escalation of coastal flood exposure in US municipalities from sea level rise*, 142 Climatic Change 477 (2017);⁴⁹
- Kristina A. Dahl et al., *Sea level rise drives increased tidal flooding frequency at tide gauges along the U.S. East and Gulf Coasts: Projections for 2030 and 2045*, 12 PLoS ONE 1 (Feb. 2017);⁵⁰
- Mathew E. Hauer et al., *Millions projected to be at risk from sea-level rise in the continental United States*, 6 Nature Climate Change 691 (July 2016).⁵¹

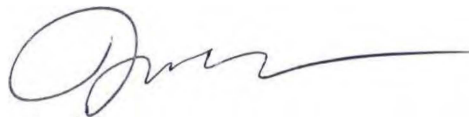
* * *

We appreciate this opportunity to comment on the NFIP draft DNPEIS. Please do not hesitate to contact us with any questions about our observations and recommendations.

Sincerely,



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⁴⁶ <https://perma.cc/29LS-FRQM>.

⁴⁷ <https://perma.cc/A5SJ-DTGH>.

⁴⁸ <https://perma.cc/5ENU-AUP9>.

⁴⁹ <https://perma.cc/8AX8-S3RD>.

⁵⁰ <https://perma.cc/TJS4-JY3E>.

⁵¹ <https://perma.cc/2DBQ-5L9M>.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 06 2017

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Mr. Bret Gates
Federal Emergency Management Agency
Docket ID FEMA-2012-0012
Federal Insurance and Mitigation Administration
Floodplain Management Division
400 C Street, SW
Washington, DC 20472

Dear Mr. Gates:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, the Environmental Protection Agency (EPA) has reviewed the Federal Emergency Management Agency's (FEMA) draft programmatic environmental impact statement (PEIS) for the National Flood Insurance Program (NFIP) (CEQ No. 20170052). The PEIS looked at the following program modifications to the NFIP: a) to implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014; and b) to demonstrate compliance with the Endangered Species Act. FEMA's preferred alternative is to implement the legislatively required changes, floodplain management criteria guidance, and mapping modifications.

The EPA appreciates FEMA's efforts to actively engage the EPA early on in the process as a cooperating agency. The EPA believes that FEMA conducted a thorough and well thought out analysis that lead to a preferred alternative that would cause the least environmental impact overall. The EPA has rated the draft PEIS as LO – "Lack of Objections." A summary of the EPA's rating is enclosed.

We appreciate the opportunity to collaborate with FEMA and look forward to providing any assistance you may need to develop or review the final PEIS. My point of contact for this review is Candi Schaedle at (202) 564-6121.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert Tomiak", is written over a horizontal line.

Robert Tomiak
Director
Office of Federal Activities

Enclosure

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION^{*}

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impacts. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS state, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1-Adequate

The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collecting is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

^{*}From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions Impacting the Environment.



Energy and Wildlife Action Coalition
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June 6, 2017

**Comments regarding the April 7, 2017
Draft Nationwide Programmatic Environmental
Impact Statement Evaluating the Environmental
Impacts of Proposed Modifications to the
National Flood Insurance Program**

Submitted by:

Energy and Wildlife Action Coalition

Filed electronically to the attention of:

Docket ID FEMA-2012-0012
Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW.
Washington, DC 20472

The Energy and Wildlife Action Coalition ("EWAC") submits these comments in response to the Federal Emergency Management Agency's ("FEMA") draft nationwide programmatic environmental impact statement ("NPEIS") evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program ("NFIP").¹

EWAC is a national coalition formed in 2014 whose members consist of electric utilities, electric transmission providers, and renewable energy entities operating throughout the United States, and related trade associations. The fundamental goals of EWAC are to evaluate, develop, and promote sound environmental policies for federally protected wildlife and closely related natural resources while ensuring the continued generation and transmission of reliable and affordable electricity. EWAC supports public policies, based on sound science, that protect wildlife and natural resources in a reasonable, consistent, and cost-effective manner.

In the NPEIS, FEMA explains that the Preferred Alternative (Alternative 2) includes actions to:

- Clarify that pursuant to 44 C.F.R. § 60.3(a)(2),² a community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing floodplain development permits to develop in the floodplain.
- Clarify that the issuing of certain Letter of Map Change ("LOMC") requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the Endangered Species Act ("ESA").

EWAC member operations commonly invoke scenarios where LOMC and similar actions may be involved, and EWAC believes the Preferred Alternative should be reconsidered with respect to the above bullet points.

First, requiring project proponents to demonstrate ESA section 7 compliance is an inappropriate burden for project proponents to bear. ESA section 7 is directed at federal agencies and obligates the action agencies with the burden of demonstrating compliance with ESA section 7. By shifting this burden to project proponents, it puts project proponents in the awkward position of having to demand a section 7 review for their project without the federal action agency behind or involved in the request. During typical section 7 processes, if the U.S. Fish and Wildlife Service ("Service") reaches a conclusion that the action agency does not agree with, the Service's Consultation Handbook provides for dispute resolution procedures to resolve the conflict. However, if FEMA does not play its role in the section 7 consultation, the project proponent is left in a relatively ill-defined position.

FEMA should instead play a more active role in the process and/or provide a clear pathway for project proponents to follow that incorporates the ESA section 7 standards and constraints. FEMA should emphasize a programmatic approach to ESA section 7 compliance. For example, FEMA regulations set forth an 8-step process for coordinating floodplain

¹ 82 Fed. Reg. 17023 (April 7, 2017).

² Section 60.3(a)(2) currently requires that the administrator of the NFIP: "Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

management activities involving wetlands. 44 CFR 9.5(f)(2). FEMA should develop something similarly practical for ESA section 7 compliance.

Second, FEMA's Preferred Alternative suggests that a concurrence letter would be required even where the project proponent has reached a "no effect" conclusion, despite that such a concurrence letter is not required under ESA section 7 and in fact disfavored by some regions of the Service. A concurrence request ("no effect" or otherwise) from a project proponent is often not at the top of the Service's priorities for a number of reasons, not the least being that the Service operates with limited resources. Requiring such a showing for LOMCs would potentially subject the project proponent to project delays.

Further, the NPEIS contains several statements that adverse impacts to ESA-listed species and designated critical habitat must be "mitigated to the maximum extent possible."³ This standard has no basis in the ESA and particularly under ESA section 7, the section arguably triggered by FEMA LOMC approvals.⁴ While many of the references to this "maximum extent possible" standard occur within the discussions about Alternative 3, and we understand the preferred alternative is Alternative 2, should the FEMA decide to incorporate or move forward with aspects of Alternative 3, the NPEIS improperly characterizes the relevant standard under the ESA.

In sum, if FEMA requires demonstration of ESA compliance for its LOMCs, FEMA should take a more traditional "action agency" role or develop clear pathways that project proponents can follow instead of pushing the responsibility down to the project proponent with little guidance. FEMA is well poised to develop programmatic pathways that minimize the burden on both the Service and project proponents and minimize project delay. FEMA should also make clear that a concurrence letter from USFWS is not required where a project proponent and/or FEMA have reached a "no effect" conclusion.

EWAC appreciates this opportunity to comment and would welcome further dialogue with FEMA on the topics above.

Please feel free to contact the following EWAC representatives:

Richard J. Meiers, EWAC Policy Chair, jim.meiers@duke-energy.com, 980-373-2363

John M. Anderson, Nossaman LLP, EWAC Policy Director, janderson@nossaman.com, 202-887-1441

Alan M. Glen, Nossaman, LLP, Partner, aglen@nossaman.com, 512-813-7943

³ See e.g., NPEIS pps. 1-10, 2-4, 2-12, 4-12, 4-16.

⁴ ESA section 10 provides authorization for non-federal project proponents seeking authorization for take of listed species. ESA section 10 requires that such applicants demonstrate they will, "to the maximum extent practicable, minimize and mitigate the impacts of such taking." The phrasing used in the NPEIS resembles this standard, but the NPEIS phrasing is neither accurate, nor applicable to the NPEIS.

FORT BEND FLOOD MANAGEMENT ASSOCIATION
c/o Allen Boone Humphries Robinson LLP
3200 Southwest Freeway, Suite 2600
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June 6, 2017

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C St., SW – Room 8 NE
Washington, DC 20472 - 3100

Via electronic submission at www.regulations.gov

RE: Docket ID FEMA-2012-0012

Comments on the Federal Emergency Management Agency (FEMA) draft nationwide programmatic environmental impact statement (NPEIS) evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program (NFIP)

These comments are submitted in response to the April 7, 2017, Federal Register notice seeking public input on a draft NPEIS about the NFIP as required by the National Environmental Policy Act (NEPA). 82 FR 17023.

The Fort Bend Flood Management Association (FBFMA) board and member Levee Improvement Districts (LIDs) appreciate this opportunity to submit comments on draft NPEIS. The common mission of our member LIDs is to provide reliable flood protection to our respective leveed areas, and by working together to the whole of our community. We fully understand and appreciate the oft repeated saying of “Without flood control, nothing else matters.” That’s not just the case for states in the lower Mississippi valley, but holds true for many cities and towns like those in Fort Bend County, Texas, that have grown up along or near our nation’s waterways. Our primary concern with this draft NPEIS is that it seemingly sets the stage to threaten quality of life and community sustainability by posing significant challenges to providing the reliable flood protection many communities depend upon in order to thrive.

To begin, we must first share our concern that a 60-day comment period is wholly inadequate for such a long-term and comprehensive effort. That is especially so when, as is the case here, the effort takes into account more than identified during the public scoping process. With only ten business days between the submission deadline and the final public meeting on May 19th in Washington, D.C., our review cannot be as comprehensive in nature as is warranted, but necessarily must be rather narrowly focused. Additional detail and comments are provided below, and in light of those we urge that FEMA not proceed with finalizing the NPEIS for the NFIP without having given full consideration to the flood risk reduction and community resiliency achieved through reliable flood protection infrastructure like the well-maintained and operated, accredited levee systems in Fort Bend County, Texas. Also, we ask that FEMA conduct further public scoping to address past deficiencies in that process and to also incorporate those features of the upcoming reauthorization as may be appropriate.

About the FBFMA, Fort Bend County, Texas, and implications of the NPEIS

Fort Bend County is located in southeast Texas, neighboring to its northeast is Harris County and the city of Houston. The FBFMA was formed in response to the emergency management challenges created by Hurricane Ike, as well as the evolving Federal regulatory framework associated with flood risks. Members recognized their need for a higher level of awareness of what is happening at the Federal level in regulations with implications for flood risk reduction, such as risk and floodplain management, and related matters. We now seek to inform that process by sharing with others, including key decision-makers, that community resilience is often dependent upon safe and reliable levees, and to also communicate the challenges we face as we seek to provide flood protection and reduce risk.

The FBFMA membership consists of most of the local Fort Bend governmental agencies with the combined responsibility of protecting over 150,000 people and more than \$14 billion of assessed property value from flooding. Fort Bend has been one of the fastest growing counties in the United States for close to forty years. The population of 354,452 in 2000 is projected to more than double to 750,000 by year 2020. Fort Bend County has been in the top 20 counties for economic excellence and population growth, and its largest city, Sugar Land, is often rated one of the best places to live in the U.S. Much of our community is levee protected, including homes, schools, businesses and critical infrastructure. There are seventeen major levee systems in Fort Bend County, and a majority of the districts responsible for those systems are FBFMA members.

The Levee Improvement Districts (LIDs) in Fort Bend County, have built, and now own, operate and maintain their levee systems. Ultimately, the levees and related improvements protect and serve the community by holding back flood waters in the Brazos River and tributaries, managing contributing stormwater runoff to the leveed areas, offering varied recreational opportunities, and protecting the environment. We are concerned that these many benefits will be lost or lessened over time as actions that are rash or perhaps ill-conceived are advocated for and advancing. We seek instead the employment of a steady, measured and rational approach to address flood risk challenges that involves local and state governments in meaningful and informed dialogue and decision-making.

Additional Comments and Detail

- An extension of the comment period to at least 120 days (60 days beyond June 6th) is requested due to the complexity of the NPEIS documents and considering the final meeting in DC on May 19th allows only 10 business days for those attending to prepare comments after that meeting.
- The NPEIS effort extends beyond the scope that was developed through the public meeting process. The initial discussions were in November 2009, and then after passage of the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act in 2014 there was further public input on scoping. However, there was no opportunity for public input (until now) on the scoping changes resultant following issuance of Executive Order 13690 on February 5, 2015. The Federal Flood Risk Management Standard (FFRMS) is established by E.O. 13690 through its amendment of the earlier E.O. 11988. This is relevant because E.O. 11988 on Floodplain Management was specifically mentioned during recent public meetings as being a part of the NPEIS effort. This should have led to further public scoping meetings at that time in order to identify and understand implications to communities and leveed areas, including the people, property and productivity they protect, and to provide public input.

- Notwithstanding FEMA having stated that Land Use and Zoning is a local (not Federal) role, there are significant implications for Land Use and Zoning, and as such, a “No Impact” for Land Use and Zoning for the Preferred Alternative (No. 2) is inappropriate. Again, additional time is being sought, in part to address those likely impacts, which is especially relevant given that Flood Plain Management Criteria Guidance is included as an important aspect of the Preferred Alternative (No. 2.)
- Because the NFIP is now in the process of being reauthorized and substantial changes are being considered, it is prudent to not rush toward finalizing this NPEIS effort and to instead determine whether the prudent course of action would be to incorporate those potential reforms prior to completing this NPEIS process and the subsequent issuance of a Record of Decision (ROD). Considering that the last EIS for the NFIP was done in 1976 it seems reasonable to await the next NFIP reauthorization and then update the scope for the NPEIS accordingly.

In Fort Bend County, Texas, we work hard, and smart, to provide flood protection, and we have the support of the community to make that happen. Fort Bend County, Texas, LIDs have already chosen to provide a level of flood protection beyond that required for levee certification and accreditation. We engage in risk communication efforts and have in place our own emergency preparedness framework that consists of a comprehensive plan and regular on-site exercises to test and improve our capabilities and lessen the chances of having something unforeseen occur during a time of flood-fighting. This work has led us to make a series of improvements to our levee systems, including pump station upgrades and enhancement to operational facilities (i.e., monitoring, reporting, etc.). This type of work is critically important and should be encouraged in local communities, and not discouraged through Federal policies or programs. In fact, the federal government has reported that well-maintained and operated levees provide a benefit to cost ratio of 6:1, while mitigation is less, approximately 4:1, or at best 5:1. The vitality of our community and the quality of life of its citizens depend on an array of flood risk reduction, mitigation and management strategies and tools, no single one being the solution. However, any one of these improperly utilized can become an overarching problem. We respectfully request that FEMA ensure that cannot happen through the NFIP or its other efforts.

On behalf of the Fort Bend Flood Management Association, thank you for your important work to help states and local communities manage and reduce flood risk, and for considering these comments.

Sincerely,

FORT BEND FLOOD MANAGEMENT ASSOCIATION

By: 

André D. McDonald
President



Protecting the Land, Water and People of America's Greatest River

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June 5, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

Re: Public Comment on Nationwide Programmatic Environmental Impact Statement for National Flood Insurance Program, Docket ID FEMA-2012-0012

The Federal Emergency Management Agency's (FEMA) proposed Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP) inadequately assesses real and potential environmental impacts of the NFIP to people and nature.

As members and partners of the Mississippi River Network, a coalition of 54 regional and national nonprofit organizations and nearly 20,000 *1 Mississippi* River Citizens, we know first-hand how FEMA's NFIP influences development decisions along America's greatest river and its tributaries, and how these development decisions in turn impact public safety and wildlife habitat. With more intense and frequent storms and resulting higher flood levels, we also have seen how climate change will increase these impacts in the future.

The NFIP has significant impacts on our nation's floodplains that affect not only the ecological wellbeing of these systems, but the safety of our nation's riverine communities. Reducing the impact of the NFIP on the environment will result in reduced flood risk for communities, habitat preservation for endangered and threatened species, and reduced financial burden for federal taxpayers.

The NPEIS should not be finalized until more extensive consultations with other federal agencies, such as the US Fish and Wildlife Service and the National Marine Fisheries Service, have occurred and the NFIP's impact on floodplains has been more fully analyzed. FEMA needs to assess alternatives such as stronger minimum standards that will better protect people and endangered and threatened species. In developing the NPEIS, FEMA too narrowly focused its analysis and missed the broader picture of how the NFIP impacts development decisions and cumulatively harms people and wildlife. FEMA needs to ensure that the NPEIS takes into account the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide.

Therefore the Mississippi River Network urges FEMA not to make the NPEIS for the NFIP final, but to instead engage federal agencies whose statutory responsibilities are impacted by the NFIP, as well as other stakeholders, in meaningful consultations that will allow for a legally defensible, scientifically defensible, and practical final outcome that will preserve both the environment and public safety.

Sincerely,
Olivia Dorothy, Associate Director, Mississippi River Management
American Rivers

Rebeca Bell, Interim Executive Director
Bluestem Communications (Chicago, Illinois)

Virginia McLean, President
Friends for Our Riverfront (Memphis, Tennessee)

Cynthia Sarthou, Executive Director
Gulf Restoration Network (New Orleans, Louisiana)

Ralph Rosenberg, Executive Director
Iowa Environmental Council (Des Moines, Iowa)

Bijaya Shrestha, Water Policy Director
Kentucky Waterways Alliance (Louisville, Kentucky)

Dean Klinkenberg, The Mississippi Valley Traveler (St. Louis, Missouri)

Heather Navarro, Executive Director
Missouri Coalition for the Environment (St. Louis, Missouri)

Carol Hays, Executive Director
Prairie Rivers Network (Champaign, Illinois)

Dana Wright, Water Policy Director
Tennessee Clean Water Network (Knoxville, Tennessee)

John McFadden, CEO
Tennessee Environmental Council (Nashville, Tennessee)

Paul Botts, President and Executive Director
The Wetlands Initiative (Chicago, Illinois)



June 6, 2017

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW.
Washington, DC 20472.

**Re: *National Flood Insurance Program Nationwide Programmatic Environmental Impact Statement
(Docket ID FEMA-2012-0012)***

Dear Chief Counsel:

The National Association of Home Builders (NAHB) appreciates the opportunity to provide comments on the draft nationwide programmatic environmental impact statement (NPEIS) evaluating the environmental impacts of proposed modifications to the National Flood Insurance Program (NFIP) by the Federal Emergency Management Agency (FEMA).

NAHB is a federation of more than 700 state and local home builder associations nationwide. The organization's membership includes over 140,000 firms engaged in land development, single and multifamily residential construction, remodeling, multifamily ownership and management, building material trades, building products manufacturing and supply, and commercial and light industrial construction.

NAHB appreciates the opportunity to respond to the draft NPEIS to evaluate proposed modifications to the NFIP. As proposed, the purpose for FEMA making program modifications to the NFIP is to twofold:

- a) Implement the legislative requirements of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA); and
- b) Demonstrate compliance with the Endangered Species Act (ESA).

Background

As required, the draft provides a review of all alternatives analyzed under the NPEIS. In particular, there are four alternative scenarios reviewed including Alternative 1 - a "No Action Alternative" - where the current implementation of the NFIP would remain unchanged. In addition, there are three Alternative Action Options as presented by FEMA.

"Alternative 2", the FEMA Preferred Alternative, would require legislative changes, changes to floodplain management criteria guidance, and mapping modifications. As outlined by FEMA the changes proposed would result in the following modifications to the program:

- a) Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for

which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.

