BUREAU OF RECLAMATION

Draft Environmental Assessment

Eagle Creek Conservation Benefit Agreement and Fish Barrier Project
Eagle Creek, Graham and Greenlee Counties, Arizona

U.S. Department of the Interior
Bureau of Reclamation
Interior Region 8: Lower Colorado Basin
Phoenix Area Office
Glendale, Arizona

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RECLAMATION

Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, Native Hawaiians, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Acronyms and Abbreviations

AZGFD	Arizona Game and Fish Department
APE	Area of Potential Effect
ASM	Arizona State Museum
ASNFs	Apache-Sitgreaves National Forests
BO	Biological Opinion
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
CAA	Clean Air Act
CBA	Conservation Benefit Agreement
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
Covered Area	Acreage that would be covered under the CBA and EOS permit.
Covered Species	Species that would be covered under the CBA and EOS permit.
CWA	Clean Water Act
DOI	Department of the Interior
EA	Environmental Assessment
EO	Executive Order
EOS	Enhancement of Survival
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973, as amended
ESP	Enhancement of Survival Permit
FMMI	Freeport-McMoRan Morenci, Inc.
FONSI	Finding of No Significant Impact
FR	Federal Register
Freeport	Freeport Minerals Corporation, Freeport-McMoRan Morenci, Inc., and Morenci Water and Electric Company
FWCA	Fish and Wildlife Coordination Act
IPaC	Information for Planning and Consultation
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
MWRA	Mexican Wolf Recovery Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFSR	National Forest Service Road
NHGS	Narrow-Headed Gartersnake
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
O&M	Operations and Maintenance

PCE	Primary Constituent Elements
P.L.	Public Law
Project	Proposed Conservation Benefit Agreement and Eagle Creek Fish Barrier Project
Reclamation	Bureau of Reclamation
RCRA	Resource Conservation and Recovery Act
RM	River Mile
SHA	Safe Harbor Agreement
SHPO	State Historic Preservation Office
USACE	U.S. Army Corps of Engineers
U.S.	United States
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
WSRA	Wild and Scenic Rivers Act
YBCU	Yellow-billed Cuckoo

Table of Contents

List of Figures

List of Tables

1.0 Introduction, Background, Purpose and Need

1.1 Introduction

The United States (U.S.) Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (USFWS) have prepared this environmental assessment (EA) to analyze the potential environmental effects of two proposed actions: (1) The USFWS proposes the issuance of an Enhancement of Survival permit (EOS permit) to Freeport Minerals Corporation and its affiliates - Freeport-McMoRan Morenci Inc., and the Morenci Water & Electric Company (collectively referred to herein as Freeport) supported by a Conservation Benefit Agreement (CBA); and (2) Reclamation proposes to construct, operate, and maintain a fish barrier in Eagle Creek, Graham and Greenlee counties, Arizona. The proposed actions would be implemented pursuant to the Reclamation Act of 1902 (Public Law (P.L.) 57-161, as amended), the Fish and Wildlife Coordination Act (16 U.S. Code (U.S.C.) 661-666(e)), the Colorado River Basin Project Act of 1968 (P.L. 90-537, as amended), sections 7(a)(1), 7(a)(2), and 10(a)(1)(A) of the Endangered Species Act of 1973 (ESA; P.L. 93-205, as amended), and the Arizona Water Settlements Act of 2004 (P.L. 108-451, as amended).

This EA was prepared in accordance with the National Environmental Policy Act (NEPA; P.L. 91-190, as amended), the Council on Environmental Quality (CEQ) NEPA implementing regulations (40 Code of Federal Regulations (C.F.R.) § 1500-1508), and Department of the Interior (DOI) NEPA regulations (43 C.F.R. § 46). Reclamation is the lead federal agency and the USFWS is a cooperating agency as defined in 43 C.F.R. § 46.225-43.230 and 40 C.F.R. § 1501.8.

1.2 Background

1.2.1 Native Fish Recovery and Nonnative Fish Management

Human induced changes in aquatic habitat and interactions with nonnative species have had a profound impact on native fishes in Arizona. Habitat destruction and alteration were the principal causes for declines of native fishes in the American southwest prior to the mid-1990s; however, in the past several decades, the introduction and spread of nonnative fishes is now considered the most consequential factor preventing survival and recovery of imperiled native fishes in the Gila River basin and other drainages of the southwest (Moyle et al. 1986, Minckley 1991, Minckley and Marsh 2009, Clarkson et al. 2012). Primary avenues by which nonnative species depress and often eliminate native species include predation on early life stages (eggs, larvae, juveniles) and adults, competition, hybridization, habitat alteration, and parasite and pathogen transmission (Propst et al. 1991, Minckley 1991, Johnson et al. 1993, Douglas et al. 1994, Fernandez et al. 1996, Kupferberg 1997, Torchin et al. 2001, Rosen and Schwalbe 2002, Stockwell and Leberg 2002, Bonar et al. 2004,

Clarkson et al. 2005, Minckley and Marsh 2009, Germaine and Hays 2009, and many others). These effects are often further exacerbated by low flow (drought) conditions (Propst et al. 2009). The cumulative impact of physical and biological stressors to aquatic habitats, especially in mainstem rivers, has fostered a pattern where native fishes now persist primarily in the upper reaches of tributary drainages. In addition, many native amphibian and semi-aquatic reptile populations, such as the narrow-headed gartersnake (*Thamnophis rufipunctatus*), have also declined in the Gila River basin in part due to similar avenues of impact, as well as the loss of native aquatic prey base (USFWS 2014).

Practical and effective alternatives for dealing with nonnative fishes are presently limited to chemical or mechanical removal or depletion of undesirable taxa. However, such controls are temporary unless accompanied by measures to prevent reinvasion. The only viable remedy against reinvasion is to protect a stream drainage with a fish barrier (e.g., physical drop structure). When accompanied by control of nonnatives upstream, a barrier can effectively segregate natives from nonnatives found downstream. Although there may be potential long-term negative impacts to native biota that can arise from such isolation (see Section 3.4.3 Fish and Aquatic Wildlife), the immediate need is to protect remaining populations against imminent local extirpation. Two reports that specifically reviewed fish barriers in the Gila River basin concluded that barriers are often the only feasible technology to segregate and protect imperiled native fishes (Carpenter and Terrell 2005, Clarkson et al. 2010). The same approach to recovery planning for federally-listed trout across the West has improved or minimally halted further deterioration of their conservation status (Rinne and Turner 1991, Young 1996, Thompson and Rahel 1998, Avenetti et al. 2006, Pritchard and Cowley 2006).

1.2.2 Eagle Creek

Eagle Creek, a tributary to the Gila River, forms its perennial headwaters near Robinson Mesa below the Mogollon Rim and flows south through desert grasslands and canyons where it often becomes seasonally intermittent in lower reaches (Marsh et al. 1991). The upper reach of Eagle Creek is considered a high-value stream for conservation of native aquatic species and habitats and exhibits favorable hydrological conditions needed for native fish conservation, including superior water quality and quantity analogous to other smaller systems (USGS 2024). Furthermore, the upper reach historically sustained eight native fish species, including longfin dace (*Agosia chrysogaster*), speckled dace (*Rhinichthys osculus*), desert sucker (*Catostomus clarkii*), Sonora sucker (*Catostomus insignis*), roundtail chub (*Gila robusta*), and the endangered Gila chub (*Gila intermedia*), spikedace (*Meda fulgida*), and loach minnow (*Tiaroga cobitis*), as well as the threatened narrow-headed gartersnake. Critical habitat has also been designated for these four federally-listed species throughout Eagle Creek (USFWS 2005, USFWS 2007, USFWS 2021a).

The native fish community in upper Eagle Creek remains largely intact; however, several nonnative species known to be detrimental to native fish communities occur in downstream reaches of Eagle Creek and the Gila River. These species include smallmouth bass (*Micropterus dolomieui*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictus olivaris*), yellow bullhead (*Ameiurus natalis*), red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), green sunfish (*Lepomis cyanellus*), and western mosquitofish (*Gambusia affinis*). Nonnative channel catfish, flathead catfish, and smallmouth bass are all known to prey on spikedace and loach minnow, as indicated by prey remains of native

fishes in the stomachs of these species (Propst et al. 1986, Propst et al. 1991, Bonar et al. 2004). Green sunfish are a particularly problematic fish for native species in the Gila River basin due to its natural and human-assisted colonizing abilities, its tolerance of a wide variety of environments including headwater streams occupied by native fishes, and its piscivorous habits (it is the most piscivorous member of its genus) (Carlander 1977, Werner 1977, Lemly 1985, Fausch and Bramblett 1991, Lohr and Fausch 1996, Dudley and Matter 2000).

Due to the impending threat of nonnative fish in the downstream reaches of Eagle Creek, conservation actions to protect the existing native aquatic community against possible future upstream incursions of nonnative fish and other aquatic species is critical. This is reinforced by recovery plans developed for spikedace and loach minnow, and a draft recovery plan for Gila Chub, which highlight key recovery objectives for these species including the need to protect existing populations and to reintroduce populations into suitable habitat within the historic range of the species. Construction of fish barriers in streams with populations of spikedace, loach minnow, and/or Gila chub is also considered a Priority 1 action, or an action that must be taken to prevent extinction of these species in the foreseeable future (USFWS 1991a, 1991b, 2015).