- b) Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.
- c) Implement a monthly installment plan payment option for non-escrowed flood insurance policies.
- d) Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing floodplain development permits to develop in the floodplain.
- e) Clarify that the issuing of certain Letter of Map Change (LOMC) requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

“Alternative 3” would require legislative changes, proposed ESA regulatory changes and, and mapping modifications. As outlined by FEMA the changes proposed would result in the following modifications to the program:

- a) Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.
- b) Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.
- c) Implement a monthly installment plan payment option for non-escrowed flood insurance policies.
- d) Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. § 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible.
- e) Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains.
- f) Increase the probation surcharge applicable to NFIP communities placed on probation from \$50 to \$100.
- g) Clarify that the issuance of certain LOMC requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

“Alternative 4” would require legislative changes, proposed ESA regulatory changes and, and mapping modifications. As outlined by FEMA the changes proposed would result in the following modifications to the program:

- a. Phase out of subsidies on certain pre-FIRM properties (non-primary residences, business properties, severe repetitive loss properties, substantially damaged or improved properties, and properties for which the cumulative claims payments exceed the fair market value of the property) at a rate of 25 percent premium increases per year.

- b) Phase out of subsidies on all other pre-FIRM properties through annual premium rate increases of an average rate of at least 5 percent, but no more than 15 percent, per risk classification, with no individual policy exceeding an 18 percent premium rate increase.
- c) Implement a monthly installment plan payment option for non-escrowed flood insurance Policies.
- d) Utilize the existing performance standard in 44 C.F.R. § 60.3(a)(2) to implement a new policy/procedure requiring communities to ensure that, for any floodplain development for which a permit to develop in the floodplain is sought, the impacts to ESA-listed species and designated critical habitat are identified and assessed and, if there are any potential adverse impacts to such species and habitat as a result of such development, that the community obtain and maintain documentation that the proposed development in the floodplain will be undertaken in compliance with the ESA.
- e) Clarify that the issuance of certain LOMC requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

NAHB will primarily focus its comments on the changes impacting the application of minimum floodplain management criteria and Letter of Map Change (LOMC) process as they relate to the requirements to demonstrate compliance with ESA as outlined in the draft NPDEIS Preferred Alternative (Alternative 2) and Alternative 3. In addition, to provide context to these comments NAHB will first address some overarching points on floodplain management and local land use regulation as it relates to the draft NPEIS and NFIP implementation in general.

Floodplain Management and Local Land Use Regulation

NAHB agrees with the foundation FEMA has established for floodplain management within both the draft NPEIS and the underlying NFIP. As FEMA repeatedly states land use authority resides at the state and local levels. As such, FEMA has no land use authority. Thus, states and localities regulate development in the floodplain, including requiring and approving permits, inspecting property, and citing violations. As a program, NFIP was designed so that floodplain management would occur at the level of government where the necessary authority existed and is based on a voluntary agreement between the participating community and the Federal government. The resulting policy circumstance as outlined by FEMA in the draft NPEIS is that "Floodplain development is not an action under the NFIP."¹ Furthermore, FEMA states "floodplain development is not authorized, funded, or carried out by FEMA pursuant to the NFIP, nor does the NFIP encourage such development to occur."² FEMA's statements taken in this context appears to directly refute assertions by U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) collectively referred to as the Service and environmental groups that FEMA is somehow subject to the ESA's section 7 statutory provisions that apply if an agency authorizes, funds, or carries out an action.³

NAHB would concur with FEMA's explanation of floodplain management authority as it relates to regulation of development in the floodplain. In addition, NAHB would take FEMA's statements to mean that building permits or authorizations issued by NFIP participating communities for new developments or construction projects located in floodplains are not federal permits but rather local issued permits issued under local authorities. FEMA goes on to say "[t]herefore, private floodplain development and the issuance, denial, and enforcement or

¹FEMA's draft EIS Executive Summary, pg. ES-3

² Ibid

³ 16 U.S.C. § 1536

individual permits are not actions taken by the NFIP.”⁴ NAHB supports the unequivocal statement by FEMA that the NFIP does not authorize, permit, or enforce permits issued by NFIP participating communities. However, this position does raise challenges we will address further below as it has ramification when it comes to FEMA’s proposed documentation requirements under alternatives presented by FEMA under this draft NPEIS.

However, despite FEMA’s repeated assertions the NFIP does not authorize or permit new development in floodplains several federal courts and the National Marine Fisheries Service (NMFS) have issued rulings and regulatory determinations under the Endangered Species Act (ESA) finding both the implementation of the NFIP and fundamental components of the NFIP including but not limited to FEMA’s floodplain mapping program and FEMA’s minimum eligibility criteria violate the ESA’s prohibition on actions that result in either “jeopardy” to the continued existence of an endangered species or “destroy or adversely modify” designated critical habitat for species located within both Oregon and Washington. NFIP participating communities in OR and WA face additional ESA compliance requirements and potential restrictions on future development in and around floodplain not discussed by FEMA under this draft EIS. FEMA does state within the draft EIS that “[F]EMA determined that it is currently in compliance with the ESA, but recognizes the need to make program changes that demonstrate and communicate ESA compliance to the public.”⁵

FEMA Compliance with the Endangered Species Act

Under updated guidance regarding “Documentation of Endangered Species Act Compliance for Conditional Letters of Map Change” issued on May 16, 2016 FEMA sought to provide applicants additional clarification regarding their role, responsibilities and documentation requirements in complying with the Endangered Species Act requirements of a prior FEMA guidance directive called Standard 215.

However, it would be useful to review FEMA’s own overview of the various letter of map change requests and how they interact with ESA-related actions and ESA Requirements Related to the FEMA Process.⁶ This information not only enumerates the various differences in expectations on Letters of Map Change (LOMC) applicants but also in the actions associated with those requests.

<i>Conditional LOMC Requests</i>		
CLOMA	No physical modification to floodplain is proposed.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
CLOMR-F	Proposed placement of fill in the floodplain.	ESA compliance must be documented to FEMA prior to issuance of CLOMR-F. FEMA must receive confirmation of ESA compliance from the Services.
CLOMR	Proposed modifications of floodplains, floodways or flood elevations based on physical and/or structural changes.	ESA compliance must be documented to FEMA prior to issuance of CLOMR. FEMA must receive confirmation of ESA compliance from the Services.

⁴ Ibid

⁵ FEMA’s draft EIS Executive Summary, pg. ES-2

⁶ <https://www.fema.gov/compliance-endangered-species-act-letters-map-change> accessed June, 1, 2017

<i>LOMC Requests</i>		
LOMA	No physical modification to floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR-F	Placement of fill in floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR	Modification of floodplains, floodways or flood elevations have occurred based on physical and/or structural changes.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.

44 C.F.R. section 60.3(a)(2) provides that communities participating in the NFIP must ensure that projects built in the floodplain do so in compliance with the ESA. A project's ESA compliance requirements stem from impact on species, or from authorization/funding provided by a federal agency. They do not stem from the NFIP.

As the chart above correctly provides, when a project proponent or community seeks a CLOMA, LOMA, LOMR-F or LOMR, ESA compliance is independent of the NFIP. However, the chart seems to indicate that if a community or project proponent is seeking a CLOMR or CLOMR-F, the act of seeking the CLOMR/CLOMR-F triggers ESA compliance. That is not true—whether a project must take actions to comply with the ESA is separate and apart from a request for a CLOMR/CLOMR-F.

NAHB would point out that because Conditional LOMCs are based on proposed construction, as-built information is not required to be provided. In addition, the Conditional Comment Documents that are issued by FEMA to applicants do not amend the effective Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM).

Action Alternative Comments – Alternative 2

- (d) Clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing floodplain development permits to develop in the floodplain.

NAHB acknowledges that participating communities enter into a voluntary agreement with the federal government when adopting minimum floodplain management criteria and agreeing to participate in the NFIP. NAHB also recognizes that under FEMA's existing regulations implementing the NFIP's "minimum eligibility criteria" found at 44 C.F.R. Part 60.3(a)(2)) already requires all NFIP participating communities ensure that permit applicants seeking locally issued development permits for activities within the SHFA obtain all necessary federal permits. However, NAHB is concerned that under FEMA's preferred alternative to demonstrate ESA compliance has the potential to be misinterpreted by FEMA or more importantly NFIP participating communities to create a higher standard of review by local communities to

demonstrate ESA compliance on proposed activities within SFHA seeking a local development permit than already exists for federal wetlands, stormwater, historic preservation, etc.

Namely, NAHB demands that FEMA clarify that FEMA does not expect NFIP participating communities to serve in the role of a federal action agency in the context of the ESA's requirements under section 7(a)(2). This clarification is essential as local governments bear neither the statutory nor regulatory obligations equivalent to a federal agency when it comes to impacts to critical habitat, nor do local governments have the staff, resources, nor expertise similar to federal agencies to ensure compliances with all facets of the ESA.

Therefore, NAHB views FEMA preferred alternative (Alternative 2) as purely an administrative task on the part of NFIP participating communities. Meaning when a developer or builder comes to a NFIP participating community and seeks a locally issued land development or building permit for an activity occurring within the SFHA, the local government permitting official would simply need to obtain and record all necessary federal permits and approvals (including ESA authorizations) obtained by the permit seeker. NAHB strongly objects that FEMA's preferred alternative #2 can be implemented through agency guidance. Requiring NFIP participating communities to document and maintain ESA compliance falls outside current requirements contained under 44 CFR Part 60.3(a)(2). NAHB believes such reinterpretation on the part of FEMA of the required action NFIP participating communities must perform under 44 C.F.R. 60.3(a)(2) requires a notice and comment rulemaking pursuant to the Administrative Procedures Act.

To be clear, the ESA clearly differentiates the responsibilities and expectations for various parties involved whether they be federal or local, private or public the statute clearly sets up different sets of expectations. NFIP participating communities do not bear the same level of responsibility akin to a federal agency under the ESA's section 7 process; chiefly local government do not need to ensure their non-federal actions do not impact critical habitat. In addition, while the ESA obligates all parties to avoid actions that would directly result in the "take" of an endangered species unless the activity was previously authorized by the Service under an "incidental take" section 10 permit. However, NFIP participating communities under 44 C.F.R. Part 60.3(a)(2) bear no responsibility to ensure all landowners, developers, or builders seeking locally issued permits for actions occurring within SHFA provide documented proof that there is no possibility of a "take" of an endangered or threatened species could occur (i.e., prove an endangered species does not exist in area impacted). Quite the opposite, all that is required of NFIP participating communities under 44 C.F.R. Part 60.3(a)(2) is that to ensure landowners seeking locally issued permits for activities within SFHA notify and provide documentations of obtaining all necessary federal permits including all necessary ESA authorizations.

Given the complexities of the ESA and the differing standards under the ESA's section 7 provisions for federal agencies as compared to private individuals or local governments FEMA must clarify under any future agency guidance concerning 44 C.F.R. Part 60.3(a)(2) its treatment of local governments. FEMA must make clear that local government are not being expected to act in lieu of a federal agency and held to the same standard as such agency would be in ensuring ESA compliance before issuing locally required land development and building permits within SFHAs.

- (e) Clarify that the issuing of certain Letter of Map Change (LOMC) requests (i.e., map revisions) is contingent on the community, or the project proponent on the community's behalf, submitting documentation of compliance with the ESA.

Of particular concern with regards to the draft PEIS is a sequencing issue that would be created by FEMA adopting Alternative 2, 3 or 4 as drafted. These provisions would require landowners seeking Letters of Map Change (LOMC) from FEMA to first demonstrate compliance with the ESA before submitting their LOMC requests. Such an approach, if adopted by FEMA, would create both practical and financial problems for landowners seeking revisions to existing floodplain maps in areas of the country where either an endangered species is present or where the federal government has designated private property as critical habitat for an endangered species. Aside from landowners located in areas of the country where either no endangered species are found or where no critical habitat has been designated by either the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) collectively referred to as the Service; landowners seeking a LOMC from FEMA would first have demonstrate compliance with the ESA prior to submitting LOMC request to FEMA. FEMA by requiring landowners to first demonstrate ESA compliance on proposed structures not yet authorized to be built would cause landowners to incur significant permitting costs and potentially create procedural problems for landowners seeking LOMC from FEMA.

For landowners whose property has either an endangered species located on it or whose property has been overlaid by a critical habitat designation by the Service, FEMA's recommended alternative would mean these landowners would first need to obtain an "incidental take" authorization from the Service before submitting their LOMC request to FEMA. Obtaining such an "incidental take" authorization from the Service is the only way an otherwise lawful land use activity which the Service determines, "is likely to adversely affect" an endangered species or designated critical habitat can legally proceed under the ESA. For landowners whose proposed projects occur in areas with either an endangered species present or designated critical habitat and requires a separate federal permit demonstrating compliance with the ESA would require these landowners to complete their federal permitting process and corresponding section 7 consultation process between the Service and whatever federal agency issues the underlying federal permit necessary to authorize the construction activity. Under the ESA's section 7 consultation regulations the formal consultation process can take upwards of four and half months to complete (135 days)⁷ during which time the Service and the federal agency responsible for issuing the federal permit analyze the potential impact of the project on an endangered species or designated critical habitat, identify alternatives or modification to the proposed activity to avoid or reduce the potential impacts, and apply restrictions to the proposed activity called "reasonable and prudent alternatives" (RPAs) that become binding terms and conditions for the underlying federal permit being sought by the landowner.⁸ Landowners are required to fully implement all RPAs identified by the Service during the section 7 consultation process in order to receive "incidental take" authorization from the Service under the ESA.

For land developers and builders the most common federal permit sought is a federal "wetlands" permit issued by the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act (CWA). Typically, however, landowners do not complete the federal wetland permitting process until after receiving their LOMC from FEMA. Obtaining CWA Section 404 permits is no small task, as the process causes delays, additional scrutiny, possible project redesign, and increased costs. For example, in an economic analysis completed by the Environmental Protection Agency (EPA) and the Department of the Army in support of the final "Clean Water Rule" redefining the term "waters of the U.S.", the Agencies cite

⁷ 50 §CFR 402.12(e)

⁸ 50 §CFR 402.12(g)(5)

a study that found it takes an average of 788 days and \$271,596 to obtain an individual CWA Section 404 permit and 313 days and \$28,915 for a “streamlined” nationwide permit.⁹ Importantly, these wetland permitting costs and delays do not include the additional permitting expenses and holdups imposed by the Service under the ESA’s section 7 consultation process nor do they reflect the additional costs for potential wetland mitigation requirements by the Corps.

Given these costs and permitting delays it seems highly unlikely a landowner would commence, let alone successfully complete the federal wetlands permitting process and the ESA’s section 7 consultation process to obtain an “incidental take” authorization from the Service before submitting a LOMC request to FEMA for a structure that is not even certain to ever be built. Again, most landowners who do submit LOMC requests to FEMA do so in the hope that proposed structures if built as designed would be determined by FEMA to be located outside of currently defined (i.e., mapped) floodway or floodplain. Furthermore, even if FEMA determines in response to a LOMC request that a proposed structure if built as designed would be located outside of the floodway or floodplain FEMA’s determination does not mean the proposed structure will be built. As FEMA has stated the Agency does not approved nor authorize construction activities in or around floodways or floodplains, rather those are local land use and permitting decisions performed by local governments not FEMA.

Perhaps even more problematic than FEMA’s preferred alternative for landowners seeking LOMC requests from FEMA for proposed activities requiring separate federal permits or authorizations is FEMA’s preferred alternative for landowners located in areas where endangered species are present but where no federal permit is needed. Under the ESA there are only two permitting mechanisms for landowners to obtain “incidental take” authorization from the Service; section 7 consultation for projects requiring a federal permit or approval, and section 10 incidental take permits for activities by private landowners impacting endangered species and where no federal nexus (e.g., federal permit requirement or federal authorization) exists. While section 7 consultation process has already been discussed, the ESA’s section 10 incidental take permitting process requires landowners to develop on their own and then submit to the Service for review and approval a detailed habitat conservation plan or HCP that addresses to four key elements (1) amount of anticipated “take” of an endangered species resulting from the proposed activity, (2) what alternatives the landowner considered but did not use that would have avoided any impact (i.e., “take) of the endangered species, (3) identification of specific measures and funding necessary to minimize, mitigate, and monitor the amount of allowed (i.e., authorized) “take” of the endangered species by the Service; and (4) identification of any additional measures required by the Service as part of the approved HCP.¹⁰ Development of theses HCPs by private landowners is major undertaking requiring the hiring of consultants (i.e., qualified biologists) and attorneys to prepare these required plans and to navigate the Service’s complex section 10 permitting process. It is highly unlikely a landowner would even have sufficient information on potential impacts to an endangered species at the stage most landowners typically submit LOMC request to FEMA. Regardless of this obstacle under FEMA’s preferred alternative prior analysis by NAHB of the Service’s own section 10 permitting data shows it takes on average over a year (399 days) for a typical landowner to prepare the required HCP and the Service’s staff an additional eight months (243 days) to review and approval a successfully submitted HCP. Service’s approval of a section 10 permit requires its own NEPA analysis as well as a separate notice and comment process in the

⁹ U.S. Environmental Protection Agency and U.S. Department of the Army. Economic Analysis of the EPA-Army Clean Water Rule. May 20, 2015. Citing: David Sunding and David Zilberman. *The Economics of Environmental Regulation by Licensing: An Assessment of Recent Changes to the Wetland Permitting Process*. 42(1) Nat. Resources. J. 60. 2002.

¹⁰ 50 §CFR 17.22(b)(2)

Federal Register. As a result, most landowners seeking an “incidental take” authorization from the Service, will seek a federal nexus (i.e., federal permit or authorization) for their proposed activities in order to undergo the section 7 consultation process rather than undergo the more complex and expensive section 10 incidental take permitting process. Even the Service has acknowledged the current ESA section 10 permitting process is too complex, time consuming, inefficient, and expensive for most private landowners to pursue [cite FWS’s HCP handbook notice found at 81 Fed. Reg. 41987, June 28, 2016]. Given the difficulties private landowner face in obtaining ESA section 10 permits combined with the Service’s own admissions about the infeasibility for most private landowner to pursue of the current ESA section 10 permit process, FEMA should not require private landowners with endangered species present to first obtain a section 10 permit before submitting a LOMC request to FEMA.

Action Alternative Comments – Alternative 3

- (d) Establish a new ESA-related performance standard in the minimum floodplain management criteria at 44 C.F.R. § 60.3 that would require communities to obtain and maintain documentation that any adverse impacts caused by proposed development, including fill, to ESA-listed species and designated critical habitat will be mitigated to the maximum extent possible.

As discussed above, FEMA repeatedly acknowledges that it does not have land use authority and that the authority to issue land use permits or authorize development lies with the State or local community. Given that, it is clear that FEMA sees building permits as state/local not federal permits and NAHB requests FEMA acknowledge the locally issued permits (i.e., non-federal permits) do not have any obligation under the ESA to either avoid or address impacts to designated critical habitat. Furthermore, under the ESA’s section 7 formal consultation provisions permit applicants are never required by the Service to “mitigate to the maximum extent possible” impacts to critical habitat as stated by FEMA. In fact, the ESA does not require any mitigation whatsoever under the section 7-consultation provisions. Rather permit applicants undergoing the formal section 7-consultation process must agree to implement so called “reasonable and prudent alternatives” (RPAs) as identified by the Service that can easily be incorporated into the originally proposed project. However, these RPAs are not mitigation and do not require permit applicants to perform mitigation functions when implementing their proscribed RPAs as part of the underlying federal permit. Therefore, FEMA must either drop this language in its entirety calling for impacts to critical habitat “be mitigated to the maximum extent possible” or cite where under the Service’s existing section 7 consultation requirements mitigation is ever required by the Service.

Furthermore, as with concerns raised above under Alternative 2(d), NAHB strongly opposes FEMA establishing requirements that would necessitate landowners whose projects impact species from having to obtain section 10 permits. The onerous burden, time delays and additional costs of this process especially given the tenuous foundation FEMA is establishing for pursuing this path of action will not ultimately serve to advance the goals of any stakeholders.

Conclusion

NAHB understands the situation FEMA has been placed in as the result of court decisions however questions remain regarding the draft NPEIS. NAHB believes the proposal to implement programmatic changes to demonstrate ESA compliance is fundamentally challenged by an underlying incompatibility of NFIA and ESA. These issues may be best addressed through statutory changes that clarify the boundaries between the programs and not through the issuance of new guidance or regulation.

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NAHB stands ready to continue to work with FEMA as it moves forward with the process of finalizing the NPEIS. Please do not hesitate to contact me (202-266-8660 or MMittelholzer@nahb.org) or my colleague Tamra Spielvogel (202-266-8327 or tspielvogel@nahb.org) if you have any questions or if you would like to discuss NAHB's comments further.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael E. Mittelholzer", with a stylized flourish at the end.

Michael E. Mittelholzer
Assistant Vice President, Environmental Policy
National Association of Home Builders

Cc: Bret Gates, FEMA, Federal Insurance and Mitigation Administration,
Floodplain Management Division



June 6, 2017

Submitted via regulations.gov and via email at Bret.Gates@fema.dhs.gov only

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE, 500 C St. SW.
Washington, DC 20472

Re: Docket ID FEMA-2012-0012

To Whom It May Concern:

The National Wildlife Federation and its affiliates (NWF) are the nation's largest federation of conservation organizations from across the country. We are dedicated to protecting wildlife and habitat and inspiring the future generation of conservationists. With six million members and supporters, we represent hunters, anglers, farmers, forest managers, and other outdoor enthusiasts who believe our nation's wildlife, fish, healthy waters, clean air, and public lands are a birthright of all Americans. We thank the Federal Emergency Management Agency (FEMA) for the opportunity to submit comments on its National Flood Insurance Program (NFIP) Draft Nationwide Programmatic Environmental Impact Statement (PEIS).

These comments focus in particular on the NFIP and the Endangered Species Act (ESA).¹ NWF believes that changes are needed to ensure that the NFIP complies with the ESA. Floodplains are vital habitat areas for multiple species, including many that are listed as threatened and endangered under the ESA. Courts have found that the NFIP has the effect of encouraging development in flood prone areas. FEMA's implementation of the NFIP has, in at least certain regions of the country, been in violation of the ESA. This is because the NFIP enables such development by insuring for flood risks that private insurers will not cover. Floodplain development has numerous impacts on listed species. Furthermore, the NFIP provides certain incentives, such as allowing filled areas to be mapped out of areas requiring flood insurance, which have likely created further impacts on floodplains and floodplain habitat. As sea level rise, increased flooding, changes in snow pack, precipitation changes and other impacts of climate change become more acute, the effects of floodplain development enabled by the NFIP

¹ NWF does not provide direct comment on the appended Biological Evaluation. However, given court rulings about the NFIP and its likely enabling of floodplain development, NWF questions the BE's "no effect" conclusion.

on species will also increase. FEMA has not taken proper measures to protect listed species from potential jeopardy.

In order to protect species and wildlife that rely on healthy and functioning floodplains and to comply with the law, nationwide reform is needed to ensure that participating communities properly protect threatened and endangered species. We believe that this requires regulatory reforms and performance standards that participating communities must comply with in order to ensure that floodplain development for participating communities does not jeopardize ESA listed species. As it applies to the alternatives laid out in the PEIS, only Alternative 3 suggests such changes. Alternatives 1 and 2 do not properly address ESA compliance. Alternative 4 offers an improvement by requiring better guidance to communities on ESA compliance, but does little to require participating communities to take measures that will protect listed species from harm.

The National Flood Insurance Program

The NFIP enables property owners to acquire insurance for properties located within flood-prone areas. Established in 1968 with passage of the National Flood Insurance Act (NFIA), the NFIP is designed to ameliorate heavy expenditures of federal disaster relief by authorizing flood insurance that would otherwise be prohibitively costly or unavailable. FEMA administers the NFIP and must: (1) map the floodplain; (2) establish minimum criteria for community participation in the NFIP; and (3) administer a community rating system (CRS) which encourages communities to surpass the minimum criteria. 42 U.S.C. § 4001 et seq. In 2012 and 2014, Congress enacted reform measures (the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014) aimed to make the NFIP's premium structure better reflect the true risks and costs of flooding. The reforms require the phasing out of subsidies on existing buildings or building build prior to the first Flood Insurance Rate Maps (FIRMs). Once the phasing is complete, FEMA will no longer offer subsidies for new or existing floodplain development.

The NFIP is premised on the congressional finding that “the availability of Federal loans, grants, guaranties, insurance, and other forms of financial assistance *are often determining factors in the utilization of land and the location and construction of public and of private industrial, commercial, and residential facilities.*” 42 U.S.C. § 4002(a)(2) (emphasis added). Thus, while the NFIP does not directly regulate land use, it is an important factor in determining how it occurs in many areas. As such, courts have recognized that “[i]f a community chooses not to participate in the [NFIP], economic development in the flood hazard area may be severely restricted,” and that “[g]enerally, the withdrawal of any form of Federal financial assistance for the acquisition or construction of buildings in the flood hazard area will eliminate sources of money and thereby have a strong tendency to decrease economic growth.” *National Wildlife Federation v. FEMA*, 345 F. Supp. 2d 1151, 1157 (W.D. Wash. 2004) (citations omitted).

Thus, while participation by a community in the NFIP is technically voluntary, as a practical matter, failure to enroll in the NFIP can significantly affect current and future property owners in the community's floodplains and the availability of federal financial assistance in the flood-prone areas of the community. For example, if a community chooses not to participate in the NFIP, various types of federal assistance, such as mortgages from a federally insured or regulated bank

and Veterans Administration loans, are prohibited if the building used to secure the assistance is in the 100-year floodplain. 42 U.S.C. § 4012a. The NFIA also prohibits other federal agencies such as the Federal Housing Administration and the Small Business Administration from making or guaranteeing a loan secured by a building in a floodplain unless the flood insurance has been purchased. *Id.* Federal flood insurance cannot be purchased for buildings in non-participating communities. *Id.* §§ 4022, 4106. Virtually all communities in the United States that have floodplains within their boundaries have elected to participate in the NFIP.

Consequently, instead of discouraging development of flood prone areas, the Eleventh Circuit Federal Court of Appeals found that “development is encouraged *and in effect authorized* by FEMA’s issuance of flood insurance.” *Key Deer v. Paulison*, 522 F.3d 1133, 1144 (11th Cir. 2008) (emphasis added). FEMA’s mapping provides a prime example of how such floodplain development is encouraged. Communities are essentially given incentive to build levees or place fill to raise a structure above the base flood elevation as the “protected” area will no longer be considered part of the floodplain or subject to NFIP guidelines. Such filling and levee construction has the effect of eliminating large areas of functional floodplain, which are depending on for species’ habitat and the health of aquatic ecosystems like rivers.

Courts have recognized the impacts of these practices on wildlife, including threatened and endangered species. For instance, the court in *NWF v. FEMA* acknowledged that, “FEMA states that ‘it is clear that good stewardship of floodplains can be an extremely important factor in protecting habitat for fish’ and that a functioning floodplain is ‘a specific habitat element necessary to be maintained, protected or restored in order for wild salmon to continue to exist and evolve.’” 345 F. Supp. 2d at 1158 (citations omitted). The court further noted that “FEMA has also recognized that ‘[m]ost development and human disturbance of floodplains inhibits the ability of the floodplain to perform its vital functions.’” *Id.* (citations omitted). In regards to fill placed in the floodplain, the court found that “[f]loodplains provide critical habitat for fisheries resources and it is highly likely filling in the floodplain would have the potential for adverse impacts to listed species and/or habitat” and that FEMA has recognized that “‘filling in the flood fringe (which is legal and accepted in the NFIP) has many detrimental effects,’ including ‘a negative effect on fish (and wildlife) habitat.’” *Id.* (citations omitted). Climate change only promises to make these negative effects more acute as the flood storage and habitat provision functions of floodplains will become more important in the face of sea-level rise, and increased storms and droughts, and other stresses upon river ecosystems.

The Endangered Species Act

Section 7 of the ESA, the heart of the ESA’s protections for federal actions, imposes a strict substantive duty on federal agencies to ensure that their activities do not cause jeopardy to listed species or adverse modification to their critical habitat. 16 U.S.C. § 1536(a)(2). It further establishes an interagency consultation process to assist federal agencies in complying with this duty. An agency must initiate consultation under Section 7 whenever it takes an action that “may affect” a listed species, subject to limited exceptions. *See* 50 C.F.R. § 402.14(a), (b). Accordingly, the Supreme Court has declared that “endangered species [have] priority over the ‘primary missions’ of federal agencies.” *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 185 (1978).

The ESA also prohibits activities that cause “take” of endangered species. 16 U.S.C. § 1538(a)(1)(B). This prohibition can be, and typically is, extended to threatened species by regulation. *Id.* § 1533(d). The ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” *Id.* § 1532(19). Congress intended the term “take” to be defined in the “broadest possible manner to include every conceivable way” in which a person could harm or kill fish or wildlife. S. Rep. No. 307, 93d Cong., 1st Sess. 7 (1973). When a federal agency consults pursuant to § 7(a)(2), the biological opinion includes a statement concerning “incidental” take, providing a limited cover from liability if take occurs. *Id.* § 402.14(i).

To assist federal agencies in fulfilling this duty to avoid jeopardy, consultation with the Secretary is required for proposed “agency actions” that “may affect” a listed species. 16 U.S.C. § 1536; 50 C.F.R. § 402.14(a). ESA implementing regulations define “agency action” broadly, encompassing “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies.” 50 C.F.R. § 402.02 (defining “action”). Similarly, the threshold for determining whether the agency action “may affect” a listed species is low. *See* 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) (“Any possible effect, whether beneficial, benign, adverse or of an undetermined character, triggers the formal consultation requirement...”).

Courts have made clear that the NFIP requires consultation under Section 7(a)(2). Most notably, in NWF’s *Key Deer* case, the U.S. District Court of the Southern District of Florida interpreted the ongoing provision of flood insurance by FEMA as an agency action triggering formal consultation requirements under Section 7. *See Florida Key Deer v. Stickney*, 864 F. Supp. 1222 (S.D. Fla. 1994). The *Key Deer* court reasoned that implementation of the NFIP by FEMA facilitated and encouraged new development that harmed the endangered Key deer and other species. *See also NWF v. FEMA*, 345 F. Supp. 2d 1151, 1172-73 (W.D. Wash. 2004) (holding that FEMA was required to engage in formal consultation with regard to its mapping activities, setting eligibility criteria, and implementing the community rating system).

A federal agency taking action that may affect listed species must initiate consultation and provide to the appropriate expert agency (FWS or NMFS) a “biological assessment” regarding the effects of the proposed action. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). Conversely, federal agency actions that may affect listed species and that fail to undertake Section 7 consultation cannot proceed. *See Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985) (“If a project is allowed to proceed without substantial compliance with those procedural requirements, there can be no assurance that a violation of the ESA’s substantive provisions will not result. The latter, of course, is impermissible.”). In short, Section 7 instructs a cautionary approach to federal agency conduct, casting wide the range of actions requiring interagency consultation to ensure that impacts to imperiled species are considered and, if necessary, mitigated.

Separately, ESA Section 7(a)(1) requires federal agencies to “utilize their authorities in furtherance of the purposes of this chapter by carrying out programs for the conservation of [listed] endangered species and threatened species.” 16 U.S.C. § 1536(a)(1); *Sierra Club v. Glickman*, 156 F.3d 606 (5th Cir. 1998) (holding that ESA imposes an affirmative duty on federal agencies to develop programs for conservation of each endangered and threatened

species); *see also* *Key Deer*, 522 F.3d at 1146 ([S]ection 7(a)(1) imposes a judicially reviewable obligation upon all agencies to carry out programs for the conservation of endangered and threatened species. . . . Total inaction is not allowed.”). Like the duty to avoid jeopardy, the conservation duty is discharged in consultation with FWS under ESA Section 7. 16 U.S.C. § 1536(a)(1).

In NWF’s seminal *Key Deer* litigation, the Eleventh Circuit held that (1) FEMA’s issuance of flood insurance effectively authorizes development, and (2) FEMA has discretion in its administration of the NFIP such that it is bound by the requirements of ESA § 7(a)(2). 522 F.3d at 1141, 1143, 1144 (finding that “[t]he Supreme Court defined the requisite discretion for section 7(a)(2) of the ESA as the discretion ‘to consider the protection of threatened or endangered species as an end in itself[]’” and that “[b]ased upon our review of the NFIA’s scheme for the development of eligibility criteria and of the purposes served by the community rating system program, we are satisfied that FEMA has discretion to consider endangered and threatened species in its administration of the NFIP. Indeed, this finding is consistent with FEMA’s *own* regulations implementing the NFIP, wherein wildlife and environmental concerns are considered.”) (emphasis in original) (internal citations omitted); *see also* *NWF v. FEMA*, 345 F. Supp. 2d at 1174 (“FEMA’s implementation of the NFIP . . . is a discretionary ‘agency action’ for the purposes of Section 7(a)(2) of the ESA”). Courts have already determined that NFIP implementation easily fits within the scope of the term agency action. *Florida Key Deer*, 522 F.3d at 1142–4 (holding ESA Section 7(a)(2) applies to FEMA’s implementation of NFIP). Importantly, it has also been ruled that that the mapping, eligibility criteria and community rating system components of NFIP *each* constitute an agency action within the meaning of Section 7(a)(2). *NWF v. FEMA*, 345 F. Supp. 2d at 1173–74.

Therefore, FEMA’s implementation of the NFIP is an agency action subject to Section 7 requirements. Courts have recognized the deleterious impacts of the NFIP on listed species. For instance, in the *Florida Key Deer* case, the Federal Appeals Court for the Eleventh Circuit found that “[FEMA’s] administration of the NFIP is a relevant cause of jeopardy to the listed species [in the Florida Keys]. . . . because development *is encouraged and in effect authorized by* FEMA’s issuance of flood insurance.” *Florida Key Deer*, 522 F.3d at 1144 (citation omitted) (emphasis added). Similarly, the court in *NWF v. FEMA* acknowledged that, “FEMA states that ‘it is clear that good stewardship of floodplains can be an extremely important factor in protecting habitat for fish’” 345 F. Supp. 2d at 1158 (citations omitted). That court further noted that “FEMA has also recognized that ‘[m]ost development and human disturbance of floodplains inhibits the ability of the floodplain to perform its vital functions. . . .’” *Id.* (citations omitted). In regards to fill placed in the floodplain, the court in *NWF v. FEMA* added that “FEMA has stated that ‘[f]loodplains provide critical habitat for fisheries resources and it is highly likely filling in the floodplain would have the potential for adverse impacts to listed species and/or habitat’” and that FEMA has recognized that “‘filling in the flood fringe (which is legal and accepted in the NFIP) has many detrimental effects,’ including ‘a negative effect on fish (and wildlife) habitat.’” *Id.* (citations omitted). Additionally, courts have ruled that “FEMA has discretion to consider endangered and threatened species in its administration of the NFIP.” *Florida Key Deer*, 522 F.3d at 1143; *see NWF v. FEMA*, 345 F. Supp. 2d at 1173 (finding FEMA had discretion to consider the impacts to listed species in its implementation of NFIP).

The Alternatives under the PEIS Do Not Provide ESA Compliance

The No Action Alternative and the Preferred Action Alternative (Alternative 2 – Legislatively Required Changes, Floodplain Management Criteria Guidance, and LOMC Certification) of the PEIS do not provide ESA compliance. The PEIS’s conclusion these alternatives have “no effect” on ESA listed species and that “[t]he NFIP does not cause development to occur, nor does it play a significant role in facilitating or encouraging floodplain development,” PEIS 4.3.4.2, pp. 4-109-110, directly conflicts with court findings that, “[FEMA’s] administration of the NFIP is a relevant cause of jeopardy to the listed species ... because development is encouraged and in effect authorized by FEMA’s issuance of flood insurance.” *E.g., Florida Key Deer*, 522 F.3d at 1144 (citation omitted). While the PEIS states that under the Preferred Alternative “FEMA would clarify that pursuant to 44 C.F.R. § 60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the ESA, as a condition of issuing permits to develop in the floodplain” and “FEMA’s issuance of certain LOMC requests (i.e., map revisions) would be contingent on the community, or the project proponent on the community’s behalf, submitting documentation of compliance with the ESA,” 4.3.4.3, p. 4-113, it does not take steps beyond documentation to ensure or enforce ESA compliance or species’ protection. Particularly as it pertains to LOMC requests covering floodplain development that has already taken place, it is critical to ensure measures exist to ensure compliance with the ESA occurs prior to the development taking place.

As such, FEMA needs to implement an alternative that contains criteria and other measures that ensure communities are actively protecting listed species as a condition of participation in the NFIP. FEMA must take pro-active measures to achieve ESA compliance and not rely on localities using a permit-by-permit approach combined with after-the-fact consideration of map changes. FEMA has wide discretion to impose measures upon participating communities that ensure ESA compliance and to monitor and enforce ESA compliance for participating communities. The benefits of these approaches, which are to some degree contained in Alternatives 3, are noted in the PEIS:

FEMA would develop guidelines and/or a process for documenting community compliance with the ESA Regulatory Changes. Communities would be monitored for compliance with the new ESA-related performance standard, and FEMA would take enforcement actions against communities that did not adhere to it (through existing processes such as CAVs and CACs). This change would increase a community’s stake in ESA compliance and provide a means for FEMA to more effectively monitor communities’ review and mitigation of the potential impacts of development on ESA-listed species and designated critical habitats. This increased stake may encourage communities to become more aware of ESA-related issues in their community and potentially develop holistic approaches to address such issues rather than continuing to address them on a permit-by-permit basis. It may also encourage communities to work more closely with the Services to develop tools to help identify areas with ESA-listed species and designated critical habitat and to establish mitigation measures specific to the community and/or the ESA listed species found in the community. Such actions may improve

a community's ability to assess and address the cumulative impacts of floodplain development on ESA-listed species and designated critical habitat.

PEIS 4.3.4.4, p. 4-114.

Other positive impacts of an approach more like Alternative 3 are mentioned in the PEIS:

[I]n addition to ensuring compliance with the ESA, the ESA-related performance standard would require communities to ensure that impacts to habitat connectivity and the natural and beneficial floodplain functions that support such species and habitat are also assessed and mitigated, which would benefit all biological resources in those floodplains, not just ESA-listed species.

Id. This highlights additional compelling reasons to require ESA compliance upon participating communities. The benefits of ESA compliance will also become increasingly important as climate change threatens coastal and floodplain areas, putting stressors on all wildlife and making migration corridors, buffer areas, and general floodplain function important for species not currently listed but that may be imperiled with a rapidly altering climate.