1.2.3 Spikedace and Loach Minnow Management Plan (Freeport)

Spikedace and loach minnow were federally-listed as threatened on July 1, 1986, and uplisted as endangered on February 23, 2012 with critical habitat in eight units within Arizona and New Mexico. Critical habitat was also initially designated for spikedace and loach minnow in 1994, 2000, and 2007; however, these designations were set aside and remanded due to legal issues (USFWS 2007, USFWS 2012). Under the 2007 and 2012 designations, portions of Eagle Creek within lands owned by Freeport (formerly called Phelps Dodge Corporation) and its subsidiaries were excluded from designation due to Freeport's commitment to the USFWS to undertake certain conservation measures to benefit these two species as outlined in a 2006 *Spikedace and Loach Minnow Management Plan for Eagle Creek* (Phelps Dodge Corporation 2006) and a 2011 revision which included both Eagle Creek and San Francisco River (hereafter referred to as Management Plan; Freeport 2011). As part of the proposed conservation measures, the Management Plan contemplates the investigation and, if feasible, the construction of a fish barrier on Eagle Creek in coordination and collaboration with Reclamation's Gila River Basin Native Fishes Conservation Program (see Section 1.2.4 Gila River Basin Native Fishes Conservation Program (Reclamation)). In addition, Freeport's commitment is also subject to USFWS entering into a CBA with Freeport and the subsequent issuance of an EOS permit under section 10(a)(1)(A) of the ESA. The proposed approval of the CBA and issuance of the EOS permit would allow Freeport to continue using portions of its land and existing infrastructure (see Section 2.1.1 USFWS – CBA and Issuance of EOS Permit) adjacent to Eagle Creek and provide the opportunity for protection of native fish species in the middle and upper Eagle Creek.

1.2.4 Gila River Basin Native Fishes Conservation Program (Reclamation)

The Gila River Basin Native Fishes Conservation Program (Program) was established for the purpose of conserving native fishes and managing against nonnative fishes in response to biological opinions (BOs) issued by the USFWS in 1994, 2001, and 2008 on the impacts of water transfers via

the Central Arizona Project (CAP) and its potential to introduce and spread nonnative aquatic species into the Gila River basin. Under the 1994 BO (and later revisions), Reclamation is committed to construct and maintain fish barriers (physical drop structures) in high-priority streams to prevent or hinder upstream movements of nonnative fish and other aquatic organisms into high-value native fish and amphibian habitats during the projected 100-year life of the CAP. As described in the 2008 BO, Reclamation has committed to constructing twelve fish barriers under the Program of which eight fish barriers have been constructed to date (Aravaipa Creek, Cottonwood Spring, Bonita Creek, Blue River, Fossil Creek, Hot Springs Canyon, Spring Creek, West Fork Black River). Reclamation's fish barrier program emphasizes streams that can be secured to prevent extinction and stabilize existing rare populations of native fishes, or that can be renovated to replicate rare populations – especially locations that would improve the status of the Program's priority species: spikedace, loach minnow, Gila chub, Gila topminnow (*Poeciliopsis occidentalis*), and razorback sucker (*Xyrauchen texanus*). Eagle Creek is a particularly noteworthy candidate for protection under the Program as the stream historically or currently sustains rare populations of endangered Gila chub, loach minnow, and spikedace, and contains designated critical habitat for these species. Construction of a fish barrier would also allow for the potential of a future repatriation of spikedace and loach minnow which were last detected in 1989 and 1997, respectively.

Given Reclamation's expertise on fish barrier design and construction, as well as its commitment to recovery of native fish in the Gila River basin, Reclamation entered into a cooperative relationship with Freeport and USFWS to evaluate the financial and technical feasibility, and, if determined feasible, the design, construction, and future maintenance of a fish barrier on Eagle Creek. Under this partnership, Reclamation is the lead agency for compliance, design, construction, operation, and maintenance of the proposed fish barrier.

1.3 Purpose and Need

1.3.1 Reclamation

The purpose of Reclamation's proposed action is to protect the existing upper Eagle Creek populations of federally-listed aquatic species, as well as other native species, against future upstream incursion of nonnative fishes from the Gila River and lower Eagle Creek. The proposed action would protect existing populations of Gila chub and narrow-headed gartersnake and facilitate replication of spikedace and loach minnow into historically occupied habitat. Implementation of the proposed action is needed for Reclamation to meet a key conservation measure of the 2008 BO.

1.3.2 United States Fish and Wildlife Service

USFWS's purpose is to fulfill its conservation obligations under Section 10(a)(1)(A) of the ESA and 50 C.F.R. § 17.32 and enable Freeport to meet the obligations of their management plan for Eagle Creek (Freeport 2011). The USFWS's need is to respond to and process Freeport's application for an EOS permit and determine whether the application is consistent with the net conservation benefit standard and all other issuance criteria required for EOS permit approval.

1.4 Project Location

1.4.1 CBA and EOS Permit

The proposed CBA and subsequent EOS permit would cover Freeport's management activities, including private land and water rights, adjacent to and in the vicinity of Eagle Creek. Beginning approximately 1 mile above the confluence of Eagle Creek and the Gila River, the properties to be potentially enrolled are located along the Gila and Salt River Baseline and Meridian in Sections 06, 07, 18, 19, and 30 of Township 5 South, Range 29 East; Section 01 of Township 5 South, Range 28 East; Sections 03, 04, 05, 15, 22, 23, 24, 25, 26, 35, and 36 of Township 4 South, Range 28 East (see Figure 1); Sections 05, 08, 21, 22, 27, 28, and 29 of Township 1 South, Range 28 East; and Sections 19, 30, and 31 of Township 1 North, Range 28 East (see Figure 2).

1.4.2 Fish Barrier

The proposed fish barrier would be constructed on Eagle Creek in Section 19 of Township 1 North, Range 28 East of the Gila and Salt River Baseline and Meridian (see Figure 3). The proposed site is approximately 51.5 river miles (RM) upstream from the confluence of Eagle Creek and the Gila River. Two potential contractor use areas for staging construction equipment and materials are identified within Freeport's private property boundary along National Forest Service Road 217 (NFSR 217; see Section 2.1.2 Reclamation - Fish Barrier Construction). Access to staging areas would require use of this road by construction personnel. Lands that would be affected by construction activities are owned and managed by Freeport.

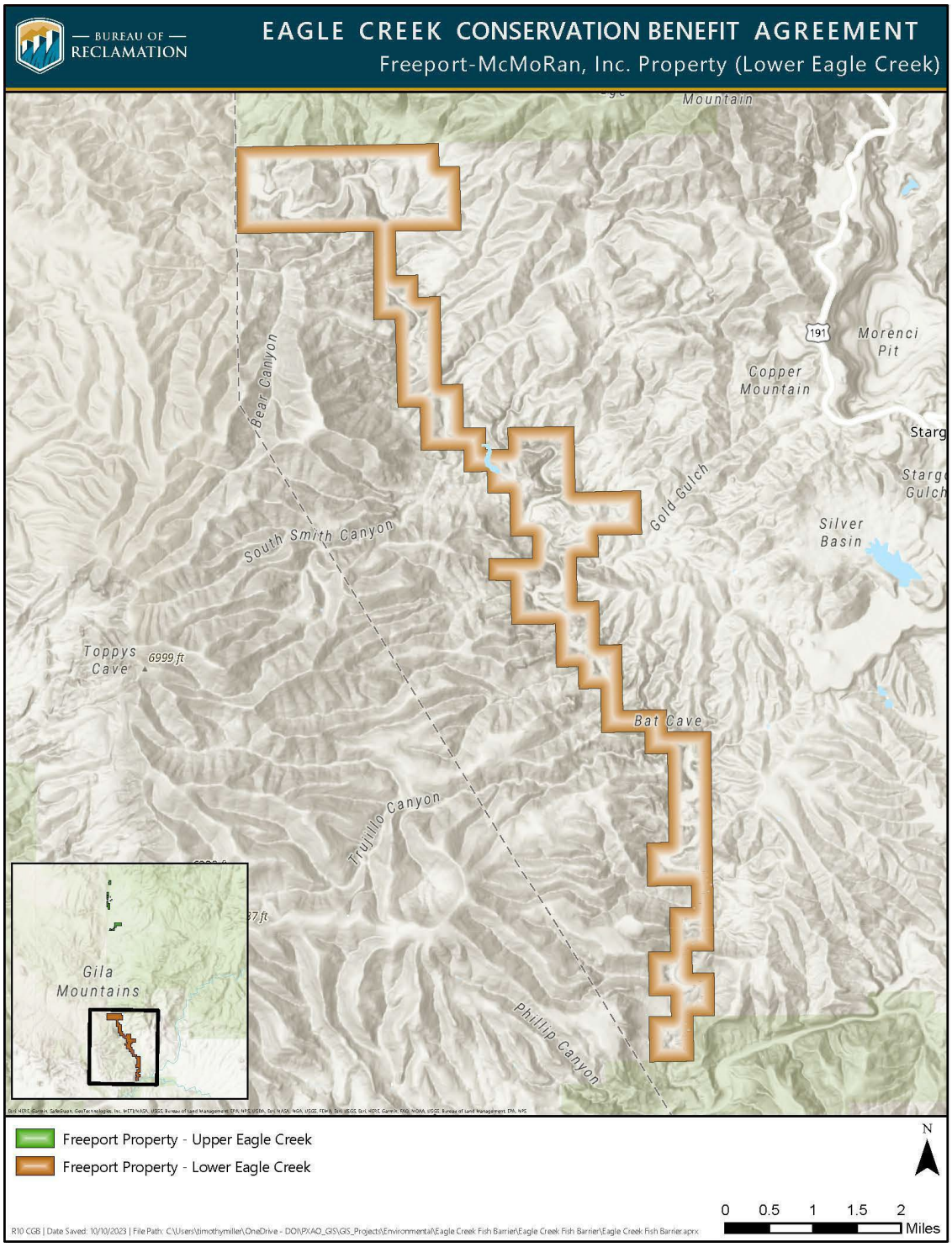

Figure 1. Location of Freeport properties to be enrolled in the CBA on Lower Eagle Creek.

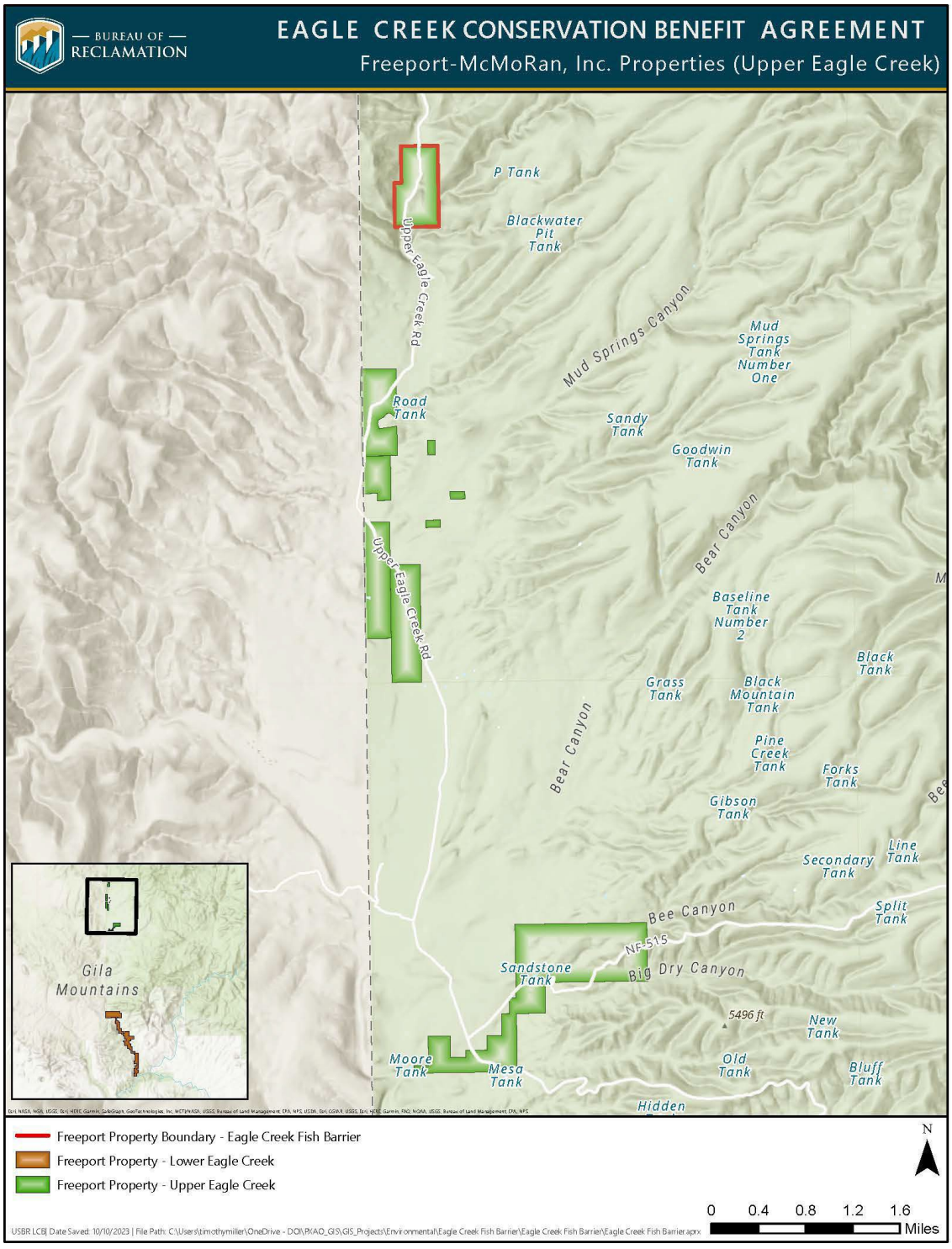

Figure 2. Location of Freeport properties to be enrolled in the CBA on Upper Eagle Creek.

Figure 3. General project location of the proposed fish barrier.

1.5 Cooperating Agencies

The USFWS was invited to be a cooperating agency in preparation of the EA and accepted due to their jurisdiction by law and special expertise, in accordance with 40 C.F.R. § 1501.8.

1.6 Public Involvement and Agency Consultation

1.6.1 Public Scoping and Tribal Consultation

USFWS originally published a Notice of Intent (NOI) to prepare a draft EA for a proposed Safe Harbor Agreement (SHA)[1] for spikedace, loach minnow, and Gila chub on Eagle Creek and the lower San Francisco River in the Federal Register (FR) on April 3, 2018 (USFWS 2018a). Two comment letters were received from the Hopi Tribe and the Arizona Game and Fish Department (AZGFD). Development of the SHA was delayed due to changes in the proposed SHA Covered Area and Covered Species prior to the public release of the draft EA.

In 2024, the NEPA process was reinitiated and Reclamation and USFWS solicited input from the public on the proposed actions to assist in identifying key issues and defining the scope of the project and environmental analysis. A 15-day public scoping period was initiated on April 8, 2024 and scoping notices were sent via email and U.S. mail to 53 interested parties (see Section 5.0 Consultation and Coordination) including Native American tribes, local, state, and federal agencies, and non-governmental organizations. Additionally, Reclamation posted the scoping notice on its website at https://www.usbr.gov/lc/phoenix/index.html. Four comment letters were received during the April 2024 public scoping period from two private individuals, the Center for Biological Diversity, and the Sierra Club. Table 1 contains a summary of the public comments received during the April 2024 scoping period.

Table 1. Summary of Public Scoping Comments

Topic	Comment Summary	Response
Wild and Scenic Rivers	Comments requested that the agencies confer with Apache-Sitgreaves National Forests (ASNFs) to complete a wild and scenic river suitability study prior to the environmental analysis of a proposed fish barrier.	The EA discusses Wild and Scenic Rivers in Table 3.
Proposed Action	Comments recommended that the EA consider alternative locations for the proposed fish barrier; the purpose and need for Reclamation's proposed action; and disclose and analyze the specific Freeport activities covered by the CBA.	The EA defines the purpose and need of Reclamation's proposed action (see Section 1.3) and discusses each agency's proposed action and alternatives (see Section 2.0).
NEPA General	Comments suggested completing a cost-benefit analysis for fish barrier locations and the trade-offs associated with the CBA and incidental take permit.	Neither the CEQ nor DOI NEPA Implementation regulations require a cost-benefit analysis for an EA.

[1] On April 12, 2024, USFWS issued a final rule simplifying the section 10(a)(1)(A) process by combining SHAs and Candidate Conservation Agreements with Assurances into CBAs. The final rule became effective May 13, 2024 (USFWS 2024), and the term CBA will be used throughout the remainder of this EA.

Topic	Comment Summary	Response
General Support	Two comments strongly supported the proposal to construct a fish barrier on upper Eagle Creek, as a crucial protection for Gila chub, roundtail chub, and other native fishes under threat from invasive, non-native fishes.	Thank you for your comments.
Special Status Species	Comments requested details on the Freeport actions covered by the CBA that might result in incidental take, the levels of expected take, and the maximum level of take allowed under the incidental take permit, as well copies of any recent (2010 to current) fish monitoring data or reports for Eagle Creek commissioned or produced by Freeport, as well as copies of any new or updated fish management plans. CBA would allow incidental take of several federally-listed species and may negate any benefits provided by a fish barrier.	Details on the proposed action can be found in Section 2 and effects to special status species are analyzed in Section 3.4.5. The fish monitoring data and management plans were provided as requested.
Cultural Resources and Traditional Cultural Properties	The Hopi Tribe noted that they consider prehistoric archeological sites to be Traditional Cultural Properties and requested consultation on any proposal with the potential to effect prehistoric sites; copies of the cultural resources survey report for the area of potential effect; and a copy of the draft EA. Additionally, the Hopi Tribe recommended that project activities should be discontinued if cultural resources are discovered and if any human remains or funerary objects are discovered the Hopi Tribe should be notified as required by law.	The Hopi Tribe was sent consultation letters including copies of the cultural resources survey report for the area of potential effect (see Section 5.0 Consultation and Coordination). The comment was noted and included as best management practices (BMP) incorporated into the proposed action (see Table 2).