Alternative 4, while better than the No Action or Preferred Action alternatives, falls short and is not compliant with the ESA. A guidance only approach to performance standards will not alone achieve needed protections for listed species. Instead, criteria for participation communities are needed and enforcement of those criteria must occur to ensure that communities that are participating are not jeopardizing threatened and endangered species.

Overall, while Alternative 3 is step in the right direction and NWF supports ESA regulatory changes to put criteria in place for participating communities to ensure and enforce ESA compliance, FEMA has wider discretion to protect threatened and endangered species than it sets forth in the PEIS and it should exercise that discretion to protect listed species.

FEMA Must Exercise Its Wider Discretion to Protect ESA Listed Species from NFIP Enabled Floodplain Development

FEMA develops, and from time to time is required to revise, “comprehensive criteria” designed to encourage the adoption of land use measures that reduce the amount of development exposed to floods, assist in reducing damage caused by floods, and “otherwise improve the long-range land management and use of flood-prone areas.” *Id.* § 4102(c). FEMA’s minimum criteria for local floodplain management are encoded in federal regulations at 44 C.F.R. § 60.3. Although the statute authorizes FEMA to adopt regulations for the general protection of the floodplain, the existing regulations are primarily designed to minimize damage to structures and water systems during flood events and eliminate the possibility that structures will exacerbate floods by increasing flood levels. Current criteria are not designed or intended to protect aquatic habitat, imperiled species, or other environmental values. Incorporating measures requiring communities to protect, and document protection of, ESA listed species into eligibility criteria is a positive step forward that National Wildlife Federation welcomes.

However, NWF believes that FEMA can and must go further than the strongest alternative, Alternative 3, in the PEIS. FEMA incorrectly claims that it “has no land use authority, and thus no ability to establish land use regulations” and that “FEMA cannot require communities to prohibit development in the SFHA; it can only place certain flood risk reduction-related conditions on how that development should be carried out to reduce the risk of flood.” PEIS § 2.3.2 at p. 2-3. While FEMA cannot directly regulate land use, it can require participating communities to take measures to protect threatened and endangered species in order to be eligible, and this can include protecting certain habitat areas. FEMA is therefore not powerless to deny participation to communities that develop in a manner that is not protective of species – indeed it is required to ensure such protections occur and can structure criteria to deny participation to communities that don’t take such measures.

As such, the PEIS wrongly claims that the only portion of its program that is “discretionary” and thus subject to the requirements of ESA consultation is the eligibility criteria and even there FEMA claims it can only put in place “performance standards.” But other aspects of the NFIP are discretionary and trigger ESA duties. In particular, FEMA further implements the NFIP through development and revision of maps and other information that identify flood-prone areas. 42 U.S.C. § 4101. These maps, FIRMs, identify various categories of flood hazard areas in which land use and building criteria are to apply. *See* 44 C.F.R. § 64.3 (identifying different zones on FIRMs). The maps are required to be updated at least every five years to accommodate new information. *Id.* § 4101(e). Individuals can request and obtain from FEMA a Letter of Map Revision (LOMR) if they can show an inaccuracy or change in the map that affects the status of their property. 44 C.F.R. Pt. 72.

LOMRs are also an area where ESA compliance is required. NWF takes issue with FEMA’s casual dismissal of the potential harms to species caused by Letters of Map Revision-Fill (LOMR-F) and FEMA’s ability to prevent this harm. While the PEIS states that “[s]uch floodplain development [fill] might trigger ESA compliance requirements if it caused adverse impacts to ESA-listed species and designated critical habitat in violation of the ESA,” PEIS § 2.3.3.1, p. 2-9, it then states that there are no studies supporting the causal relationship between LOMR-F’s and increases placement of fill, with the exception of one study. *Id.* The PEIS then dismisses that study as flawed because it had a small sample size. This analysis does not support the PEIS conclusion that placement of fill pursuant to LOMR-F does not require ESA compliance. To the contrary, the trigger for ESA consultation is low, and even a small sample size study is indication of a causal relationship and adverse effect. Also, the PEIS does not state that there are studies *disproving* the causal relationship. This is an unwarranted attempt to side step compliance with the ESA for LOMR-Fs.

The PEIS also claims that, “The issuance of LOMRs and LOMR-Fs is a non-discretionary action for which FEMA has no obligation to consult.” But these actions are not non-discretionary, FEMA has discretion over mapping decisions. While NWF is encouraged that the PEIS states that:

FEMA proposes to issue clarification guidance stating that, under this minimum floodplain management criterion, the community must obtain and maintain documentation of compliance with the ESA for the proposed floodplain

development. Furthermore, FEMA would require the community, or the project proponent on the community's behalf, to produce documentation of compliance with the ESA prior to processing LOMR and LOMR-F requests based on physical development in the floodplain. By documenting that the private floodplain development for which a LOMR or LOMR-F is sought is ESA-compliant, FEMA can demonstrate that it is only issuing LOMRs or LOMR-Fs for ESA-compliant floodplain development (and, thus, not encouraging floodplain development that adversely impacts ESA-listed species and designated critical habitat).

PEIS § 2.3.3.4, p. 2-10, this measure again seeks largely to establish a document trail, not ESA compliance. More detail must be given about the criteria that would determine ESA compliance as well as consequences if ESA compliance is not achieved. Additionally, while LOMR-F are often issued after the fill has taken place, FEMA can make changes to dis-incentivize fill and elevate habitat and species protection.

The Impacts of Climate Change Must be Considered in Assessing ESA Impacts

The PEIS lays out the impacts that climate change will bring and how they will affect ESA listed species. Climate change will bring:

Extreme weather events include tropical storms, heavy precipitation, flooding, tsunamis, volcanic eruptions, landslides, earthquakes, wildland fires, heat waves, and droughts, all of which may lead to direct mortality or intensify existing stressors on biological resources (U.S. Climate Change Science Program, 2008).

PEIS § 3.7.3.3.6 p. 3-144. The PEIS also outlines potentially severe impacts to species:

Climate change can potentially cause abrupt changes to habitat and ecosystems, and may be a threat to many species. Notably, climate change is affecting the migration of songbirds; breeding birds' arrival dates are changing, often occurring before the necessary food supply is available. Climate change has exacerbated wildfires, insect outbreaks, pathogens, coral bleaching, disease outbreaks, and tree mortality. Higher water temperatures resulting from climate change may impact cool water fish, and rising sea levels affect many fish and wildlife habitats (USFWS, 2012d). Climate change effects also include warmer air and ocean temperatures, more high-intensity rainfall events, and heat waves that are more frequent.

Id.

Climate change impacts must be considered in complying with the ESA. Given changes that a warming planet will bring, past data is no longer an accurate gauge of future conditions. Impacts from floodplain development should be assessed not only under current and past threats and conditions, but ones that climate change will bring like sea-level rise, increased flooding, changes in precipitation and other impacts that will effect species. These changes will cause and influence habitat shifts, habitat loss, species migration patterns, and other factors. Climate

change impacts also need to be accounted for in mapping, and mapping related decisions like LOMR and LOMR-Fs, both in terms of how alterations to the floodplain will impact flooding, floodplain function, species and habitat over time, but also the extent to which such elevation changes alter flood risk.

The PEIS Definition of “Action Area” Does Not Comport with the Scope of ESA

The action area for the for the Nationwide PEIS is defined as “the limit of the jurisdictional boundaries of the NFIP participating communities, including those areas in the United States and its territories designated as Special Flood Hazard Areas (SFHAs) on a Flood Insurance Rate Map (FIRM) under the NFIP.” PEIS § 2.2, p. 2-1. However, under the ESA, “Action Area” is defined as, “All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” 50 C.F.R. § 402.02(d). Given the potentially wide-ranging impacts that NFIP enabled flood plain development can have on threatened and endangered species, the action area as defined by the PEIS almost certainly does not encompass the action area as defined by the ESA, which includes areas outside of the “immediate area” involved. In order comply with the ESA, FEMA must consider impacts to species within the action area as defined by the ESA, not the PEIS.

We again appreciate the opportunity to comment on the PEIS and thank you for your consideration.

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June 2, 2017



Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

Subject: Comment on the draft National Flood Insurance Program Nationwide Programmatic Environmental Impact Statement

Docket ID: FEMA-2012-0012-0047

The Oregon Department of Land Conservation and Development (DLCD) is pleased to have this opportunity to comment on the draft of the Nationwide Programmatic Environmental Impact Statement (NPEIS) on the National Flood Insurance Program (NFIP).

Flexibility and Collaboration

DLCD strongly advocates for local communities and for floodplain management that protects endangered species and their habitat consistent with Oregon's statewide land use program. It is the Oregon way to find collaborative solutions for the betterment of our economy and quality of life that both support local communities and Oregon's natural environment. For this reason we support the preferred alternative (Alternative 2), which would only require local governments to document how they responded to their existing obligations under the Endangered Species Act (ESA) when issuing floodplain development permits. Local governments already have a duty to comply with section 9 of the Endangered Species Act in their land use permitting decisions. Additional performance standards and regulatory guidance from FEMA that go beyond section 9 to require mitigating all adverse impacts, as described in Alternatives 3 and 4, would limit flexibility and stifle collaboration. Instead, the preferred alternative would be an opportunity for FEMA to provide information and education to NFIP communities about the ESA.

Oregon ESA Consultation

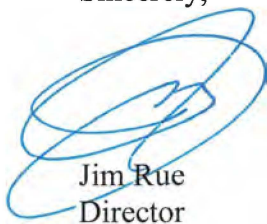
FEMA must help communities in Oregon understand how the preferred alternative in the draft NPEIS affects the process already underway in Oregon as a result of the earlier consultation between FEMA and Fisheries Service within the National Oceanic and Atmospheric Administration. The resulting Biological Opinion issued in April of 2016 contains a reasonable and prudent alternative that looks very different from the preferred alternative identified in the draft NPEIS. We request that FEMA provide timely information to local governments on how implementing the Biological Opinion intersects with this NPEIS. Until then, FEMA must avoid

undue burdens and premature punitive actions to Oregon communities that participate in the NFIP.

Further Input

Oregon looks forward to working with FEMA on a collaborative process to ensure that any revised floodplain management standards meet multiple social, economic and environmental needs. We call on FEMA to work closely with local communities, tribal governments, state agencies and stakeholders on implementing measures resulting from the Biological Opinion or the NPEIS.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jim Rue", is written over a light blue circular stamp or watermark.

Jim Rue
Director



June 6, 2017

SUBMITTED VIA REGULATIONS.GOV

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

RE: National Flood Insurance Program: Draft Nationwide Programmatic Environmental Impact Statement (Docket No. FEMA-2012-0012)

Dear Federal Emergency Management Agency:

Thank you for the opportunity to comment on the draft Nationwide Programmatic Environmental Impact Statement (DNPEIS) for the National Flood Insurance Program (NFIP). I am writing on behalf of Sierra Club and its members, including many members who live in coastal and riverine areas that are subject to increased risk of flood from the impacts of climate change, including rising sea levels, more frequent and intense storm and heavy precipitation events, precipitation falling as rain rather than snow, and earlier and faster snow melt.

We note that Columbia Law School's Sabin Center for Climate Change Law has submitted comments on the DNPEIS. We add the following observations:

- We agree that FEMA should incorporate climate change impacts in flood maps, and that the DNPEIS reasoning does not support FEMA's decision not to do so.
- The DNPEIS fails to adequately assess the combined effects on low-income communities of the increased risk of flooding due to climate change and the proposed plan to phase out subsidies. FEMA should examine the role of climate change on increasing the risk of flooding in low-income communities, and then assess how the phase-out plan will affect the ability of those communities to cope with such flooding events.

Please contact me if you have any questions about these comments. My direct line is 415-977-5725 and my email address is joanne.spalding@sierraclub.org.

Sincerely,

Joanne Spalding
Chief Climate Counsel

We have to make some thought rules on shippers and receivers most likely they took most of the time from the driver and they to deliver on time was things you late they charge the driver for late therefore some ended driving over the limit driver must login at the shipper and must get paid after one hour some know

You need the load they more than 8hrs to load you

And they expect driver to be on time for delivery

Maxime Tanis

Docket Number FEMA-2012-0012 DL Regulatory Affairs Legal Division
Office of the Chief Counsel
Federal Emergency Management Agency
500 C Street SW , Room 8NE
Washington, D.C. 20472-3100
Via regulations.gov, Docket FEMA-2012-0012 06 June 2017

Ladies and Sirs:

We are grateful for the opportunity to comment on the Draft National Programmatic Environmental Impact Statement on [changes in the] National Flood Insurance Program. And we are grateful for the opportunity to thank the FEMA staff who have clearly undertaken a heroic task in approaching these issues under difficult circumstances. This may be an excellent answer to the wrong question, and we wish to be clear about our appreciation for the efforts made, though we are compelled to call for re-framing of some issues and for a substantial revision in the approach that was taken.

There is no doubt of the importance of reducing flood losses and reducing flood risks, which bear costs even with instantiation of a flood, in the need for higher levels of investment and financial capacity or risk of failure. The NPDEIS establishes this, as do many other publications. We emphasize that the National Flood Insurance Program is the most important hazard mitigation program centered on governmental action; the only rival in benefits provided and cost-savings may be the public-private partnership that provides the remarkable advances in urban fire safety (America Burning, FEMA 2002).

These comments are not made in great detail, because the issues raised questions which must be further examined, and better answered, to provide the information needed for flood mitigation. Where voluntary actions are necessary, on the part of families and businesses as well as communities, adequate and reliable information is also necessary. The FEMA Flood Maps have become a standard source of information, though we raise questions about the important potential improvements that can be achieved; which we believe these would be very wise investments with a high rate of return. The noted planner and demographer, Dr. Arthur “Chris” Nelson, has noted that fully half of the built environment that will exist in the US in 2050 does not now exist (Nelson 2003). The markets in land and buildings need the best possible information, and fair rules for competition, and adequate regulatory certainty to make wise investments that do not result in needless misery and costs that affect all taxpayers and levels of government.

In summary, we argue that there are critical elements of information that are within our grasp with inexpensive and timely means, which warrant delay in both the two major elements of the purposes and needs for the DNPEIS and in the re-authorization of the NFIP impending. The stakes are too high for haste, and the benefits too valuable to disregard.

Recommendation on Rate-setting/Phase-Out Purpose and Need:

With appreciation, we endorse the detailed comments of American Rivers and the Natural Resources Defense Council, with two exceptions, noted below. These concern the present status of the 1% Special Hazard Flood Area (SFHA), and the adequacy of present calculations of the Base Flood Elevation (BFE); we urge that BFE be made into an engineering-quality standard, rather than an insurance-oriented estimation.

And, we add the point that the rate-change (or phase-out of Pre-FIRM insurance premia) is certainly part of the policy instrument which we call the National Flood Insurance Program. It differs from private insurance in many ways, though it has admirable analogous elements, such as the Community Rating System, which rightly follows the private fire insurance ratings.

But mandatory purchase flood insurance contemplates the life of the loan for which the insurance is required – this is not similar to the insurance markets in which experience affects annual re-rating. The life of the structures is certainly far longer still, and the community interests last as long as the building provides and consumes services.

The public interests are well understood, and the recent discussion of the idea of a “disaster deductible” for public assistance under the Stafford Act, and the Federal Floodplain Risk Management Standard have provided substantial airing of many of those interests. The private interests, on the other hand, were pronounced in the debates on the Biggert-Waters Act of 2012, and the Homeowners’ Flood Insurance Affordability Act of 2014.

The issues involved in going ahead with rules that provide unwanted outcomes (e.g. rising public costs and losses as well as private losses) versus the burdens borne from a change in the rules are the essence of policy debate. We assert that a valuable inquiry has been undertaken but not yet completed, in response to this particular set of issues of affordability and rate-setting. That is the study by the National Academies (reports 1 and 2, 2015 and 2016) and the ensuing efforts to apply state-of-the-science flood risk modeling to census and demographic information, in North Carolina, to establish useful information on affordability of flood insurance and testable levels.

With the affordability issues laid out in clear choices with clear consequences, the NPDEIS on the rate-setting elements can be meaningfully based on a set of case studies which can provide information supporting an informed impact statement. The focus of that is clearly socioeconomic impacts and pressures on land use as direct and indirect impacts, which can be considered in terms that relate to the range of land use concerns.

Proceeding without this information is like going to a medical clinic, having samples drawn for lab tests and images taken for examination, but then leaving and making a decision in a taxicab. It is likely that the affordability “labs” are more complicated than was anticipated, but the stakes are high enough to warrant making informed decisions.

Recommendation on ESA-Related Purpose and Need:

Again, we gratefully acknowledge and endorse the comments by American Rivers and the Natural Resources Defense Council, and we agree with their recommendation that response to this purpose and need should be delayed for adequate inquiry, though we urge that operations and mapping not be suspended nor continuity of service be interrupted. The following section explains our rationale for the recommendation of suspension of the NPDEIS in favor of thoughtful efforts to maximize the benefits achievable; subsequently we comment on the need for inclusion of future conditions in risk estimation.

Rationale for Recommendations Beyond the Immediate Scope of the DPNEIS:

Federalism and collaborative governance: The new administration has emphasized the values of rethinking federalism, and we laud that in application to the issues of land use. The NFIP is a Federal policy instrument which provides valuable benefits in exchange for actions which further federal, as well as State and local, goals, and which reduce burdens on taxpayers at all levels. The means of accomplishing diverse and somewhat overlapping goals are rapidly evolving in the age of “wicked” complex problems of governance, through a variety of forms of collaborative governance. The NFIP works through performance standards (the floodplain management minimum criteria), as the DNPEIS argues. It is time now to extend that approach to the fundamental goals of providing information and using a policy instrument designed in simpler times for present and impending needs.

ESA, NFIP, and Informational Platforms: One of the critical steps in improving pursuit of the goals of the NFIP and the ESA would be increased coordination through improved informational platforms. The new collaborative efforts – ranging from watershed management and Integrated Water Resource Management (see, e.g. American Water Resources Association 2012) proceed on both workable relationships among the parties, and a basis of common understanding of situations. These conditions allow not only getting past gridlock, but getting to “buy-in” with willing participation.

The FIRM by definition should not be a compromise; better risk estimations and communication are possible (Edelman 2016), but hydrology is non-negotiable. But many other maps are representations of preferences and aspirations, or demands and conditions. The ESA is essentially a demand that is implemented through aspirations which include designated critical habitat; there are many ecosystem and environmental services which are supported by conservation of critical habitat for a particular species. Some human uses foster conservation, or may sustain it by provision of value and funding (e.g. for open space with aesthetic, amenity/recreational, and real estate value increases; for descriptions of valuation in a variety of cases, see Earth Economics). The well-appreciated successes in hazard mitigation that employ “green infrastructure” are examples of overlapping and compatible interests which have substantial economic benefits. These are place-specific examples of the value of common platforms and capacity to find common interests.

Efficiency and Innovations: Efficiency of agency services and costs can likely be substantially advanced. The “not-invented-here” syndrome of disdain for other approaches and tools is unaffordable, now. There are likely to be regional variations in preferences for models for

different purposes, and regional variations in priorities. Those should be respected, as long as there is adequate linkage to national platforms and needs. The cost-savings may be considerably lower than the gains to unexpected uses, as we have seen in the remarkable expansion in the use of satellite imagery, and public-access geographic information systems. Current applications in common use were a gleam in the eye last time the NFIP was authorized.