1.6.2 Issues

Reclamation and USFWS developed a list of preliminary resource issues to address in the EA using comments from the public, agencies, and the internal interdisciplinary team. The preliminary resource issues were separated into resources carried forward for detailed analysis in Section 3.0 Affected Environment and Environmental Consequences) and resources that do not require detailed analysis to address potential environmental effects. The preliminary resource issues that were not analyzed in further detail in the EA and the analysis rationale are discussed in Table 3. These resource issues were evaluated and determined to either be not affected or minimally affected with implementation of BMPs, as summarized in Table 2

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

2.1.1 USFWS – CBA and Issuance of EOS Permit

Under the proposed action, USFWS would enter into a CBA and to issue an EOS permit to Freeport for incidental take of spikedace, loach minnow, Gila chub, and narrow-headed gartersnake (herein referred to as the Covered Species) resulting from implementation of conservation actions and monitoring, as well as existing activities conducted on land owned by Freeport adjacent to Eagle Creek both above and below the proposed barrier location (see Figures 1 through 3).

Under the CBA, and in compliance with the 2011 Management Plan, Freeport would undertake and fund several conservation actions to protect and enhance habitat for the Covered Species in Eagle Creek. The CBA would also establish an adaptive management framework for cooperation and coordination between Freeport and the USFWS, and when signed, serve as the basis for an EOS permit. Specifically, Freeport would agree to perform the following conservation actions:

- Assist and collaborate with Reclamation on the investigation, design, construction, and long-term operations and maintenance (O&M) of a fish barrier on Eagle Creek that would protect and enhance aquatic habitat for the Covered Species by preventing nonnative species from moving upstream into the upper portion of the creek. Freeport would also contribute $2,100,000 towards the total cost of construction of the fish barrier.

- Develop and implement a 3-year monitoring program to detect the presence of nonnative, invasive virile crayfish (*Orconectes virilis*) within the upper reach of Eagle Creek and investigate the practicability and cost of actions to suppress the populations of this species above the proposed fish barrier site.

- Implement a monitoring program on land owned or controlled by Freeport along Eagle Creek. This program would include annual surveys on Eagle Creek for the Covered Species, as well as other fish species, which can be used to inform future conservation and management activities, assisting in the recovery of the Covered Species.

These actions are anticipated to provide a net conservation benefit to the Covered Species, as well as other native aquatic species, by precluding the advancement of nonnative species into upper Eagle Creek and providing protection of individuals and habitat above the constructed barrier. In addition, aquatic species monitoring would provide important data on native and nonnative species in the upper Gila River basin. As such, these activities would satisfy the requirements for a CBA and meet the issuance criteria for an EOS permit for the incidental take of Covered Species that may result from Freeport's land and water uses along Eagle Creek within the Covered Area (see Figure 1 and Figure 2).

The EOS permit would provide incidental take authorization for the 50-year term of the CBA (until 2074) and authorize Freeport to incidentally take members of the Covered Species and their progeny and impair habitat within Eagle Creek downstream of the proposed fish barrier site; incidental take would not be authorized in the Covered Area upstream of the proposed fish barrier site.

The specific existing activities conducted by Freeport on its land along and adjacent to Eagle Creek that would be covered under the EOS permit would include continued O&M of an existing residence, two existing water diversions, and a pump station and all appurtenant facilities along and adjacent to Eagle Creek (see Figure 1 and Figure 2).

The proposed fish barrier would be located at RM 51.1 within the northernmost property that Freeport owns on Eagle Creek, extending approximately 3,000 feet upstream of the fish barrier. Freeport has no existing infrastructure or conducts any activities above the location of the proposed barrier (see Figure 2). Proposed actions related to fish barrier construction, operation, and maintenance are described in more detail in Section 2.1.2 Reclamation - Fish Barrier Construction.

Below the proposed fish barrier location, Freeport owns four parcels in upper Eagle Creek between RM 46.5 - 49.5. This section of the river is ephemeral (only flows during heavy precipitation events) and these properties contain a single existing residence. Freeport does not conduct any additional activities or have any existing infrastructure on these parcels (see Figure 2).

Freeport diverts water into Eagle Creek at two locations. Water from the Black River is conveyed to Eagle Creek via Willow Creek (RM 44.2) and water from existing groundwater wells is conveyed to Eagle Creek via Bee Canyon (RM 42.2) (see Figure 5). Freeport does not own property along Eagle Creek at these two locations and does not conduct any additional activities or have any existing infrastructure along Eagle Creek at these locations.

Freeport operates an existing diversion dam at RM 13.8 and a pump station at RM 11.5 (see Figure 5). Freeport would continue to operate and periodically maintain these facilities in their present configuration. O&M activities would not involve ground disturbance, and no upsizing of existing equipment or installation of additional new equipment would occur.

2.1.2 Reclamation - Fish Barrier Construction

Reclamation is proposing to construct a reinforced concrete drop structure, or fish barrier, within upper Eagle Creek to preclude the upstream movement of nonnative fishes from lower Eagle Creek and the Gila River. The fish barrier is designed to prevent fish movement during periods of base flow and portions of ascending and descending stages of floods that do not completely inundate the drop structure. At flows associated with peak floods that may submerge the fish barrier's crest at the abutments, high water velocity would be the primary hindrance to the upstream movement of nonnative fishes.

The proposed fish barrier would consist of three key features: (1) a 4-foot-high arched drop structure placed across the approximately 100-foot-wide channel; (2) a sloped concrete apron spanning the width of the drop structure to prevent plunge pool development; and (3) buried upstream and downstream scour walls to help anchor the barrier and prevent scour from

undermining the structure. Additionally, the barrier would be designed to withstand forces associated with a 100-year frequency flood (e.g., anchored to abutment bedrock with anchor bars and keyed into the channel alluvium to ensure stability) as determined by hydraulic modeling and engineering.

Construction of the proposed fish barrier would occur between mid-October 2025 (or 2026) to mid-March 2026 (or 2027). Fall construction is preferable to avoid high river flows that result from snowmelt (February – April) and monsoon storms (June to September), as well as to avoid the breeding seasons for Special Status Species. All equipment and construction crew members would be transported to the proposed fish barrier site via Upper Eagle Creek Road (NFSR 217). Road improvements to NFSR 217 would not be anticipated, and equipment staging and storage would occur within the two designated contractor use areas (see Figure 4). Batched concrete would be delivered by commercial mixer trucks to the lower contractor use area, where it would be pumped to the fish barrier construction area in a pipe. Construction crews (consisting of 4-5 workers) may also camp within the two contractor use areas. No firewood cutting or gathering of firewood would be permitted and sanitary services would be provided by Freeport.

The sequence of construction would consist of site mobilization (delivery of equipment and setup of the staging area); site preparation (excavation of streambed alluvium for construction of the scour walls, dewatering, and stream diversion); construction of the concrete formwork, placement of concrete, backfill; and demobilization (site restoration and removal of equipment). Stream flow, if present, would be diverted with dikes or piped around the active work areas. Alluvial deposits adjacent to the foundation trench would be dewatered with shallow subsurface pumps to keep the excavation free of water during construction. Water from these pumps would be discharged to the channel immediately downstream of the work area. Concrete would be placed in several phases to allow for continuous stream diversion. Standard excavation methods would be used to prepare the foundation trench for placement of formwork and concrete. Fluvial material extracted from this trench would be temporarily stockpiled within the fish barrier construction footprint for reuse as backfill.

At the end of construction, dewatering pumps would be removed, and diversion berms and any surplus stockpiles of excavated alluvium would be spread to conform to the predominant contours of the ground surface. All unused construction materials would be removed when the project is finished.

2.1.3 Reclamation - Fish Barrier Operation and Maintenance

The fish barrier would become a feature of the CAP. Inspection and maintenance would be performed by the Central Arizona Water Conservation District. Operation of the structure would require annual inspections and inspections after major flood events (5-year frequency or greater). Inspectors would hike to the barrier from the nearest road-accessible location. Any maintenance or repair requiring materials and equipment that could not be carried to the site would be performed using measures and techniques similar to those described in the above section for barrier construction, staging, and access.

Routine inspection and maintenance of the proposed fish barrier is anticipated to occur through October 31, 2095, which is commensurate with the current operational authorization of the CAP. Fish barrier O&M activities are restricted to the "Easement Area" defined in Reclamation and Freeport's *Contract and Grant of Easement Agreement* (see Figure 4). Potential maintenance activities are difficult to pre-determine; however, previous actions at other Reclamation fish barriers have included activities such as painting or cleaning of graffiti; vegetation and sediment removal, and concrete erosion repair (i.e., installation of non-shrink grout or placement of steel plates). If any substantial maintenance or repair activities (outside of the scope of this EA) are required, the action may require supplemental compliance documentation (e.g., NEPA, ESA - Section 7, etc.) by Reclamation, in coordination with Freeport, USFWS, and other appropriate agencies, prior to any action.