Future Conditions: One of the most striking examples is the consideration of future conditions. National data (with national-level quality control, security, and privacy protections) from the Census supports demography at all levels, and that supports considerations and projections of future growth. Future growth can be estimated in terms of urbanization, characterized by applicable and potential standards for features such as urban permeability, storm water detention or discharge, urban-wildland interface development, conversion of agricultural land, reforestation/deforestation, and rates of growth. Without adequate consideration of future conditions, there cannot be adequate understanding of impending changes in the flood hydrographs that will arrive in the floodway after the FIRM is set but long before the structures potentially affected have been removed.

Property Rights: The “no adverse impact” standard, or “no rise [in BFE]” are ideas that encompass the fundamental principle that one cannot use one’s property so as to harm another (or in the case of disasters for which relief arrives, many or all others). This fundamental protection of property rights is expressed in competent planning, and through such policy instruments as the NFIP.

Market Needs and Regulatory Certainty: Markets operate with information; poor information leads to poor results. Where non-market values are involved, policy and collaborative processes are invoked; where market values are involved, price signals that adequately reflect relevant interests depend on information. The informational role of the NFIP FIRM maps is undisputed (e.g. ASFPM 2013, TMAC 2015; Adams-Schoen and Thomas 2015). That alone warrants modernization and adequate funding, and a pause before re-authorization to give deep consideration to the potential for improvements.

Investments also depend on adequate regulatory certainty. The ESA is a demand for certainty in conservation of conditions; the NFIP FIRM is (and should be a better) expression of risk and the need for risk averse decisions because the losses affect others as well as the directly impacted. There are dozens of other interests expressed in planning for services, transportation, market access, and other goals, though all relate in some way to the watershed and its qualities. The centrality of floodway and ecological considerations warrants making these the core of common mapping and modeling applications using platforms that interface with national information sources and with local applications.

This approach would provide optimal regulatory certainty: with best available information, flood risk mapping and anticipatory conservation measures (e.g. recognition of migratory corridors under extreme weather variations, critical winter range for some species, etc.), and thoughtfully designed land use and transitions to desired conditions, developers can anticipate risk levels and expect that surprises are minimized. That in turn provides incentives for increasing life-of-building efficiencies and thus returns on investment; a virtuous circle.

Extreme Weather Events: There is substantial observational evidence that extreme weather events may have increased within the recent past, which may be interpreted in different ways; however viewed, the frequency and intensity of heavy rainfall and other events affecting flooding and hydrology, directly and indirectly, are a factor that must be considered in future conditions. Such changes may interact with human changes in land use, such as urbanization, storm and agricultural drainage, and other changes. (A sampling of references is provided.) We observe that treatment of weather and hydrologic impacts in the DPNEIS would not be considered adequate for a project with conventional place-specificity.

Inadequacy of the DPNEIS: On the other side of the ledger, the present DNPEIS is inadequate for the ESA issues in a conventional sense because it cannot address the environmental issues with sufficient specificity; the programmatic changes that are needed to facilitate that are beyond the scope of FEMA's discretion, but are nevertheless nationally important. Pursuing means of achieving the necessary specificity is not beyond FEMA's discretion. This part of the EIS process is infeasible, but can be the spring board to constructive engagement with the potential we can realize.

Uncertainty of the Alternatives in Practice: Despite diligent study of the alternatives, we fear that in practice, two outcomes are most likely under any of them; we fear this renders them functionally quite similar. First, many communities may regard any additional effort as an unfunded mandate, despite the fact that indeed, it would instead be a condition upon a benefit received. But, the community staff may be already overburdened and in the wide range of support for civil service, there may be little capacity. As shown in the FEMA studies for the Disaster Deductible for Public Assistance, will to support infrastructure and civil service is highly variable. Further, the capacity to make biologically informed judgements is rare, so the support would have to be quite blunt, raising the problems described so well by TMAC for the traditional FIRMs.

Second, there is an inevitable and somewhat fair opportunity for an applicant to prove a claim of inapplicability though submission of apparently qualified evidence. The "somewhat" in front of fair refers to three points. First, the capacity to acquire such a showing is very unevenly distributed. Second, the capacity of community staff to evaluate such a showing is unevenly distributed. And third, to the extent that such showing enable actions which raise flood stages early or later, there are impacts upon others and the environment which may be unfair.

Finally, we suggest that given the very wide range of non-market values in water features and floodways, for wildlife activities such as birding and fishing, boating, quiet enjoyment, and human refreshment, there is good reason for a more transparent and public process and wide access to the relevant information, in a process such as we suggest.

Additional Comments on Future Conditions

The Technical Mapping Advisory Council (TMAC 2016, TMAC 2015) responded with affirmative recommendations on the need for inclusion of future conditions. That rationale is

clear; however, we suggest that in the long term, achieving the legislative goals requires more than has been previously considered. The recent increase in extreme weather events combined with increasing exposure of property and infrastructure necessitates a more effective approach to uncertainty and future conditions must not be optional in the estimation of flood risk. The notion that freeboard is a luxury is obsolete; it is the only sensible response to the inherent limits of predictability over the long lives of structures and public investments. But what else must be considered that is new? The answers are partly place-specific; the cascading electrical power failure from ice-storm impacts on wiring for New England is different from supply-chain problems for industry from storm or intentional damage to port facilities. But recognition of the long life of investments and the long-term commitments by the NFIP and by the communities and their infrastructure providers demands recognition that increasingly “tight coupling” of systems, such as only a few days’ supply of food in major cities makes for decreasing slack and increasing risk (Tierney, 2014).

FIS and FIRM studies should henceforth include, at a minimum:

- (1) Federal and/or State demographics for the watershed, including projections for the built environment;
- (2) State and regional assessment of the capacity in existing watershed development to avoid adverse impact and the creation of adverse impact downstream, due to obsolete or inadequate drainage and detention, and due to earlier development which may in the future raise flood stages as conditions change;
- (3) State and regional assessment of the adequacy of watershed standards for development to effectively apply the standard of “no adverse impact” to new and future development;
- (4) State and regional assessment of the impacts of observed changes in extreme events and changes in watershed conditions which may interact; e.g., increasing wildfire fuel loading interacts with inadequate management capacity and life/property-saving priorities to increase fire intensity, which interacts with flooding by increasing the speed and volume of run-off, which interacts with sedimentation and ash loads in aquatic environments and water supply systems.

The Association of State Floodplain Managers has also provided a compelling rationale for the inclusion of future conditions (ASFPM, 2013). Additional support is cited in Adams-Schoen and Thomas (2015).

Additional Programmatic Changes Recommended

Mapping accuracy and risk communication: TMAC president Dorman noted to the Senate committee that 26% of NFIP claims have been outside the “floodplain” as mapped. TMAC vice-president Edelman noted that the flood maps and the BFE as used for mapping “is the only product that engineers produce and communicate to the public that deals with averages and not what is safe. We also have a great deal of uncertainty within the calculations. In all actuality, the current 100-year average line shown on the flood insurance maps is perhaps closer to a safe design level of a 10-year event.” (Edelman 2016). Mr. Edelman expanded on those points at the hearing (Edelman 2016), pointing out that if these standards were applied to a bridge, half the trucks would crash the bridge.

The TMAC is fervently in favor of providing information for every structure, as effective risk communication. We suggest that the coordination goals described here would also allow communication of other risks, and opportunities. The NFIP is an instrument for flood risk reduction, but it can be synergistic with reduction of other risks as well. Expansion of risk mapping, as TMAC urges, can provide information that may benefit markets in unexpected ways; no one expected a “walkability score” to be part of real estate listings, but that is widely provided now because of increasing consumer interest in that information.

Building codes and standards: Section 322 of the Stafford Act provides authority for improved building standards within the Floodplain Management Criteria. The necessity of accounting for unforeseeable changes over the long lives of the structures and development yet to be built (Nelson 2003) must also be considered in the building codes and standards which should be incorporated into the Floodplain Management Criteria minimum standards. Inadequate building codes are a widespread failure of public policy, allowing the imposition of disaster relief and delayed recovery costs onto all taxpayers and public projects. Where the NFIP operates, as a program that provides benefits otherwise not available, standards that add little to the cost but a great deal to lifetime building value are a desirable condition. National policy also creates a level playing field which helps reduce the “race to the bottom” in standards that can result in sharply uneven imposition of risks on those least able to bear them.

For instance, at the 2016 Building Innovation Conference and Expo, sponsored by the National Institute of Building Sciences, Dr. Keith Porter suggested that if the goal of building codes were to be resilience, costs would increase about 1%; the savings in areas prone to earthquakes would be many multiples of the extra costs. In following the earthquake example in the above paragraph, earthquake codes could be modified as Dr. Porter suggests moving from current standards to a more holistic one: “Ordinary buildings in earthquakes will: ‘Avoid serious injury and life loss due to structural collapse, substantial damage to nonstructural components and systems, and release of hazardous materials, and be **largely habitable or functional.**’” [Emphasis added.] The codes should be modified for other foreseeable natural hazards as well to incorporate resilient standards into our development practices and avoid the costly scenario of losses and future retrofits. Flood-proofing is somewhat vague, but standards for drainage, reparability, elevation of appliances and other measures add little to lifetime cost but may provide very large increases in lifetime value (we await the forthcoming National Institute of Building Sciences update study on costs and benefits of hazard mitigation).

No adverse impact and no fill to comply with NFIP in the future: This is a low-hanging fruit which could dramatically reduce interference with natural floodplain functions, and thereby reduce impacts to habitat values. The recommended coordination with other interests might reveal places so thoroughly denatured that additional adverse impacts might be minimal, as well as revealing opportunities for restoration, but until shown otherwise, no adverse impact by no fill is wise policy.

Lender Compliance and WYO Compliance: Floodplain Management Criteria minimum standards can be strengthened to improve compliance by lenders and policy writers. The enforcement authority of non-renewal of lapsed policies is not the desired outcome, as suggested by the legislative requirement of monthly payment plans for escrowed policies. The most desirable means of increasing compliance may be reflective of the affordability goals which are not yet fully known, but where hardship is not apparent, allowing lapse defeats public goals and is a fraud, in effect, on the NFIP, however gentle it may seem.

The “Big Picture” Recommendation: Steps to Take for Efficient Mapping and Coordination

We recommend three steps, which are not sequential but should be cumulative.

1) A public request for comment such as advance notice of proposed rule-making, or by some other means. Seek public input on coordination and implementation of ESA and land use planning needs at all levels without impractical unfunded mandates. Provide time long enough for thoughtful response, including time for professional societies to organize for their responses. The questions for the national academies are apt for the professional societies, also. Our people are an underused public resource.

2) Request study by the National Academies on issues and limitations in regional coordination of and use analyses and water quality and flooding implications. There are a wide range of land use and water modeling tools which might serve for elements of regional analysis which could integrate ESA issues and future ESA issues and habitat needs with FEMA/NFIP needs, and significant federal investments in efforts to model and predict water quality as well as flood and reservoir management (USDA, USFS, BOR, ACE). Iowa, for example, is making extensive use of state-wide LIDAR, for many purposes; North Carolina is stated by FEMA to have exemplary data. Which platforms and interactions have been fruitful? Which should be models for others? Which best extend to regional/basin applications?

We note that this is compatible with pursuing the goals of the Technical Mapping Advisory Committee for going beyond the FIRM as a map. As Mr. Roy Wright of FEMA, Mr. John Dorman and Mr. Scott Edelman of TMAC (2016) pointed out, the ideal is a structure-specific risk assessment, for flood risk assessment. Such point-specific estimations are compatible with other kinds of mapping.

3) Consideration of some case study regions which may already have substantial land use and environmental issue studies and documentation. To what extent have these goals been met in existing efforts/planning processes?

These comments are submitted with great appreciation for the efforts of FEMA's dedicated staff, and with the hope that we have stepped away from institutional representation of our professional and avocational affiliation, to offer a perspective outside the conventional opposition or support, and to assist in development of a more beneficial outcome.

We emphasize that these comments do not necessarily represent the views of the Natural Hazard Mitigation Association, and certainly do not represent a position of the University of Colorado or any part thereof.

Sincerely,

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June 6, 2017

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C St. SW., Room 8NE
Washington, DC 20472-3100

Re: Comments regarding the *National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement*
Docket #FEMA 2012-0012

Dear Regulatory Affairs Division:

I am writing on behalf of Oregonians for Floodplain Protection, a non-profit corporation made up of national and local industry trade associations, individual property owners in Oregon, and others affected by the *Endangered Species Act (ESA) Section 7(a)(2) Jeopardy and Destruction or Adverse Modification of Critical Habitat Biological Opinion and Section 7(a)(2) 'Not Likely to Adversely Affect' Determination for the Implementation of the National Flood Insurance Program in the State of Oregon* ("Oregon NFIP BiOp" or "BiOp"). As you know, the Oregon NFIP BiOp concludes that FEMA's implementation of the National Flood Insurance Program ("NFIP") in Oregon is causing jeopardy to several ESA-listed species and adversely modifying and destroying their designated critical habitat. The Oregon NFIP BiOp sets forth a six element "reasonable and prudent alternative" ("RPA") that would significantly constrict development – and in many cases prohibit it – within the Special Flood Hazard Area, triggering crippling effects to many land owners and NFIP participating jurisdictions in Oregon. For more than a year, members of Oregonians for Floodplain Protection have been wrestling with FEMA and the Oregon Department of Land Conservation and Development ("DLCD") regarding FEMA's implementation of this RPA.

Based on FEMA's efforts to implement the RPA in Oregon, members of Oregonians for Floodplain Protection were surprised and relieved to review FEMA's *National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement* (March 2017) ("DPEIS"), and corresponding *National Flood Insurance Program Biological Evaluation* (November 2016) ("BE"). In contrast to the Oregon NFIP BiOp, both the DPEIS and the BE concluded that the NFIP is not affecting ESA listed species or their designated critical habitat. BE at vii; DPEIS at 4-110, 4-113. This is very good news for our members *provided that* FEMA applies this analysis in Oregon and discontinues any further implementation of the RPA from the Oregon NFIP BiOp.

We previously requested clarification from FEMA regarding whether it intends to implement the Oregon NFIP BiOp's RPA, particularly Element 2, as previously represented in Oregon, or if FEMA intends to take a modified approach consistent with FEMA's "no effect" determination in the DPEIS and BE. Letter from Molly Lawrence to FEMA, April 20, 2017, (enclosed). Unfortunately, FEMA Region X and FEMA Headquarters provided only non-substantive responses to that request, and suggested that we raise this request again as a comment on the DPEIS. Letter from Michael Grimm, Assistant Administrator for Mitigation, FEMA, to Molly Lawrence, May 22, 2017; letter from Sharon Loper, Acting Regional Administrator, FEMA Region X, to Molly Lawrence, May 11, 2017, (enclosed). Consequently, the intent of this letter is to again request clarification regarding how FEMA intends to proceed in Oregon in light of the DPEIS, and also to provide comments regarding some misstatements in FEMA's analysis of the potential impacts of its Preferred Alternative. We request that FEMA squarely address each of the issues raised in these comments in the Final Programmatic EIS.

I. Addressing the Inconsistency between the Oregon BiOp and FEMA's DPEIS

On April 14, 2016 the National Marine Fisheries Service ("NMFS") delivered to FEMA the Oregon NFIP BiOp, which found the administration of the NFIP in Oregon jeopardizes the continued existence of 16-anadromous fish species and Southern Resident killer whales, and results in the destruction or adverse modification of critical habitat for the fish species. The BiOp includes a six-element RPA that directs FEMA to make unprecedented changes to the implementation of the NFIP, initially just in Oregon, but ultimately nationwide. At the outset, the RPA directs FEMA to adopt "Interim Measures," which would require local jurisdictions in Oregon to impose significant restrictions on development within their floodplains by March 15, 2018. *See* Oregon NFIP BiOp, RPA Element 2. The remaining elements of the RPA require sweeping changes to the NFIP nationally, such as modifying mapping protocols, revising floodplain management criteria, imposing an "ESA performance standard" as a condition of NFIP eligibility, allowing no new development or substantial improvements in a newly mapped "high hazard area," data collection, and enforcement.

On June 13, 2016, FEMA issued a 60-day notice letter to NFIP participating communities in Oregon, in which FEMA indicated that it intends to implement (at least) the Interim Measures (RPA Element 2) from the BiOp. The letter provides that "until all permanent RPA elements are in place, your community may either choose to voluntarily impose a temporary moratorium on all floodplain development that adversely impacts ESA listed species or their habitat, or voluntarily implement the interim measures found in RPA Element 2." FEMA also expressed its intent to implement other elements of the RPA, stating that it will provide "guidance regarding how to achieve the requirements listed" in the other RPA Elements. Based on this letter, as well as FEMA's continuous efforts with DLCD to identify means to implement RPA Element 2, we understand it is FEMA's intention to implement the RPA.

Since issuing the 60-day notice letter in Oregon, FEMA has issued the BE and the DPEIS, which state that FEMA intends to take a different approach to addressing its obligations under the ESA. The BE and the DPEIS both state that FEMA's proposed approach to complying with its ESA obligation is as follows:

- (a) Changes to Floodplain Management:
 - (1) Clarify that pursuant to 44 C.F.R. §60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or state laws, including the ESA, as a condition of issuing floodplain development permits.
- (b) Changes to Flood Hazard Mapping:
 - (1) Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted documentation of compliance with the ESA.

BE at iv; DPEIS at ES-5. The changes required to implement the Oregon NFIP BiOp RPA are significantly different and more expansive than the Proposed Action/Preferred Alternative evaluated in the BE and the DPEIS.

Oregonians for Floodplain Protection are concerned that FEMA Region X's message to participating communities in Oregon with respect to their obligations to implement the RPA is in contradiction to FEMA Headquarters' intent to implement the Preferred Alternatives as evaluated in the DPEIS and BE. In particular, it is our understanding that FEMA Region X continues to move forward with developing a draft ordinance that would fully implement RPA 2. Therefore, we ask the FEMA to clarify whether and to what extent it intends to implement the RPA from the Oregon NFIP BiOp.

Further, to the extent that FEMA does intend to proceed with implementing the RPA set forth in the Oregon NFIP BiOp, FEMA has thus far neglected to review the effects of those program changes on the environment under NEPA. Such environmental review is mandatory *before* FEMA begins implementation of the RPA. Thus, if FEMA intends to proceed with the RPA in Oregon, Oregonians for Floodplain Protection request that FEMA issue a Supplemental Draft Programmatic EIS evaluating the probable environment impacts of implementation of the RPA. That would provide members of Oregonians for Floodplain Protection, and other members of the public, an opportunity to more clearly understand FEMA's plan, and to participate and comment regarding the effects of FEMA's approach.

II. Continuing Ambiguity Regarding FEMA's Proposed NFIP Eligibility Requirements

While members of Oregonians for Floodplain Protection were relieved by FEMA's conclusion that the NFIP does not affect ESA listed species or designated critical habitat, they continue to be concerned and confused by FEMA's Preferred Alternative. The DPEIS asserts that the proposed NFIP changes to require "documentation of compliance with the ESA" is benign. That has not been the experience of property owners and jurisdictions who have been attempting to understand and navigate this new "requirement" in Oregon and Washington for the last few years. We have found that requiring such documentation has triggered significant confusion and frustration at the local permit counter.