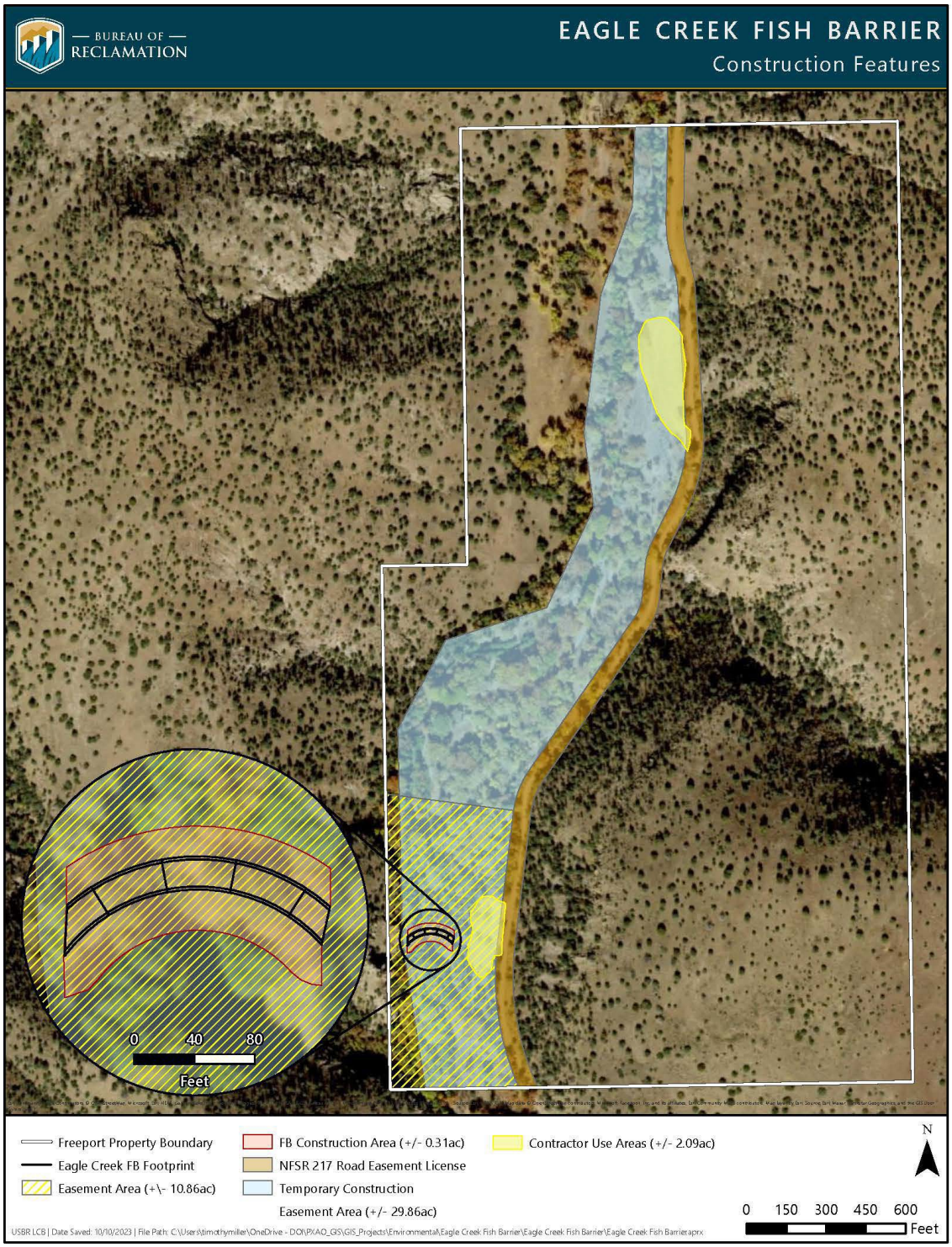

Figure 4. Project location with construction features for the Eagle Creek fish barrier.

2.1.4 Reclamation – Best Management Practices

The BMPs incorporated as part of the Proposed Action are listed in Table 2. The environmental effects analysis conducted for this EA considers environmental effects after these BMPs are implemented. Implementation of BMPs would be required.

Table 2. Best Management Practices to Avoid, Minimize, and Mitigate Impacts

Resource	Best Management Practice
Air Quality	• Dust control measures approved by Greenlee and Graham counties, such as road watering, shall be implemented during construction. • To minimize wind erosion, all construction activities will follow mitigating measures that may include watering, application of dust palliatives, and 'stop work' periods during high winds. • Vehicle speeds on access roads will be limited to 25 miles per hour. • All trucks hauling soil and other loose material will be covered or at least 2 feet of freeboard will be maintained. • Unnecessary idling of equipment will be limited.
General Wildlife	• Site fencing will be designed to meet the Arizona Game and Fish Department's (AZGFD's) standards for wildlife-compatible fencing, as appropriate. • Notations summarizing permit conditions related to wildlife, such as timing restrictions and survey requirements, shall be included on construction documents.
Cultural Resources	• Archaeological site AZ W:11:34(ASM) shall be avoided for the duration of this project. Prior to any ground-disturbance associated with this project, including but not limited to use of the staging areas and construction, temporary orange construction fencing shall be installed around the cultural avoidance area. This fencing will remain in place until the project is completely constructed, and all staging of equipment has ceased. • If cultural resources, including human remains or burials, are encountered during land-disturbing activities, work will cease immediately at the location. Personnel from Reclamation's Cultural Resources Branch shall be contacted at (623) 773-6262 or jaxsom@usbr.gov and coordination will be conducted with the Arizona State Historic Preservation Office and the Hopi Tribe. • If needed, all borrow material must come from an approved source (i.e., a source that has been previously cleared under the NHPA by ADOT) before purchasing and/or removing the borrowed material.
Land Use and Access	• A Temporary Construction Easement and O&M Easement will be coordinated with the landowner and obtained prior to construction to access private lands where the project is located. • Access for residents, recreational users, and emergency vehicles on public roads to be used for construction of the fish barrier will be maintained.
Migratory Birds	• To ensure compliance with the MBTA, all vegetation clearing, and ground-disturbing activities will be conducted outside the migratory bird nesting season (March 15 – August 31). • All work in the immediate area will cease if any federally-listed species are observed in the construction area. Reclamation and USFWS personnel will be notified immediately.
Noise	• Construction vehicles and equipment will be maintained in proper operating condition and will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).
Soils	• To the extent practicable, construction activities will be scheduled to avoid direct soil disturbance during periods of the year when heavy precipitation and runoff are likely to occur. The amount of exposed or disturbed soil at any one time will be the minimum necessary to complete construction operations. Operation of equipment will be limited when ground conditions could result in excessive rutting, soil puddling, or runoff of sediments. • Hay bales, silt fences, or other appropriate erosion controls would be placed immediately down slope of exposed soils or fill to prevent the transport of sediment. Siltation and turbidity control measures (e.g., silt fences, hay bales, etc.) shall be implemented in all areas where disturbed soils may potentially wash into the stream via storm runoff. Such measures would remain in place until the project is complete and exposed soils are stabilized. • Cuts/fills will be balanced on-site to the greatest extent possible.

Resource	Best Management Practice
Special-Status Species	• If a federally-listed species is identified during construction, the contractor will stop work in that location and coordinate with the USFWS to determine appropriate measures and avoid disturbance. • Prior to construction a qualified biologist will provide an environmental awareness program that will cover narrow-headed gartersnake life history, status, identification, and mitigation measures to avoid encounters and impacts.
Vegetation	• Contractor use areas for equipment staging, stockpiling materials, and parking will be established to minimize the area of ground disturbance. • Grading will be kept to a minimum to preserve existing vegetation, landforms, and topography. Where grading is necessary, topsoil shall be removed, stockpiled, and used for site reclamation and revegetation during decommissioning. • All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials will remain within existing roads and marked work areas. • Vegetation disturbances will be limited to the project area and all revegetation efforts will involve the use of native plant species to the extent possible. • Construction activities would avoid mature riparian trees and minimize impacts to other vegetation within the project area to the extent possible.
Non-native Plants and Noxious Weeds	• Vehicles and equipment will be washed and cleaned before entering the project area to remove mud, debris, and vegetative material to mitigate spread and/or establishment of noxious/invasive species. • To minimize the introduction of undesirable plant species, specific control measures may be implemented, including the following: o using weed-free fill o developing contractor use areas for storing equipment, materials, and vehicles
Waste and Hazardous Materials Management	• An approved Waste Management Plan (WMP) will be implemented for the management and disposal of solid and hazardous wastes generated during construction. The WMP will be consistent with federal, state, and county regulations. • A Spill Prevention, Control, and Countermeasures Plan will be developed for the temporary storage and use of petroleum products at the construction site. Daily visual inspections of equipment and containers will be conducted for leaks, discharges, corrosion, or other conditions that could lead to a discharge of petroleum products. • Hazardous materials will be stored in approved containers with appropriate spill containment features and available spill response kits. Safety Data Sheets and Hazardous Material Authorization forms will be reviewed prior to construction to ensure environmentally compatible products are selected.
Water Resources	• All applicable permits under the Clean Water Act will be obtained prior to construction. The terms and conditions of the permits and certification will be incorporated into the project. • Stream flow would be diverted around the work area to reduce potential release of sediment to the stream, in combination with soil erosion control measures described above. • The construction contractor's petroleum product storage would be located at least 20-ft from storm water channels, washes, and rivers. The petroleum storage areas would be located in the contractor use areas and lined and diked to permit safe containment of leaks and spills. • Final barrier design plans would be physically modeled at Reclamation's Denver Technical Center hydraulic lab, and the design selected would minimize impacts to the hydrology and geomorphology of the project area.
Wildfire Risk	• Wildland fire prevention measures will be implemented to minimize fire risks, including limiting vehicle travel to and within construction areas to only essential vehicles, establishing parking guidelines in remote areas, banning smoking and non-construction flame sources outside of vehicles, and establishing safety guidelines for construction flame and spark sources. • All on-site employees will receive fire prevention and response training.

2.1.5 Reclamation - Repatriation of Native Fish

Following construction, spikedace and loach minnow would be stocked in Eagle Creek upstream of the fish barrier and would be coordinated among the AZGFD, USFWS, U.S. Forest Service (USFS),

Reclamation, and Freeport. Consideration may be given to translocating Gila chub and narrow-headed gartersnake if populations severely decline in the future. The fish translocations would include one or more annual augmentations of individuals following the initial stocking events to ensure species establishment and that the established populations adequately reflect genetic variability inherent within the donor populations. Post-stocking monitoring (see Section 2.1.6 Reclamation – Fish Community Monitoring) would determine the success of the stocking program.

2.1.6 Reclamation – Fish Community Monitoring

A 5-year monitoring program would be established after the fish barrier is constructed to monitor barrier effectiveness, to detect incursion of new nonnative fishes, and to monitor responses of native fishes. This monitoring would be funded by Reclamation and developed in cooperation with AZGFD, USFWS, and Freeport. Surveys of the fish community in Eagle Creek below the constructed barrier would be undertaken to determine presence/absence of nonnatives, document relative population sizes of natives, and detect reproduction and recruitment of native fishes. Methods may include electrofishing, seining, and netting.

Monitoring of repatriated populations (spikedace and loach minnow), as well as the co-occurring fish assemblage, would also be initiated following initial stockings to assess population establishment. This monitoring would occur for a minimum of 5 years following the initial repatriation; however, monitoring efforts may span a longer period of time if augmentation stockings are necessary. Non-lethal fin clips may be collected from a representative sample of each species (30-50 individuals) and provided to a recognized genetics laboratory for comparison to archived samples from the donor population. Comparisons would determine the need for additional augmentations from the donor populations. Following population establishment, monitoring funded by Reclamation and Freeport, in cooperation with AZGFD and USFWS, would likely continue for the foreseeable future as part of native fish recovery efforts instituted under Reclamation's Program and Freeport's Management Plan.

2.2 No Action Alternative

Under this alternative, USFWS would not approve a CBA and issue an EOS permit to Freeport for incidental take of Covered Species, and Freeport would continue the existing O&M activities on their properties as described in Section 2.1.1 USFWS – CBA and Issuance of EOS Permit. Freeport would continue to implement the actions within its Management Plan. In addition, Reclamation would not construct, operate, and maintain a fish barrier within upper Eagle Creek and would not repatriate native fish into upper Eagle Creek. Eagle Creek would remain hydrologically connected during periods of high flow and nonnative species would continue to have access to upper portions of the stream.

2.3 Alternatives Considered but Eliminated from Further Study

Several planning alternatives were considered but eliminated from detailed analysis for reasons stated below.

Reclamation – Concrete Materials Transported by Truck. As an alternative to standard excavation methods, transport of batched concrete from offsite to the Eagle Creek Fish Barrier construction site for use in the barrier scour walls was investigated. Batched concrete would be delivered by commercial mixer trucks to the staging area, where it would be transferred to a loader or equivalent machinery and transported to the work area and placed directly into the formwork of the fish barrier. This alternative would have required increased traffic on Eagle Creek Road to complete the deliveries of the batched concreate. Relative to the alternative described here, the proposed onsite batch plants appear the most cost-effective and least damaging to environmental resources, while concomitantly providing suitable biological benefit to native fishes and amphibians.

Reclamation – Alternative Barrier Construction Sites. In 2009, investigations regarding the feasibility of constructing a fish barrier on Eagle Creek were initiated. Given the presence of Freeport's diversion dam on lower Eagle Creek and the distribution of nonnative fish in the system, investigation efforts were focused above the Willow Creek confluence to protect the upper portion of Eagle Creek and its tributaries. Ten locations above the Willow Creek confluence were evaluated as potential fish barrier sites in October 2009. During 2012 and 2013, biologists and engineers from Freeport, USFWS, and Reclamation further refined potential fish barrier locations on Eagle Creek, and a preferred location (the site of the proposed action) was identified based on land ownership and topography. Reclamation completed a preliminary analysis of the feasibility of constructing a fish barrier at this site, and consensus was reached that the preferred location (RM 51.1) was a viable site for fish barrier placement and would provide substantial conservation benefits to native aquatic species. Downstream of this location, from RM 49 to the Willow Creek confluence (RM 44.2), flows in Eagle Creek are seasonally intermittent and land ownership is comprised of Freeport-owned lands (RM 49.5 to 48.5, RM 48.0 to 46.5), other private lands, San Carlos Apache Indian Reservation, and ASNFs. A small patch of ASNFs-managed land is present within the perennial section near RM 51.0; however, this reach was dismissed from further consideration as the location occurred outside of Freeport's property boundary and does not considerably maximize the amount of upper Eagle Creek protected from the upstream incursion of nonnative fishes. Alternative fish barrier construction sites on ASNFs upstream of the proposed fish barrier site were also dismissed as this would leave a larger portion of Eagle Creek unprotected and are not within Freeport's property boundary.

3.0 Affected Environment and Environmental Consequences

This chapter describes the existing conditions of resources within the project area that have the potential to be affected and discloses the potential environmental effects that would be reasonably expected from implementing the proposed action(s) and alternatives. Environmental consequences are analyzed based on effects to resources under consideration within the proposed action area as defined in the following sections. Resources that do not require detailed analysis to address potential environmental effects and the rationale for that determination are listed in Table 3. BMP's (or other mitigative or protective measures) described above and in the following sections are considered part of the proposed action and are taken into consideration when predicting environmental consequences.

Table 3. Resources Not Analyzed in Detail in the EA

Resource	Dismissal Rationale
Air Quality	Air quality is determined by the ambient concentrations of pollutants that are known to have detrimental effects on public health and the environment. In accordance with Section 109 of the Clean Air Act (CAA), the U.S. Environmental Protection Agency has promulgated National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, particulate matter (PM10 and PM2.5), ozone, sulfur dioxide, and lead. Areas with air quality that do not meet the standards are designated as "nonattainment areas." Designation of nonattainment submits an area to regulatory control of pollutant emissions so that attainment of the NAAQS can be achieved within a designated time period. The area encompassing Eagle Creek is in attainment for all regulated NAAQS, and emissions from the No Action and action alternatives would be incremental to other sources of air pollution within the project area and regional airshed. Additionally, implementation of BMPs would reduce air pollutant emissions associated with the No Action and action alternatives.
Public Health and Safety	The proposed action(s) would not include the use of hazardous materials, except for chemical constituents contained in fuels (gasoline and diesel fuel), lubricants (oil and grease), and concrete-mixing (lime). Contractors would comply with all hazard communication and hazardous material laws and regulations regarding these chemicals and would implement a Spill Prevention, Control, and Countermeasures Plan to minimize the leaks of motor oils, hydraulic fluids, and fuels. No effects from hazardous materials are anticipated. The proposed fish barrier construction would have a minimal risk of fire ignition during operations due to the limited activities occurring in a wet, riparian area and, in the event of a fire, would be protected by on-site water systems and portable fire extinguishers. Additional emergency response would be provided externally by local service providers, if required. With the implementation of these design features and BMPs, the proposed action(s) would have negligible impacts to public health and safety; therefore, no further analysis is necessary.
Socioeconomics	The proposed action(s) would occur on private land in a remote location within Greenlee and Graham County, Arizona. The project area is in a rural setting approximately 27 miles from Morenci, Arizona, which has a total population of 1,976. Short-term minor economic gains would be expected from fish barrier contracting and construction. Due to the isolated nature of the project area, the proposed action(s) would not be expected to affect the overall social and economic character of the nearest community.
Environmental Justice	No environmental justice populations, as defined by Executive Order (EO) 12898 (59 FR 7629), would be affected by the proposed action(s). The project area encompasses sparsely populated private lands. The proposed action(s) would not result in disproportionately high and adverse health, safety, or environmental