Although local governments have long been aware of federal regulatory obligations related to projects under their review, those local governments have not been required to demonstrate or document compliance with federal law as part of the local permitting process. Consequently, FEMA's assertion in the DPEIS that its proposed "clarification" of "existing

standards, laws, and regulations under the NFIP would not change or conflict with existing land use plans or other community plans or policies since these plans are based on existing standards, laws, and regulations,” is simply inaccurate. *See* PDEIS at p. 4-96. For more than four decades, FEMA never required local jurisdictions to document or demonstrate compliance with the ESA as a condition of NFIP participation or issuance of a floodplain permit. Contrary to FEMA’s claim that its Preferred Alternative is a mere “clarification,” it would in fact amount to a significant change in the way that FEMA has operated the NFIP. Such a change requires a public notice and rulemaking process under the Administrative Procedure Act, 5 U.S.C. § 553, not merely some form of clarifying guidance. To date, FEMA has not undertaken the rulemaking process, although it has already begun implementing these new requirements in portions of the U.S.

Most concerning, the DPEIS and BE provide no guidance or certainty regarding what documentation FEMA will accept as adequate to meet this new requirement – i.e., what qualifies as “documentation of compliance with the ESA”? Over the past few years, FEMA has attempted to integrate this new protocol in Washington and Oregon, both of which have been the subject of Biological Opinions issued by NMFS, but has vacillated regarding the type or amount of documentation it believes would satisfy this new requirement. In Oregon, for example, FEMA has attempted to expand the scope of the ESA by suggesting that a Section 10 permit is a required permit in cases where a floodplain proposed development project presents the “potential for a take.” *See* FEMA’s *Program Level Biological Assessment for the NFIP, Oregon State* (February 2013) at 2-40. NMFS, however, has since clarified that a Section 10 permit is not a required permit, and consequently does not fall within the rubric of 44 C.F.R. § 60.3(a)(2), which encompasses only required permits.

Depending on the type and degree of documentation that FEMA is proposing to require from NFIP participating communities and permit applicants, this change could have a *significant* impact on land use patterns. In states like Oregon and Washington, which utilize urban growth boundaries as a bright line separating urban lands from rural and resources lands, moving development out of the floodplain into non-floodplain areas can have significant and dramatic impacts that are not acknowledged, much less addressed, in the DPEIS.

Our members are acutely familiar with the confusion and concern that this sort of ill-defined requirement creates for local jurisdictions, who fear being sued for non-compliance with the ESA. For projects with no independent federal nexus, we suggest that FEMA clarify that all that is required is a letter signed by the applicant confirming that the proposed project will not cause “take” to reflect the limited obligations of non-federal actors under the ESA. To the extent any documentation is required, it must be simple, inexpensive to develop, and not require action from NMFS, who does not have adequate staff to engage on private projects that do not have a federal nexus triggering an ESA Section 7 consultation.

Thank you for considering these comments. We request that FEMA squarely address these issues raised by Oregonians for Floodplain Protection in its Final Programmatic EIS. If you have any questions as you conduct this additional analysis, please do not hesitate to contact me at (206) 623-9372 or mol@vnf.com.

Very truly yours,

VAN NESS FELDMAN LLP



Molly A. Lawrence

Cc: Mark Carey, FEMA Region X Mitigation Director
Board of Directors, Oregonians for Floodplain Protection

ATTACHMENTS

April 20, 2017

Bob Fenton
Acting Administrator
FEMA
500 C Street S.W.
Washington, D.C. 20472

Kenneth Murphy
Regional Administrator
FEMA Region 10
130 228th Street SW
Bothell, WA 98021-8627

Re: Clarification regarding FEMA's Plan for ESA Compliance in Oregon

Dear Administrators Fenton and Murphy:

Last November, our Coalition sent you the attached letter stating our intention to file suit against FEMA related to its efforts to implement one or more elements of the Reasonable and Prudent Alternative ("RPA") set forth in the *Endangered Species Act (ESA) Section 7(a)(2) Jeopardy and Destruction or Adverse Modification of Critical Habitat Biological Opinion and Section 7(a)(2) 'Not Likely to Adversely Affect' Determination for the Implementation of the National Flood Insurance Program in the State of Oregon* ("Oregon NFIP BiOp" or "BiOp"). Since then, FEMA has issued both the *National Flood Insurance Program Biological Evaluation* (November 2016) ("BE") and the *National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement* (March 2017) ("DPEIS"). FEMA's Proposed Action in the BE and Preferred Alternative in the DPEIS are not consistent with FEMA's intent, as stated in its 60-day notice letter to NFIP participating communities, to move forward with the implementation of RPA Element 2, and likely other RPA elements from the Oregon NFIP BiOp. We request that FEMA clarify whether it intends to implement the Oregon NFIP BiOp's RPA, particularly Element 2, as previously represented, or if FEMA intends only to require NFIP participating communities to "obtain and maintain documentation of compliance with . . . the ESA" as proposed in the BE and DPEIS.

Background regarding the Oregon BiOp

On April 14, 2016 the National Marine Fisheries Service (“NMFS”) delivered to FEMA the Oregon NFIP BiOp, which found the administration of the NFIP in Oregon jeopardizes the continued existence of 16-anadromous fish species and Southern Resident killer whales, and results in the destruction or adverse modification of critical habitat for the fish species. The BiOp includes a six-element RPA that directs FEMA to make unprecedented changes to the implementation of the NFIP, initially just in Oregon, but ultimately nationwide. At the outset, the RPA directs FEMA to adopt “Interim Measures,” which would require local jurisdictions in Oregon to impose significant restrictions on development within their floodplains by March 15, 2018. *See Oregon NFIP BiOp, RPA Element 2.* The remaining elements of the RPA require sweeping changes to the NFIP nationally, such as modifying mapping protocols, revising floodplain management criteria, imposing an “ESA performance standard” as a condition of NFIP eligibility, allowing no new development or substantial improvements in a newly mapped “high hazard area,” data collection, and enforcement.

Subsequently, on June 13, 2016, FEMA issued a 60-day notice letter to NFIP participating communities in Oregon, in which FEMA indicated that it intends to implement (at least) the Interim Measures (RPA Element 2) from the BiOp. The letter provides that “until all permanent RPA elements are in place, your community may either choose to voluntarily impose a temporary moratorium on all floodplain development that adversely impacts ESA listed species or their habitat, or voluntarily implement the interim measures found in RPA Element 2.” FEMA also expressed its intent to implement other elements of the RPA, stating that it will provide “guidance regarding how to achieve the requirements listed” in the other RPA Elements. Based on this letter, as well as FEMA’s continuous efforts with Oregon’s Department of Land Conservation and Development (“DLCD”) to identify means to implement RPA Element 2, we understand it is FEMA’s intention to implement the RPA.

More Recent Nationwide Activity

Since issuing the 60-day notice letter in Oregon, FEMA has issued the BE and the DPEIS, which state that FEMA intends to take a different approach to addressing its obligations under the ESA. The BE and the DPEIS both state that FEMA’s proposed approach to complying with its ESA obligation is as follows:

- (a) Changes to Floodplain Management:
 - (1) Clarify that pursuant to 44 C.F.R. §60.3(a)(2), a community must obtain and maintain documentation of compliance with the appropriate Federal or state laws, including the ESA, as a condition of issuing floodplain development permits.
- (b) Changes to Flood Hazard Mapping:
 - (1) Clarify that certain letter of map change requests will not be issued until the community or project proponent has submitted document of compliance with the ESA.

BE, p. iv; *see also* DPEIS, Preferred Alternative, p. ES-5. The changes required to implement the Oregon NFIP BiOp RPA are significantly different and more expansive than the Proposed Action/Preferred Alternative evaluated in the BE and the DEIS. Further, by failing to analyze the changes set forth in the RPA, FEMA leaves open the question of whether it intends to implement such changes at all.

Request for Clarification

The Coalition is concerned that FEMA Region 10's message to participating communities in Oregon with respect to their obligations to implement the RPA is in contradiction to FEMA Headquarters' intent to implement the Proposed Action/Preferred Alternatives as evaluated in the BE and the DPEIS. In particular, it is our understanding that FEMA Region 10 continues to move forward with developing a draft ordinance that would fully implement RPA 2. Therefore, we ask the FEMA clarify whether and to what extent it intends to implement the RPA from the Oregon NFIP BiOp.

In addition, we note that the BE and DPEIS indicate that under the Proposed Action/Preferred Alternative, a participating community must obtain and maintain "documentation of compliance" with the appropriate Federal and State laws, including the ESA, as a condition of issuing floodplain development permits. It does not appear that FEMA has prescribed the type of documentation that it is proposing to demonstrate this compliance. For projects with no independent federal nexus, we suggest that FEMA clarify that all that is required is a letter signed by the applicant confirming that the proposed project will not cause "take" to reflect the limited obligations of non-federal actors under the ESA. Aside from the recent revisions to the "community acknowledgment" in Form M-2, we are unaware of any circumstance where FEMA has required any form of documentation to demonstrate ESA compliance under 44 C.F.R. § 60.3(a)(2).¹

¹ As FEMA is aware, Form M-2 requires only that the community sign the following acknowledgement as part of submitting for a map amendment:

Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements ... that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted.

No other documentation appears to be required.

Mr. Bob Fenton
Mr. Kenneth Murphy
FEMA

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April 20, 2017

Thank you for considering these issues. If you have any questions, please do not hesitate to contact the undersigned.

Very truly yours,

VAN NESS FELDMAN LLP

A handwritten signature in blue ink, appearing to read 'Molly', followed by a horizontal line.

Molly A. Lawrence

Cc:

Jenny Pakula, Oregon Association of Realtors
Jon Chandler, Oregon Homebuilders Association
Mary Anne Nash, Oregon Farm Bureau
Mike Freese, Association of Oregon Industries
Richard Angstrom, Oregon Concrete & Aggregate Producers Association
Susan Steward, BOMA Oregon
Linda Engbretson, City of Warrenton
Bryan Pohl, Tillamook County



FEMA

MAY 11 2017

Ms. Molly A. Lawrence
Van Ness Feldman LLP
719 Second Ave, Suite 11580
Seattle, Washington 98104-1728

Dear Ms. Lawrence:

Thank you for your April 20, 2017, letter to the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 requesting clarification of FEMA's plan for Oregon's Endangered Species Act (ESA) compliance, outlined in the March 2017 Draft Programmatic Environmental Impact Statement (DPEIS). FEMA Region 10 is significantly engaged in ESA compliance planning for the State of Oregon; however, FEMA Headquarters leads the DPEIS efforts related to the nationwide implementation of the National Flood Insurance Program.

Please note that FEMA Headquarters is additionally in receipt of your April 20, 2017, letter and will formally respond to your request for clarification.

If you need additional information or assistance, please contact John Graves, Floodplain Management Branch Chief, at (425) 487-4737, or by email at John.Graves@fema.dhs.gov.

Sincerely,

Sharon Loper
Acting Regional Administrator

SVH:vl



FEMA

May 22, 2017

Ms. Molly A. Lawrence
Van Ness Feldman LLP
719 Second Avenue, Suite 1150
Seattle, Washington 98104-1728

Dear Ms. Lawrence,

I am in receipt of your April 20, 2017 letter regarding the National Flood Insurance Program's (NFIP) Endangered Species Act consultation and implementation of the Reasonable and Prudent Alternative (RPA) in Oregon, and FEMA's draft Nationwide Programmatic Environmental Impact Statement (NPEIS) on the NFIP.

With respect to your comments on FEMA's implementation of the RPA, FEMA continues to develop its implementation plan. We have not yet concluded that process, but we intend to keep the public apprised of our implementation plans.

With respect to your comments on the draft NPEIS, I recommend that you submit those comments as part of the notice and comment process currently underway for that document. There are several avenues still available for the public to comment before the end of the comment period on June 6, 2017.

- (1) Regulations.gov: You may also provide comments on <http://www.regulations.gov>. Search for Docket ID FEMA-2012-0012 and follow the instructions for providing comments.
- (2) Mail/Hand Delivery/Courier: You may also provide written comments by mail, hand delivery, or courier to the Regulatory Affairs Division, Office of Chief Counsel, Federal Emergency Management Agency, 8NE, 500 C Street, SW, Washington, DC, 20472.

We appreciate your continued engagement and value your feedback, and we look forward to continuing to work with you in the future.

Sincerely,

A handwritten signature in blue ink, appearing to read "Michael M. Grimm".

Michael M. Grimm
Assistant Administrator for Mitigation
Federal Insurance & Mitigation Administration



June 6, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

Re: National Flood Insurance Program Draft Nationwide Programmatic Environmental Impact Statement (NPEIS) Docket ID FEMA-2012-0012

To Whom It May Concern,

The Vermont River Corridor and Floodplain Protection Program provides direct technical assistance to 248 communities participating in the NFIP. Vermont espouses a No Adverse Impact floodplain management approach that seeks avoid increasing flood risk and degrading natural and beneficial floodplain functions.

We fully concur with the comments and recommendations put forth by the Association of State Floodplain Managers. Nonetheless, we offer the following reinforcing comments on the NPEIS

A genuine programmatic EIS would not be limited in scope to the Endangered Species Act. This presents an opportunity to evaluate impacts of the NFIP more holistically with respect to its impacts on floodplain resources and the entire suite of natural and beneficial functions that should be protected, including habitat for endangered species.

The NPEIS in many instances is devoid of historical context and reality. The NFIP does, in fact, promote the development of floodplains both through the land use and mapping criteria, 44 C.F.R., Parts 60.3 and 65, respectively.

Communities gain entry into the NFIP by adopting minimum standards. Minimum standards allow development so long as the minimum elevation/floodproofing standards are met. Insurable structures meeting minimum standards are eligible for affordable flood insurance. Affordable flood insurance for meeting minimum standard results in continued encroachment that degrades the floodplain resource – death by a 1000 cuts.

The mapping revision provisions are a particularly perverse incentive. Most communities with minimum standards allow filling of the flood fringe. The Letter of Map Revision provisions allow developers, with community concurrence, to revise the maps to exclude filled areas from the regulatory floodplain, thus removing floodplain management regulatory requirements, removing mandatory flood insurance purchase requirements, and resulting in filled areas being classified as low risk.

The existing NFIP framework has resulted in an ongoing squandering of the nation's floodplains over time. The NPEIS provides an opportunity to programmatically update the NFIP based on lessons learned over the last 49 years. Unfortunately, like many efforts before, this misses the opportunity by dodging the crux of the problem and once again passing the onus onto municipalities.

Many smaller communities have NFIP minimum standards and are challenged to administer base NFIP requirements. Moreover, FEMA has a long history of not sanctioning communities – via probation or suspension – for lack of compliance due to a myriad of issues that largely remain today (see the 2006 AIR NFIP Evaluation Report on compliance : https://www.fema.gov/media-library-data/20130726-1602-20490-1461/nfip_eval_community_compliance_a.pdf). Expecting ESA compliance via local regulation will not fix the problem.

The reality is that the NFIP, including the minimum floodplain management criteria, needs extensive overhaul to recognize that floodplain management has evolved substantially over the last half century. The 1968 Act, while extremely important at the time, was a compromise that enabled continued development of the nation's floodplains. A modernized NFIP needs to move beyond the focus of simply reducing risk to insurable structures by providing a robust mechanism to protect our remaining undeveloped floodplain resources. In light of a changing climate and ever-increasing disaster recovery costs, anything less simply kicks the can down the road.

We implore FEMA to think big as federal leadership is needed to make meaningful progress.

Thank you for the opportunity to comment and we would appreciate serious consideration of all the comments and recommendations submitted.

Respectfully,

A handwritten signature in blue ink, appearing to read "Rob Evans", is written over a light blue horizontal line.

Rob Evans, CFM
State Floodplain Manager/NFIP Coordinator
River Corridor & Floodplain Protection Program
VT Department of Environmental Conservation.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

*Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341*

June 6, 2017

Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency, 8NE
500 C St SW
Washington, DC 20472

RE: Docket ID: FEMA-2012-0012

Comments on Draft EIS for National Flood Insurance Program

To Whom It May Concern:

The Washington Department of Ecology (Ecology) submits the following comments on the Draft Environmental Impact Statement (DEIS) for the National Flood Insurance Program (NFIP). Ecology is the State of Washington coordinating agency for the NFIP. As such, we enjoy a strong working relationship with NFIP staff at FEMA, Region X. As discussed below, we are concerned that the approach proposed in Alternative 2 of the DEIS will lead to ongoing implementation difficulties for communities participating in the NFIP.

Implementation of the Endangered Species Act

At Section 4.1.1 of the DEIS, FEMA contends that the NFIP does not increase the rate of floodplain development. However, we note that the Biological Opinion prepared by the National Marine Fisheries Service for the implementation of the NFIP in the Puget Sound region noted that "NMFS's analysis during the consultation supports the conclusion that FEMA's activities do lead to floodplain development in Washington State" (National Marine Fisheries Service, 2008). This situation where FEMA takes a position regarding the impacts of the program that cannot be reconciled with existing Endangered Species Act (ESA) coordination documents could place participating communities in the difficult position of sorting out the implementation of conflicting direction.

The preferred alternative does not clearly provide support for the implementation of biological opinions. The preferred alternative includes clarification that participating communities must obtain and maintain documentation of compliance with the appropriate Federal or State laws, including the Endangered Species Act, as a condition of issuing floodplain development permits.



This places the onus of complying with biological opinions on participating communities. Such compliance could lack sufficient technical support and be done in a piecemeal fashion.

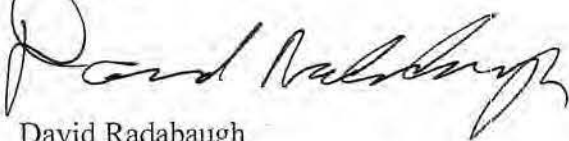
While we note the efforts by FEMA, Region X to provide technical support for the implementation of the Puget Sound Biological Opinion, there is not a clear commitment in Alternative 2 for FEMA to provide technical support to participating communities for implementation of biological opinions. Thus, the DEIS should consider the impacts of the uncoordinated and piecemeal approach to the implementation of the Endangered Species Act that could occur as part of Alternative 2.

Cost Estimates for Conducting Community Assistance Contacts

The DEIS estimates that the cost of a Community Assistance Contact (CAC) is \$500 (Appendix I, page 5). This is based on an estimate of 8 hours needed to conduct a CAC. We note that Publication FEMA F-776, "Guidance for Conducting Community Assistance Contacts and Community Assistance Visits" is FEMA's primary guidance for the conduct of CACs. At Chapter 3, this guidance notes that the CAC includes six areas that should be addressed: 1) floodplain management regulations; 2) map availability, accuracy, and recent flooding history; 3) development permits and review process; 4) NFIP community information review and verification; 5) potential deficiencies or violation; and 6) any follow-up and/or community action that is needed. Given the extensive expectations for CACs, we ask that FEMA reconsider its cost estimate for conducting a CAC.

We thank FEMA for the opportunity to comment on the DEIS. If there are any questions regarding our comments, please contact me at (425) 649-4260 or david.radabaugh@ecy.wa.gov.

Sincerely,



David Radabaugh
State NFIP Coordinator

Cc: Gordon White, Department of Ecology
Brian Lynn, Department of Ecology
Scott McKinney, Department of Ecology

REFERENCES

National Marine Fisheries Services, 2008, Endangered Species Act – Section 7 Consultation
Final Biological Opinion, Implementation of the National Flood Insurance Program in the State
of Washington, Phase One Document – Puget Sound Region, p. 3)

**Alabama Rivers Alliance • American Rivers • Association of Northwest Steelheaders •
Florida Wildlife Federation • Friends of the Santa Clara River • Great Rivers Environmental Law Center •
Great Rivers Habitat Alliance • Hoosier Environmental Council • Kentucky Resources Council, Inc. •
Kentucky Waterways Alliance • Matilija Coalition • Michigan Environmental Council •
Missouri Coalition for the Environment • National Wildlife Federation • The Passaic River Coalition •
Prairie Rivers Network • The River Project • Surfrider Foundation • Water Alliance •
Water-Culture Institute • Upper St. Lawrence Riverkeeper**

June 6, 2017

Mr. Bret Gates
FEMA, Federal Insurance and Mitigation Administration
Floodplain Management Division
400 C Street SW
Washington, DC 20472

***Re: Seeking public comment on the National Flood Insurance Program Nationwide Programmatic
Environmental Impact Statement: Docket ID FEMA-2012-0012***

Dear Mr. Gates:

On behalf of the following members of the Water Protection Network (WPNetwork), thank you for the opportunity to submit comments on the Federal Emergency Management Agency's (FEMA) draft Nationwide Programmatic Environmental Impact Statement (NPEIS) for the National Flood Insurance Program (NFIP).

The Water Protection Network is a coalition of national, regional and local organizations working to advocate for water projects and policies that are environmentally and economically sound. The NFIP has significant impacts on our nation's floodplains that affect not only the ecological wellbeing of these systems, but the safety of our nation's riverine communities. Reducing the impact of the NFIP on the environment will result in reduced flood risk for communities, habitat preservation for endangered and threatened species, and reduced financial burden for federal taxpayers.

The NFIP plays a critical role in community decision-making about floodplain use and infrastructure development that can have profound impacts on natural resources. Notably, the NFIP can inadvertently incentivize floodplain development, and spur communities to build higher levees or other flood control infrastructure to take advantage of lower NFIP flood insurance rates or to eliminate mandatory flood insurance requirements. Such infrastructure can impact the local environment in a number of ways, including

- Damaging floodplain wetlands where the infrastructure is located,
- Encouraging the draining and conversion of landside wetlands for economic development,
- Threatening nearby natural resource and/or recreational infrastructure by increasing flood surcharges, and
- Reducing river's access to its floodplain during flood events to the detriment of native fish and wildlife.

The NFIP needs to be structured and applied in a way that acknowledges and addresses the program's role in incentivizing floodplain development and flood damage reduction infrastructure to the detriment of the environment. This can be accomplished by

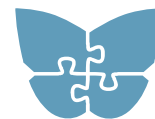
- Considering the NFIP's direct and indirect impact on floodplains and the ecosystem services they provide;
- Broadening the analysis to review how the NFIP impacts development and flood damage reduction infrastructure decisions, and cumulatively harms people and wildlife;
- Consulting with other federal agencies, such as the US Fish and Wildlife Service, to analyze the NFIP's impact on floodplains and to ensure that the NFIP is in compliance with the Endangered Species Act;
- Improving flood risk standards to better ensure community safety and maintain critical floodplain functions; and
- Assessing alternatives such as stronger minimum standards that will better protect people and endangered and threatened species.

The Water Protection Network urges FEMA to address these concerns as the NPEIS is finalized to ensure a legally defensible, scientifically defensible, and practical flood insurance program that will preserve both the environment and public safety. Thank you for considering our comments. For any further information, please contact Marisa Escudero at escuderom@nwf.org.

Sincerely,

A handwritten signature in black ink that reads "Marisa C. Escudero". The signature is written in a cursive, flowing style.

Marisa C. Escudero
Water Protection Network Manager



June 6, 2017

Robert Fenton
Senior Official Performing the Duties of the Administrator
Federal Emergency Management Agency
500 C St. SW.
Washington, DC 20472

RE: National Flood Insurance Program Nationwide Programmatic Environmental Impact Statement

Dear Mr. Fenton,

Willamette Partnership is an Oregon-based non-profit committed to improving conservation outcomes for the benefit of natural and human communities alike. We appreciate the opportunity to comment on this programmatic environmental impact statement (PEIS). We believe it has potential to significantly affect Oregon communities that participate in the NFIP, and that the PEIS as drafted does not do enough to support local governments and individual landowners in making responsible decisions about development in flood hazard areas. This has troubling ramifications, both for the ability of Oregon communities to grow in a safe and sustainable manner, and for the native fish populations critical to our state's economic, cultural, and environmental well-being.

We are writing to urge the Federal Emergency Management Agency (FEMA) to delay finalization of the PEIS until full consultation with the US Fish and Wildlife Service and National Marine Fisheries Service (Services) can be completed to determine the nationwide impact of the NFIP on ESA-listed species and to identify a truly programmatic approach to avoiding jeopardy under Section 7 of the ESA. This consultation is particularly important in Oregon, where an existing Biological Opinion has reached a jeopardy determination but FEMA has not yet determined what actions will be taken to bring NFIP implementation in the state into compliance with NFIP.

Oregon's local governments have known since at least 2013 that NMFS would likely find that implementation of the NFIP in Oregon was creating jeopardy for ESA-listed fish. During that time, NFIP communities have been faced with a dilemma: they continue to receive permit requests for development actions in floodplains, some of which are likely to cause significant adverse impacts to listed salmonid species, but they have no clear path to avoid contributing to jeopardy (in the context of their participation in a federal program) or creating take of those species other than through individual consultations with NMFS.

Despite release of the Biological Opinion in 2016, significant uncertainty continues as communities wait for clear guidance from FEMA on the appropriate route for meeting both NFIP and ESA requirements for permitting land-use decisions in flood hazard areas. FEMA has clearly communicated that it does not plan to implement the reasonable and prudent alternative offered in NMFS's Biological Opinion as written but has not yet offered a viable replacement. In the current state of uncertainty, Oregon communities are highly unlikely to invest in mapping and modeling efforts, zoning and ordinance changes, or even proactive floodplain restoration that may be inconsistent with FEMA's future recommendation.

Communities need more guidance and support from FEMA. Their land use decisions in flood hazard areas take place in the context of participation in a federal program, and they have neither the capacity nor the authority to analyze the impacts of individual land use decisions on listed species, let alone the cumulative impacts of all such decisions related to the NFIP. Because such projects have a federal nexus through FEMA,

a consultation with the Services on national implementation of the NFIP is the appropriate place for that analysis to take place.

FEMA's assertions that the NFIP has no effect on listed species stands in stark contrast to recent judicial decisions and NMFS's biological opinions in Washington and Oregon concluding the opposite. Until NFIP communities have a clear route to ensuring both their own decisions and the broader implementation of the program are compliant with the ESA, they will continue to experience:

- Greater legal and practical uncertainty in deciding whether to permit development in floodplains, and under what conditions;
- Greater legal risk that permitting actions might cause take of listed species (especially in Oregon, where the incidental take coverage provided under the existing Biological Opinion is dependent on FEMA's timely implementation of the reasonable and prudent alternative);
- Greater flood risk to properties and property owners in the floodplain, as continued development in floodplains alters flood dynamics; and
- Greater likelihood that the continued imperilment of listed species will undermine recovery efforts and require increased regulatory interventions.

The resulting lack of clarity around the intersection between NFIP and ESA creates a significant source of uncertainty, risk, and cost for local governments as they determine how best to grow their communities in safe and resilient ways.

A full consultation, resulting in clear guidance to FEMA and local communities on how best to avoid jeopardy of species, is needed so that communities seeking to develop in the floodplain can do so responsibly and without impacts to listed species. The results of this consultation should form the basis of FEMA's EIS and future implementation of the program. For local governments, the certainty provided would translate directly into increased opportunities for safe and thoughtful economic development and potentially significant savings on infrastructure costs. It would be a vitally important and timely step in the right direction for both Oregon's communities and our native fish.

Sincerely,



Bobby Cochran,
Executive Director
Willamette Partnership

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

April 18, 2017 Webinar

Verbal Comment from: Chad Berginnis, Executive Director, Association of State Floodplain Managers

Comment: My name is Chad Berginnis and I'm the Executive Director of the Association of State Floodplain Managers. Admittedly, I have not read all of the 600 pages in depth, but I am having trouble finding this aspect and it may be problematic. I could not find the judicial history of the ESA and the NFIP. The basic tenets of impact statements is to identify areas of controversy. A judicial proceeding would be considered controversial, such as the key deer ruling. In reviewing the document, Section 1.2 discusses implications to agencies and the public but does not mention any of the judiciary proceedings. Further, in Section 4.1, there is no mention of these judiciary issues either. I find that the history of the judiciary issues for the NFIP and ESA should be addressed and without addressing them, it is problematic.

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

May 9, 2017 Webinar

1) Verbal Comment from: Sarah Bruce, Senior Planner at City of Hillsboro, Oregon

Comment: My comments are around why the affordability legislation is being included in this NPEIS. I intuitively get why the ESA is happening, and I know that is something then needs to be addressed and is how I am coming at this via the Oregon Biological Opinion. It is how I found out about this effort. The affordability questions and why the Homeowner Flood Insurance Affordability Act and Biggert-Waters, why those are part of this PEIS effort isn't entirely clear to me. I will go back and read the document. But just as far as the summary, that's not obvious to me from the outset.

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

May 9, 2017 Webinar

2) Verbal Comment from Mark Riebau

Comment: Much of the draft EIS basically refers back to the state and local government as having permit authority, which is correct. However, FEMA has a process for dealing with Letters of Map Revision based on fill, they are called LOMRF or LOMR-F, which they accept absent any comment or input from the local government. Now these are applications provided by the landowner and the applications provide elevation information to demonstrate that the land has been filled to at or above the base flood elevation. And FEMA issues a LOMR-F, which the applicant then takes back to the local government official who is responsible for issuing the building permit and said “see this, I’m no longer in the floodplain”. And the local government official has no option but to issue a building permit. FEMA needs to understand that this basically puts them in the position of issuing building permits. They need to require as a part of the LOMR-F application a building permit from a, excuse me, a floodplain development from a local government. If there is no floodplain development permit associated with the LOMR-F application, the LOMR-F application must be rejected and returned to the applicant. Then FEMA will no longer be in the position of land use regulation as they claim.

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

May 10, 2017 Public Meeting held in Portland, Oregon

Verbal Comment from: Aylvia Ten

Comment: I'm with the community, and I speak for myself -

Facilitator: We need your name.

Comment: My name is Alyvia, and I live off of 122nd and Southeast Division. And this is my first meeting, public meeting. And I was wondering if the Federal Emergency Management Agency, FEMA, does that only apply to flood or hurricane victims or -- et cetera, et cetera, which I really don't know. Can you come up with the rest?

Facilitator: We can try to answer your questions. We're just taking comments today.

Comment: Okay. Do you think Federal Emergency Management Agency would also cover organized crime or human trafficking?

Facilitator: Thank you. We're only taking comments today.

Comment: Oh. Are you recording something? Where can I get my answers at? Is there a website?

Facilitator: They'll be in the back of the -- when we write the final document, we'll respond to all of the comments that were provided today, and the answers will be there.

Comment: Okay.

Facilitator: Does anybody else have a comment?

Comment: Okay. So also, does FEMA also apply to sex slavery right here in our community? Also, what does FEMA, like, cover, besides flood? Because that's all I see. It's a comment, question to myself, all I'm thinking. So I see that all over the world it only covers flooding and tsunamis and earthquakes, but I only see FEMA helping Americans and its citizens that have migrated here only when it's made national news that we help other countries. So we have to help ourselves now. Second of all, how would any of you feel if your daughter or niece or granddaughter was a victim of sexual assault in a community where somebody's family money runs long and hard, and there's nothing to do about it? And the more you ask, the more you comment, the more you question, the more you're harassed by Portland Police. How is it -- does FEMA cover, like, police departments not serving and protecting their community, even if a criminal has not been charged with sexual assault? Okay. That's all the questions I have.

Facilitator: Thank you, Aylvia. Are there any other comments on the document?

Comment: I have a question - comment. So I was just reading right here, I mean, I feel that this organized crime that's going around here, that was once called Mafia back in the day, I feel that it's a problematic environmental impact because it's victimizing our young ladies and our girls. Is FEMA responsible also for the -- what is that -- the Willamette River? I'm not from Portland. So I have a lot of questions. This is like -- I'm used to coming from a controlled environment, the South, a military base. I

was just wondering, how is there a roofing company, when FEMA hasn't even been involved in no windstorm or anything, is making more than a trucking company? We should ask FEMA. I don't see anybody over here with any brand-new roofs, even though we advertise that right. Maybe we should contract with them, the county, the state. They can get perks for their tax write-off if they would, like, service the state to do, you know, weatherized roofing and stuff like that.

Facilitator: Thank you.

Comment: Does that make you feel uncomfortable, sir, talking about human trafficking, sex slavery, white slavery? Because it's not just, like, thugs doing it now; it's like professionals participating in it. Who else? Make you uncomfortable? I'm not asking for an answer, just a comment.

Facilitator: We're not allowed to comment today.

Comment: Because you'd have to retract your statement if you're wrong, huh?

Facilitator: It's not the purpose of a public meeting for NEPA.

Comment: Where can I go for debate on this? I just want to know how many girls are going to have to disappear? How many girls are going to have to be victimized by the system? How many girls are going to fight their way out of apartments for four days and cameras from taking down a parking lot at a clinic on 125th and Division? They're not even vandalized. The signs are still up, and professionally they're not taken off. How is it that somebody -- I thought the strip clubs would be an issue for FEMA, maybe. And how is it filmed, and there's no police forum when you get off the track? Isn't that a known property for known prostitutes? Isn't that known from south -- northeast, three blocks, go four blocks, now you're in chino (phonetic) territory. And if a guy's not convicted of sex crimes, at least give him some downers to stay off the damn playground with drugs and booze. This man is a nuisance, y'all. And I need FEMA to step in, because I'm having a problematic problem right now.

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

May 17, 2017 Public Hearing held in Kansas City, Missouri

Verbal Comment from: Karin Jacoby, Husch Blackwell, Inc.

Comment: My name is Karin Jacoby. I'm a levy and flood protection attorney here in Kansas City, working for the firm Husch Blackwell, and I'm here today on behalf of our many levy clients, municipalities with levies, levy districts, owner/operators, and submitting these comments for the record on their behalf, so thank you for the meeting and for the presentation.

To begin, I would like to request an extension of comments beyond the current due date of June 6th, in part, due to the complexity, and that the final meeting is May 19th in Washington, D.C., which only allows for a few days prior to the end of the comment period.

Second, we have some concerns with scoping on this process. The initial scoping meeting in November of 2009 occurred in November of 2009. Since then Biggert-Waters 12 and HFIAA took place following which there were some webinar scoping meetings, but there were no additional scoping meetings that we were aware of after EO 13690, the Federal Flood Risk Management Standard, which because that amends the Floodplain Management Executive Order 11988, which is listed as being a consideration in the NPEIS scoping, we thought that at that time there should have been additional scoping meetings, recognizing that the FFRMS can have significant implications for levied areas and land use.

Again, additional time is sought to address those concerns seeing that the floodplain management criteria guidance and EO 11988 and through that FFRMS is being considered in the NPEIS and, in fact, is part of the preferred alternative, the floodplain management criteria guidance.

So after these most recent public meetings, time is needed to assess implications to levied areas and to people, property and productivity that levies protect.

Lastly, considering that the NFIP is now being reauthorized, consideration should be given to incorporating those potential reforms prior to a record of decision being made. Considering that the last EIS was in 1976, it seems reasonable to wait for this new reauthorization and to update the scope accordingly.

And, finally, while it is understood that FEMA does not have land use authority, it must be recognized that there are implications for land use and zoning, as such a no-impact for land use and zoning seems inappropriate.

Thank you. Appreciate the opportunity to provide these comments for the record.

National Flood Insurance Program (NFIP)
Draft Nationwide Programmatic Environmental Impact Statement (NPEIS)

May 19, 2017 Public Meeting held in Washington, DC

Verbal Comment from: John McShane

Comment: First, I commend FEMA for preparing a PEIS in order to more effectively implement the NFIP and improve compliance with environmental laws such as the Clean Water and Endangered Species Acts.

I believe that Alternative 3 is the best course of action for the NFIP to achieve the goals of floodplain management and is consistent with both Executive Order 11988, Floodplain Management, and section 1302(c) of the 1968 National Flood Insurance Act. The goals of floodplain management are not only to reduce the loss of life and property caused by floods but also to protect and restore the natural resources and functions of floodplains, these dual goals were first espoused in the 1970's by the Federal Interagency Floodplain Management Task Force which was tasked with developing a unified national program for floodplain management.

For example, Alternative 3 will: ""Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains."" This will allow important projects to move forward to protect and restore the natural functions of floodplains that were often adversely impacted by structural flood risk reduction projects in the past.

Although floodplains comprise just 2% of the land area, in their natural state riverine and coastal floodplains provide approximately 25% of all terrestrial ecosystem services benefits 1 including improving water quality, promoting groundwater recharge, and providing habitats for fish and wildlife. In that regard, I would like to submit for the record a paper that was published by the American Water Resources Association, ""Shifting the Paradigm for the 21st Century: Protecting and Restoring the Natural Resources and Functions of Floodplains,"" which provides additional information on the economic and environmental values of protecting and restoring naturally functioning floodplains.

Thank you.

FEMA should undertake a study to determine the true value for flooding losses that include direct and indirect flooding losses. The \$8 billion estimate for flooding losses is too low and the estimate should be closer to \$30 to \$50 billion for direct and indirect flood losses. "

May 18, 2017

Regulatory Affairs Division, Office of Chief Counsel
Federal Emergency Management Agency 8NE
500 C St. SW., Washington, DC 20472.

Re: Comments on the National Flood Insurance Program Programmatic Environmental
Impact Statement, Docket ID FEMA-2012-0012.

To Whom It May Concern:

First, I commend FEMA for preparing a PEIS in order to more effectively implement the NFIP and improve compliance with environmental laws such as the Clean Water and Endangered Species Acts.

I believe that Alternative 3 is the best course of action for the NFIP to achieve the goals of floodplain management and is consistent with both Executive Order 11988, Floodplain Management, and section 1302(c) of the 1968 National Flood Insurance Act. The goals of floodplain management are not only to reduce the loss of life and property caused by floods but also to protect and restore the natural resources and functions of floodplains, these dual goals were first espoused in the 1970's by the Federal Interagency Floodplain Management Task Force which was tasked with developing a unified national program for floodplain management.

For example, Alternative 3 will: "Clarify that the exception to the no-rise performance standard in the floodway applies only to projects that serve a public purpose or result in the restoration of the natural and beneficial functions of floodplains." This will allow important projects to move forward to protect and restore the natural functions of floodplains that were often adversely impacted by structural flood risk reduction projects in the past.

Although floodplains comprise just 2% of the land area, in their natural state riverine and coastal floodplains provide approximately 25% of all terrestrial ecosystem services benefits¹ including improving water quality, promoting groundwater recharge, and providing habitats for fish and wildlife. In that regard, I would like to submit for the record a paper that was published by the American Water Resources Association, "Shifting the Paradigm for the 21st Century: Protecting and Restoring the Natural Resources and Functions of Floodplains," which provides additional information on the economic and environmental values of protecting and restoring naturally functioning floodplains.

Thank you.