Resource	Dismissal Rationale
	effects to communities and populations described in EO 12898 because there are no such populations in the project area.
Wild and Scenic Rivers	The October 2014 Wild and Scenic Rivers (WSR) Specialist Report (USFS 2014) by the United States Forest Service (USFS) – ASNFs found portions of Eagle Creek within ASNFs eligible for inclusion in the National Wild and Scenic Rivers System. USFS management policy (Forest Service Handbook 1909.12, Chapter 80) applies only to portions of an eligible river within the boundaries of ASNFs. Under the WSR Act of 1968, designation of a WSR neither gives nor implies government control of private lands and protective management of eligible river segments would apply to only to federal lands to the extent the agency with jurisdiction over those lands is authorized. The proposed action(s) would not threaten or be incompatible with the values that contributed to the designation of "eligible" for the portions of Eagle Creek within ASNFs and would not affect future suitability determinations for Eagle Creek on the portions of the river corridor within ASNFs.
Prime Farmlands	The Farmland Protection Policy Act of 1981, as amended (P.L. 97-98), and 7 C.F.R. § 658 are intended to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural purposes. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, and oilseed crops and is also available for these uses. There are no agricultural lands within the project area that meet the prime or unique farmland criteria; therefore, no prime or unique farmlands would be affected by the proposed action(s).
Land Use	The project area is located on private lands owned and managed by Freeport. Water diversions and livestock grazing are the primary land uses in the project area. Other land uses occurring in the general vicinity include intermittent outdoor recreational use (i.e., hiking, camping, hunting, and wildlife observation). The proposed action would not result in changes to land ownership or current grazing operations. Effects to land use and livestock grazing from the proposed action would be negligible.
Global Climate Change	Greenhouse gas emissions associated with the proposed actions, primarily from vehicle and equipment use during the construction period, would be negligible. The quantities of pollutants released during construction would not have a measurable effect on global processes that lead to climate change and would fall below levels considered significant due to the short duration of the proposed action.
Indian Trust Assets	Indian Trust Assets (ITA) are legal assets associated with rights or property held in trust by the U.S. for the benefit of federally recognized tribes or individuals by treaties or individual tribal members. The U.S., as trustee, protects and maintains the specific rights reserved by, or granted to, Indian tribes or individuals by treaties, statutes, and executive orders. There are no known ITAs within the project area; therefore, the proposed action would result in no adverse effects to any ITA and no further analysis is necessary. Additionally, information regarding the proposed project was sent to the nine Native American tribes listed in Chapter 5 Consultation and Coordination. The tribes did not comment on the possible occurrence of ITAs in the project area. No effect to ITAs is anticipated.
Recreation	Dispersed recreational opportunities for hiking, hunting, off-highway vehicle riding, and wildlife viewing exist on USFS, Arizona State Lands, and private lands in and around the project area. The nearest developed recreational opportunity is the Honeymoon Campground, managed by the USFS and located approximately 4 miles north of the proposed fish barrier location. Public and private access would be maintained throughout construction and operation, fencing and signage would be posted prior to construction to inform the public and ranch users of project activities. With the implementation of these BMPs, the effects to recreation from the proposed action(s) would be negligible.
Visual Resources	The proposed fish barrier would be located in a rural location on private land. If viewed from downstream, the sweeping arched outline of the barrier would contrast with irregular and random patterns of surrounding substrates. Contrasts would be less noticeable from upstream viewpoints once the channel aggrades, and the upstream face of the barrier is mostly covered by sediment. Intervening canyon terrain and riparian vegetation would conceal the barrier from viewpoints along the river and adjoining uplands at distances greater than 500 feet. The barrier would not be visible from key public-use viewpoints such as roads, trails, and recreation

Resource	Dismissal Rationale
	sites. Therefore, effects of construction of the proposed fish barrier to visual resources would be negligible. Following construction, inspections of the fish barrier and repatriation of native fishes, and monitoring would have no effect.
Noise	The proposed actions would be located in a rural location on private land. The nearest developed area that may be exposed to noise from equipment and vehicles during construction, operation, and maintenance activities is the Honeymoon Campground. Construction noise would be short-term, temporary, and localized to the project site. Adverse effects related to noise would be negligible.
Traffic and Transportation	Reclamation's proposed action would utilize the following roads during construction activities: U.S. Highway 191 and NFSR 217. During construction, motorists may experience a minor disruption to travel along NFSR 217 because it is the only primitive, unmaintained route into upper Eagle Creek. Considering ASNF's designation of light use and the remoteness of this road, no adverse effects would occur. Traffic would remain open, and delays, if any, would be of short duration. In addition, the fish barrier design would account for periods of high flow to reduce or eliminate any potential road damage caused by flooding events.

3.1 Impact Analysis Methods and Terminology

The impact analysis for each resource is focused only on areas where the applicable resource is likely to be affected by the proposed action and alternatives. The analysis area for USFWS's proposed action includes all the Freeport land identified to be enrolled in the CBA (see Section 1.4.1 CBA and EOS Permit). The analysis area for Reclamation's proposed action would be the "Temporary Construction Easement Area" shown in Figure 4.

For each resource, this section describes the current conditions (hereinafter referred to as "Affected Environment"), followed by an analysis of the effects of the proposed action and no action using the following impact type definitions:

- Direct − A direct effect is an effect on a resource that is caused by the action and occurs at the same time and place.
- Indirect − An indirect effect is an effect on a resource that is caused by the action later in time or farther away and is still reasonably foreseeable (e.g., increased likelihood of nonnative, invasive species moving into the area after disturbance).
- Cumulative − Cumulative effects are defined as "the effect on the environment which results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.1). Cumulative effects were determined by combining the effects of the alternatives on the affected environment with other past, present, and reasonably foreseeable future actions.
- Short-term − A short-term effect is an effect on a resource that would be less than 5 years in duration, including temporary disturbance during construction.

- Long-term – A long-term effect is an effect on a resource that would greater than 5 years in duration.
- Negligible – This indicates no measurable or observable change from current conditions: The effect on the resource would be at or below the levels of detection.
- Minor or minimal – This indicates a small, detectable, or measurable change. The effect could be:
    - Outside the range of natural or typical variability but occur for a very brief duration; or
    - Within the natural or typical range of variability but occurs for a longer period of time. Mitigation, if implemented, would be easily applied and successful with a high degree of certainty.
- Major – This indicates a large observable or measurable change. The effects would result in substantial impacts to the resource that would be readily apparent, consequential, and outside the natural or typical range of variability. Mitigation, if implemented, would be uncertain in its success, or ineffective with consequent long-term and permanent changes in the availability or natural recovery of the resource.
- Beneficial – This indicates a positive change in the condition, appearance, or function of the resource.
- Adverse – This indicates a negative change that moves the resource away from or detracts from its condition, appearance, or function.

The analysis captures effects to the extent reasonably possible, based on the best available information.

3.2 Water Resources

The effects of USFWS's and Reclamation's proposed actions are considered under this resource. Native fish repatriations and fish community monitoring are not analyzed because there would be no effect on water resources if these two actions are implemented.

3.2.1 Affected Environment

CBA and Issuance of EOS Permit. Eagle Creek begins near Robinson Mesa, south of the Mogollon Rim in east-central Arizona, where several smaller streams join East Eagle Creek. Eagle Creek flows south to join the Gila River southwest of Clifton, approximately 60 miles. Flow characteristics of Eagle Creek are variable. The upper portion of Eagle Creek is perennial where the stream passes through mountainous terrain and is likely bedrock controlled. Upon entering a broader alluvial valley, Eagle Creek becomes seasonally intermittent. At the downstream end of this valley, Willow Creek discharges into Eagle Creek, and Eagle Creek is again perennial and remains perennial to its confluence with the Gila River. Encompassing 662 square miles, Eagle Creek's watershed is predominantly tribal and federal lands, with smaller areas of private and state lands. The contributing portion of the Eagle Creek drainage upstream of the fish barrier is approximately

199.5 square miles. Drainage area elevations within the watershed vary from approximately 1,550 feet near Arsenic Tubs to 10,002 feet at Heliograph Peak. Eagle Creek's watershed is broad and also encompasses Bonita Creek and portions of the Gila River. Perennial tributaries to Eagle Creek include Willow Creek, Cottonwood Canyon, and Cienega Creek, all of which originate to the west of Eagle Creek on the San Carlos Apache Indian Reservation. Smaller intermittent and ephemeral drainages also enter the stream throughout the watershed and have the potential to contribute surface water during periods of snowmelt or rainfall. Annual precipitation in the project area averages about 17.4 inches per year (USGS 2024), with a bimodal precipitation pattern that peaks in winter/early spring, and again in mid to late summer.

Continuous records of discharge on Eagle Creek have been collected by the U.S. Geological Survey (USGS) since 1981 at its stream gage (Station No. 09447000) above the pumping plant near Morenci, Arizona, approximately 12 miles upstream of its confluence with the Gila River. For the period of record, the maximum discharge is 36,800 cubic feet per second (cfs) in 1993, and the lowest daily mean discharge is 3.5 cfs (USGS 2024). For the last 10 years of approved daily-mean data (2013 – 2022), the average annual streamflow at the Eagle Creek gage varied from a high of 59.3 cfs in 2018 to a low of 32.2 cfs in 2019, with a decadal average of 41.4 cfs (USGS 2024). The values recorded at the gage are affected by diversions above the gage station for private land irrigation of approximately 500 acres, mostly above Willow Creek.

A second USGS gage is located near Double Circle Ranch on Eagle Creek (09446500) and was active from 1944 to 1972 and 2018 to present day. Discharge estimates (cfs) for the indicated recurrence interval (years) for Eagle Creek are based on the difference between flows at USGS 09446500 and 09447000 (USGS 2024). The design flood will correspond with the 100-year flood. The frequency flood estimates in Table 4 were generated using USGS National Flood Frequency Arizona Region 1 regression equations.

Table 4. Estimated Peak Flood Flows at the Fish Barrier

Recurrence Interval	Instantaneous Peak Flow (cfs)
2-year	1,080
5-year	2,780
10-year	4,560
25-year	7,690
50-year	10,810
100-year	14,600

Arizona sets narrative and numeric water standards for water quality based on the uses people and wildlife make of the water. The Arizona Department of Environmental Quality (ADEQ) 2022 Integrated 305(b) Water Quality Assessment and 303(d) Listing Report identifies Eagle Creek as a Category 2 stream, which indicates that it is in attainment for some criteria, but there is insufficient data for a full evaluation. Samples were collected at Eagle Creek at its headwaters and at Sheep

Wash. At the headwater site, Eagle Creek was ranked as not attaining the aquatic and wildlife (cold water) designation due to a low score on biocriteria. Biocriteria is a measure of the biological integrity of the stream and measures the macroinvertebrate assemblage in the stream. Results for Eagle Creek were inconclusive, and ADEQ will re-evaluate this criterion when new implementation procedures are adopted. At the headwater site, Eagle Creek was in attainment for domestic water use, fish consumption, full body contact, agricultural irrigation, and agricultural livestock criteria (ADEQ 2022).