John H. McShane
314 E. Capitol St. NE
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SHIFTING THE PARADIGM FOR THE 21st CENTURY: PROTECTING AND RESTORING THE NATURAL RESOURCES AND FUNCTIONS OF FLOODPLAINS

John H. McShane

INTRODUCTION

Floods have caused a greater loss of life and property and have disrupted more families and communities in the United States (U.S.) than all other natural hazards combined (McShane, 2007). In their natural state, however, coastal and riverine floodplains provide more value to society per acre than any other landform; in fact, although floodplains comprise just 2% of the land area worldwide they provide approximately 25% of all terrestrial ecosystem service benefits (Opperman *et al.*, 2010). Protecting and restoring these ecosystem services, or the natural resources and functions of floodplains, have significant economic and environmental benefits that are a "natural" asset for a community and are of immense value to the Nation.

Floodplain management is not just "flood control" but encompasses two co-equal goals – reducing the loss of life and property caused by floods and protecting and restoring the natural resources and functions of floodplains. Although there have been significant efforts at all levels of government over the past century or so to address the first goal, the latter has often received only cursory attention at best. However, as flood losses continue to escalate, a new paradigm of floodplain management is beginning to emerge that promotes the protection and restoration of natural resources, considers the economic and environmental benefits of nonstructural measures, and seeks to achieve more resilient and sustainable communities.

Using nonstructural measures to reduce flood risk is often more cost effective than other methods, such as dams and levees, if all the benefits of nonstructural measures and all the economic and environmental costs of structural measures are included in the cost/benefit analysis. Nonstructural measures also help to maintain natural floodplain functions, mitigate flood damages, and provide for the health and safety of the public as well. Allowing floodplains to function and using a "Make Room for Rivers" strategy protects wetlands and riparian areas, maintains natural areas, and reduces flood risks, all part of achieving the goals of floodplain management in an economically and environmentally sound manner. Working with natural systems instead of trying to "control" flood waters also achieves multiple objectives, such as improving water quality, facilitating ground water recharge, and protecting fish and wildlife habitats.

Floodplains are low lying areas adjacent to inland and coastal waters that are occasionally and temporarily inundated during high flows. This intermittent flooding is necessary for maintaining the natural hydrological, biological, geomorphic, and other functions of floodplains. For regulatory purposes the floodplain is defined as the area inundated during the "100-year" flood, or more accurately the flood having a 1% chance of being equaled or exceeded in any given year.

THE NATURAL RESOURCES AND FUNCTIONS OF FLOODPLAINS

Although there has been some debate in the floodplain management community regarding the difference between "natural resources" and "functions" there is general agreement that natural resources are considered to be the physical features of a floodplain, such as a wetland or bottomland hardwood forest, while a function refers to a service, such as conveying floodwaters (see Figure 1 and Table 1). However, some features of floodplains, such as wetlands, are natural resources that also provide functions such as storing floodwaters.

Wetlands are perhaps the most important feature of floodplains, as well as upland sites. Depending on its location, one acre of wetland can store up to three acre feet of water, or about one million gallons, and slowly release it over time, protecting adjacent and downstream property from flooding (USEPA, 2006). However, since European settlement more than half of the wetlands in the U.S. have been lost (of the original 225 million acres only 107 million acres remain), most having been drained for agriculture or filled for development (USEPA, 2006). Building levees and other structural measures to facilitate and protect development and agricultural land has disconnected rivers from their floodplains causing extensive loss of wetlands, as well as other important floodplain resources. Significantly, the loss of flood water storage, in conjunction with the increase of impervious surfaces in many watersheds has correlated with an increase in flooding in many communities.

By adapting to the natural phenomenon of flooding, rather than trying to control floodwaters, we can reduce the loss of life and property, protect critical natural and cultural resources, and contribute to the sustainable development of communities across the country.

Coastal wetlands are especially important for providing the critical function of reducing storm surge; depending on the type of vegetation the surge can be reduced by up to one foot for every mile of wetlands (USEPA, 2006). Coastal wetlands have been called "nurseries of life" because of the myriad species of commercially and recreationally valuable fish along the Atlantic and Gulf coasts that are directly dependent on these

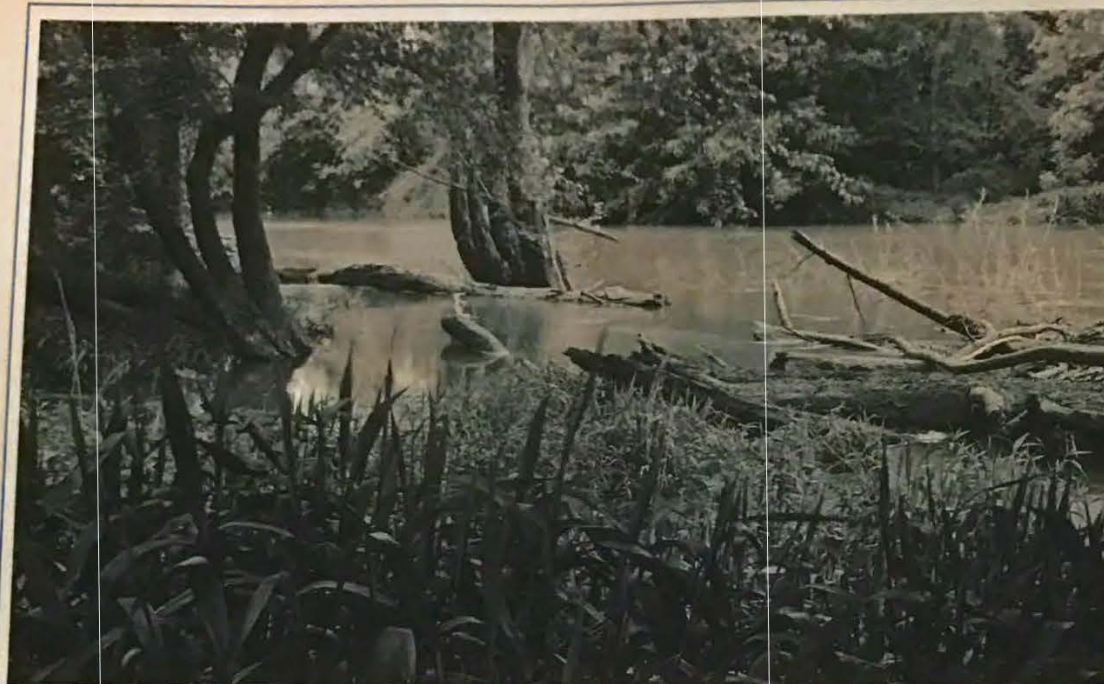


Figure 1. Naturally Functioning Floodplains Convey and Store Floodwaters, Provide Habitats for a Wide Variety of Flora and Fauna, and Provide Numerous Economic and Societal Benefits (photo courtesy of ©Gary P. Fleming).

Table 1. Natural Resources and Functions of Floodplains.

Naturally functioning floodplains provide a number of environmental and economic benefits that fall into three general categories, hydrological, biological, and societal. This table is adapted from the 1994 document, *A Unified National Program for Floodplain Management*.

<p style="text-align: center;">Hydrological</p> <p><i>Natural Flood and Erosion Control</i> Provide flood storage and conveyance Reduce flood velocities Reduce flood peaks Reduce sedimentation</p> <p><i>Water Quality Maintenance</i> Filter nutrients and pollutants from runoff Process organic wastes Moderate temperature fluctuations</p> <p><i>Groundwater Recharge</i> Promote infiltration and aquifer recharge Reduce frequency and duration of low surface flows</p>	
<p style="text-align: center;">Biological</p> <p><i>Biological Productivity</i> Support high primary productivity Enhance biodiversity Maintain ecosystem integrity Preserve wetland functionality</p> <p><i>Fish and Wildlife Habitats</i> Provide breeding and feeding areas Create waterfowl habitats Protect habitats for rare and endangered species</p>	
<p style="text-align: center;">Societal</p> <p><i>Wild and Cultivated Products</i> Enhance agricultural lands Provide sites for aquaculture Protect and enhance forest lands</p> <p><i>Recreational Opportunities</i> Provide areas for active and passive uses Provide open space Provide aesthetic values</p> <p><i>Areas for Scientific Study and Outdoor Education</i> Contain cultural resources (historic and archaeological) Provide opportunities for environmental studies Provide "wild" natural areas for experiencing and enjoying nature</p>	

wetlands during some part of their life cycle. Unfortunately, a recent study found that from 2004-2009 there was an average net loss of 60,000 acres per year of wetlands in coastal watersheds (Dahl and Stedman, 2013).

Because many species have a connection with the land/water interface, naturally functioning floodplains contribute to maintaining the biological integrity of rivers, streams, wetlands, lakes, and estuaries. Floodplains also provide habitats for numerous species of flora and fauna, provide critical wildlife corridors, and are areas of significant biodiversity. Many species not only tolerate the disturbance regime of intermittent flooding but are dependent on it (in this way floodplains are analogous to forests that need intermittent fires to maintain their long-term ecological integrity). For example, a recent study of 31 natural floodplain sites in the Hudson River Valley of New York State found 442 species of vascular plants, 25 species of mammals, 46 species of birds, and 12 species of reptiles and amphibians, including a number of rare and threatened species (Knap-Vispo and Vispo, 2010). The wide variety of soils, including rich alluvial soils, and the varying hydrology in different parts of the floodplain contribute to this biodiversity. Floodplains are critical spawning areas for many species of fish, as well as amphibians, as the shallow areas during floods provide the opportunity for the young to develop free from the presence of predators. Floodplains are also important breeding, nesting, and resting areas for migratory waterfowl and other birds and are a critical component of healthy watersheds.

THE CLEAN WATER ACT

The goals of the Clean Water Act (CWA) are to maintain and restore the chemical, physical, and biological integrity of the Nation's waters. Naturally-functioning floodplains contribute to achieving these goals. While the CWA addresses aquatic health rather than floods, many of the same actions that protect and improve water resources also help to reduce flood damages and threats to human health and safety. For example, because of alternating wet and dry cycles floodplain soils denitrify nitrogen compounds (e.g., nitrate and ammonium from fertilizers), converting them to gases (e.g., NO). As nitrogen is a major factor in the outbreak of algal blooms, which cause hypoxia when the algae eventually die and use up the available oxygen, the denitrifying function of floodplains contributes to improving water quality. As most of the floodplains of the Mississippi and Missouri Rivers have been severely degraded, or disconnected from the rivers due to the construction of levees and other "flood control" structures, they are essentially pipelines carrying pollutants, such as nutrients (especially nitrogen and phosphorus), directly to the Gulf of Mexico. Restoring floodplains that have been disconnected from the rivers will reduce the amount of nutrients entering the Gulf and minimize the extent and duration of the annual hypoxic or "dead zone." Excess nutrients also contribute to harmful algal blooms (HABs) that can adversely impact public health as well as aquatic life.

In addition, the riparian corridors of many floodplains are especially important for improving surface and

ground water quality. For example, the State of Ohio developed a Total Maximum Daily Load (TMDL) to improve water quality that eventually led to the protection and restoration of functioning floodplains to reduce non-point source pollution. The State of Vermont proved the effectiveness of this approach when it reconnected a small river with its floodplain and, over the following year, two moderate floods deposited 1,100 cubic feet of sediment and 1.2 tons of phosphorus on 21 acres of a restored floodplain site (Schiff *et al.*, 2008). There is a TMDL for phosphorus in Lake Champlain and restoring even this small floodplain helped to improve the river, its floodplain, and the water quality in the lake.

FEDERAL ROLE IN FLOODPLAIN MANAGEMENT

The role of the federal government in managing flood risks has changed significantly since the early part of the 20th Century. This change started in the 1960s when the Congress, recognizing that flood losses and disaster relief expenditures were continuing to escalate, established the "Task Force on Federal Flood Control Policy" to investigate alternatives to structural measures to reduce flood losses. In 1966, the Task Force completed its report, *A Unified National Program for Managing Flood Losses* (House Document 465) (House of Representatives, 1966) that advocated a broader approach to "flood control," including the need to regulate land use in flood hazard areas. In some ways this report provided the foundation for the National Flood Insurance Program (NFIP) that Congress created in 1968 to make flood insurance available in those communities that agreed to adopt and enforce a floodplain management ordinance.

The most important provision of the NFIP with regard to protecting and restoring the natural resources and functions of floodplains is the designated floodway. The floodway is that area of the watercourse and floodplain land that must be preserved to allow the discharge of the base flood (the 1% annual chance flood) through a community without increasing flood heights by more than a designated amount. Any construction in a floodway that would increase flood heights is prohibited. A floodway designation can therefore be a powerful preservation tool. FEMA has already mapped more than five million acres of floodway, an area more than twice that of Yellowstone National Park.

The NFIP also provides credits for flood insurance discounts through its Community Rating System for communities that implement activities such as preserving wetlands in floodplains, adopting Low Impact Development ordinances, or promulgating other measures to preserve naturally functioning land. The primary purpose of the credits is to encourage activities that reduce flood losses but these also act to protect the natural functions of floodplains as well.

In 1975, the U.S. Water Resources Council established The Federal Interagency Floodplain Management Task Force to prepare reports for the President to transmit to the Congress on progress towards achieving the goals of floodplain management; the Task Force has prepared four reports since 1976. In the 1994 document, *A Unified National Program for Floodplain Management*, the

President emphasized the importance of protecting and restoring the natural resources and functions of floodplains in his letter transmitting the document to the Congress (The Federal Interagency Floodplain Management Task Force, 1994).

[The Unified National Program] urges the formulation of a more comprehensive and coordinated approach to protecting and managing human and natural systems to ensure sustainable development ... This is significant in that the natural resources and functions of our riverine and coastal floodplains help to maintain the viability of natural systems and provide multiple benefits for people.

The Task Force's current work plan includes an activity to assess the value of ecosystem services provided by the natural resources and functions of floodplains. A more comprehensive understanding of the values of natural floodplains will assist decisionmakers at all levels of government. The Task Force is also working closely with the Council on Environmental Quality to coordinate its activities with other task forces and committees, especially those developing recommendations and policies that address the hydrological impacts of climate change. With climate change already causing an increase in the frequency and duration of intense rainfall events in some parts of the country, protecting and restoring floodplains will be even more important in the decades and centuries to come.

Federal agencies are required to comply with the provisions of Executive Order (EO) 11988 (EO, 1977), *Floodplain Management*, in order to reduce future flood losses, although some provisions also act to protect floodplain functions. For example, agencies are to avoid occupying or modifying the floodplain environment, avoid any direct or indirect support of floodplain development, and must evaluate their proposed actions and select alternative sites outside the floodplain if practicable. The Executive Order 13653, *Preparing the United States for the Impacts of Climate Change* (EO, 2013), which the President signed on November 1, 2013, reinforces the principles of EO 11988 providing further protection for the natural resources and functions of floodplains. For example, EO 13653 includes a provision that agencies "reform policies and federal funding programs that may, perhaps unintentionally, increase the vulnerability of natural or built systems, economic sectors, natural resources, or communities to climate change related risks." Revising federal policies and programs to ensure resilient and sustainable communities with respect to climate change will also have significant benefits with regard to protecting the natural functions of floodplains.

In addition, the recently revised "Principles and Requirements for Federal Investments in Water Resources" (formerly the "Principles and Guidelines") includes a provision that agencies "avoid the unwise use of floodplains and flood-prone areas and minimize adverse impacts in any case in which a floodplain area must be used." Another objective of the "Principles and Requirements" is that federal agencies should take an active role in "protecting and restoring the functions of natural systems

and mitigating any unavoidable damage to natural systems" when planning and implementing projects. This is a significant shift in how federal agencies approach the management of water resources in America. This new approach will help to reduce the loss and degradation of the natural resources and functions of floodplains that too often occurred in the past due to federal actions to reduce flood risks. There has already been an effort to start "de-engineering" structures built in the 20th Century, including moving levees back from rivers that will increase natural areas and have the added benefit of reducing flood heights and flood damages.

CONCLUSION

Riverine and coastal floodplains are dynamic and complex natural systems that provide important societal benefits, both economic and environmental. By adapting to the natural phenomenon of flooding, rather than trying to control floodwaters, we can reduce the loss of life and property, protect critical natural and cultural resources, and contribute to the sustainable development of communities across the country. Floodplain management research has shown that naturally functioning floodplains provide multiple benefits for society, and are of immense value to the nation. Their protection will enhance the quality of life for this generation and those to come. The role of the federal government in floodplain management will continue to evolve as climate change increases the extent of the regulatory floodplain and flood losses continue to rise. In response, stronger and more comprehensive programs and policies will need to be adopted in the coming years by all levels of government, as well as the private sector, to ensure that we can continue to protect and restore the natural resources and functions of floodplains while reducing flood losses.

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(Disclaimer: The views expressed in this article are those of the author and do not necessarily represent those of the United States or USEPA.)



AWRA 2014-2015 RICHARD A. HERBERT MEMORIAL SCHOLARSHIP OPPORTUNITIES

Background - In 1980, AWRA established the Endowment-Memorial Fund to be used for the enhancement of education in water resources. The fund has since been renamed the Richard A. Herbert Memorial Educational Fund to honor Richard A. Herbert - a champion for water resources education -- who passed away in 1994. In order to carry out his vision, AWRA is proud to announce the availability of scholarships derived from the proceeds of this fund.

Eligibility and Awards Available - Each applicant must be a **national AWRA member**. At least one \$2,000 scholarship will be awarded to a **full-time undergraduate student** working toward his/her first undergraduate degree and who is enrolled in a program related to water resources for the 2014-2015 academic year. At least one \$2,000 scholarship will also be awarded to a **full-time graduate student** enrolled in a program relating to water resources for the 2014-2015 academic year. (The AWRA Board of Directors may, at its sole discretion, approve additional scholarship awards, based upon the performance of the Memorial Fund.)

Selection Criteria - The **undergraduate scholarship** will be awarded to the student most qualified by academic performance. Measures of academic performance include the cumulative grade point average, relevance of the student's curriculum to water resources, and leadership in extracurricular activities related to water resources. The **graduate scholarship** will be awarded to the student most qualified by academic and/or research performance. The measures of academic performance are identical to those of the undergraduate scholarship with the addition of the quality of the student's research and its relevance to water resources. Recipients will be selected by the AWRA Student Activities Committee and announced during summer 2014.

Application Process - A complete application packet contains:

- Title page that includes the applicant's full name, permanent mailing address, email address, phone number where he or she may be easily reached, and the type of scholarship (undergraduate or graduate).
- Two-page summary (approx. 500 words) of his/her academic interests and achievements, extracurricular interests, and career goals as they relate to the above selection criteria.
- Resume or curriculum vitae.
- Three signed letters of reference from professors and/or advisors. Letters of reference **MUST** include the signatures of the referee - PDFs of the signed letters work best.
- Transcripts of all college courses (undergraduate and graduate). **Legible** copies of "Issued to Student" transcripts are acceptable to save on fees but unofficial grade reports (such as those students can access from their online student accounts at the university) are unacceptable. **Application packets that include unofficial grade reports will not be considered.**

Application packets should be submitted electronically to info@awra.org and limited to 5mb in size to ensure delivery.

All applications must be submitted in their entirety. AWRA will provide an acknowledgement of receipt of your application but will not provide updates to your application status or request missing information. Please make sure your application is complete when it is submitted. We look forward to hearing from you.

Deadline: All applications and supporting materials must be received electronically by
APRIL 22, 2014

Questions?
Call AWRA at (540) 687-8390
or send an e-mail to
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