At the Sheep Wash site, water quality testing results were inconclusive for domestic water source and full body contact. The result for domestic water source was inconclusive due to one in eight samples being in exceedance for manganese. The result for full body contact was inconclusive due to one exceedance in the last 3 years for *E. coli*. The Sheep Wash site at Eagle Creek was in attainment for fish consumption, agricultural irrigation, agricultural livestock, and aquatic and wildlife (warm water). ADEQ has given medium priority to collecting additional *E. coli* and manganese samples at this site (ADEQ 2022).

Freeport owns or controls certain water rights on Eagle Creek and utilizes a portion of Eagle Creek for inter-basin water transfers from the Black River. Water is diverted from the Black River, transported via Willow Creek, and discharged into Eagle Creek near RM 44 (see Figure 5). Freeport also pumps groundwater from wells completed within bedrock aquifers east of Eagle Creek, which is transported and discharged into Eagle Creek at RM 43, approximately 1 mile south of the confluence of Willow Creek and Eagle Creek (see Figure 5). These water releases further augment stream flow below the proposed fish barrier.

Additionally, water is diverted from Eagle Creek at Freeport's diversion dam, which is located approximately 14 RM above the Gila River confluence (see Figure 5). This water diversion includes water that is transferred from the Black River, groundwater, and a portion of the natural flow in Eagle Creek. In a typical year, less than 10 percent of the natural flow of the creek is diverted. This water supply is used for mining operations and for the Town of Morenci's municipal water system. Seepage and underflow from the diversion dam allows perennial flow in Eagle Creek from the diversion dam downstream to the Gila River. Freeport does not capture or divert water below the diversion dam and has no plans to do so in the future.

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in short-term, minor disturbances to water resources.

Fish Barrier Construction, and Operation and Maintenance. The proposed fish barrier site is located in upper Eagle Creek, upstream of all water diversions and other management actions as described above. The fish barrier site is a canyon bound riparian area with the river itself exhibiting hydraulic heterogeneity, characterized by a diverse composition of runs, riffles, and pools. The proposed barrier would provide a uniform 4-foot drop to ensure that fish cannot migrate upstream beyond the site. There are no wetlands, special aquatic sites, or Outstanding Arizona Waters in the analysis area for Reclamation's proposed action.

3.2.2 Environmental Consequences

3.2.2.1 No Action

Under the no action alternative, there would be no change to existing water resource conditions because the project would not be implemented. Freeport's current operations, water management practices or diversions would be expected to remain the same as described above. Additionally, there would be no effect to existing water quality and quantity because construction of the fish barrier would not occur.

3.2.2.2 Proposed Action

CBA and Issuance of EOS Permit. Approving the CBA and issuing the EOS permit to Freeport would not have any effect on water resources. Freeport's water rights and water management activities are expected to continue as described in Section 3.2.1 (Water Resources, Affected Environment), and Freeport does not have plans to expand water diversions below their diversion dam in the foreseeable future.

Waters of the U.S. The U.S. Army Corps of Engineers (USACE) regulates discharges of fill material to waters of the U.S. pursuant to Section 404 of the Clean Water Act (CWA), and issues permits for actions proposed within such waters. Jurisdictional, non-tidal waters of the U.S. regulated by the USACE are defined in 33 C.F.R. § 328.4 (c) as those that comprise the area of a water course that extends up to the ordinary high-water mark (OHWM), in the absence of wetlands. The construction area is in a stream-riparian corridor, and there are no wetlands present. Based on a delineation of the OHWM, approximately 0.19 acres of jurisdictional waters would be permanently affected by the placement of fill (concrete and excavated alluvium redeposited as backfill) during construction of the fish barrier. An additional 0.10 acres of channel could be affected by temporary stockpiles of excavated alluvium and soil disturbances associated with site preparation at the barrier. Following construction, immobilized bedload material would permanently aggrade the channel upstream of the barrier, affecting approximately 4.4 acres (see Figure 6). The terrace, where the contractor intends to position the staging area, is located above the OHWM. A USACE 404 permit and ADEQ 401 water quality certification would be acquired prior to construction. All necessary conditions and terms required by the relevant permits would be implemented to ensure the project's compliance with sections 401 and 404 of the Clean Water Act.

Hydrology and Fluvial Geomorphology. After construction, the barrier would initially trap bedload sediment in a zone of deposition immediately upstream of the structure. Aggradation of the streambed from sediment deposition would slightly flatten the channel gradient and permanently raise the water surface profile on a 100-foot segment (4.4 acres) of stream (see Figure 6). This effect would be greatest where the water overtops the barrier (4-foot elevation change) and disappear altogether where the aggraded zone converges with the existing streambed. The raised water surface elevation would have minimal corrosive effect on the channel banks, which are armored with bedrock and boulders. Pool development along the upstream side of the barrier would be minimized by backfilling the area with surplus alluvium excavated from the foundation and riprap

trenches. Bedload sediment deposited from flooding and high seasonal flow is expected to displace any remaining pools within 1 to 2 years.

Changes in channel morphology in the project area may have a minor effect on downstream flow and erosion patterns. Design specifications for the barrier and contractor use area include requirements to minimize bank disturbance and preserve on-site characteristics. Natural regrowth of riparian vegetation and subsequent stabilization of the disturbed soils within this area would be expected to remove any long-term impact to stream conditions.

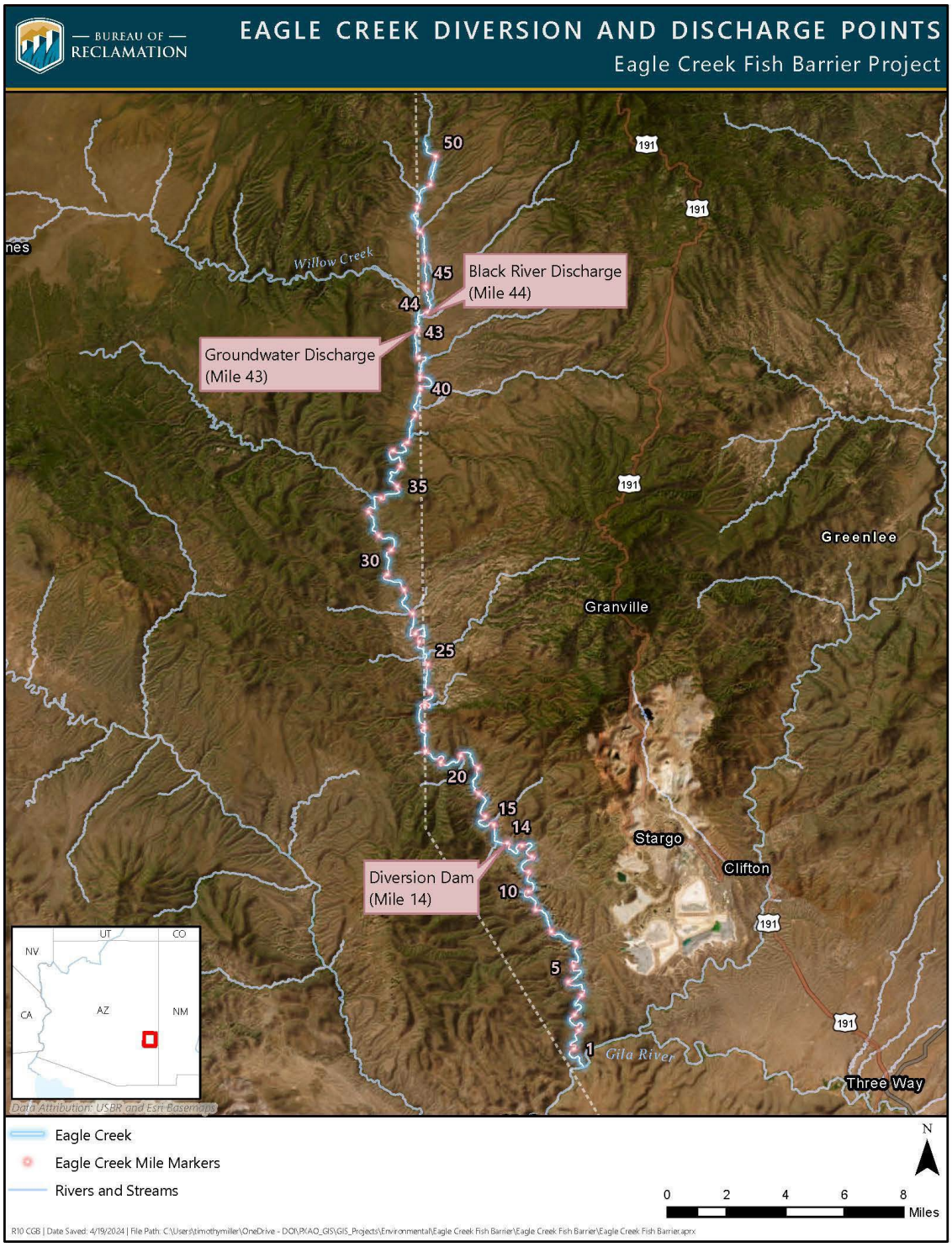

Figure 5. Eagle Creek water diversions and discharge points.

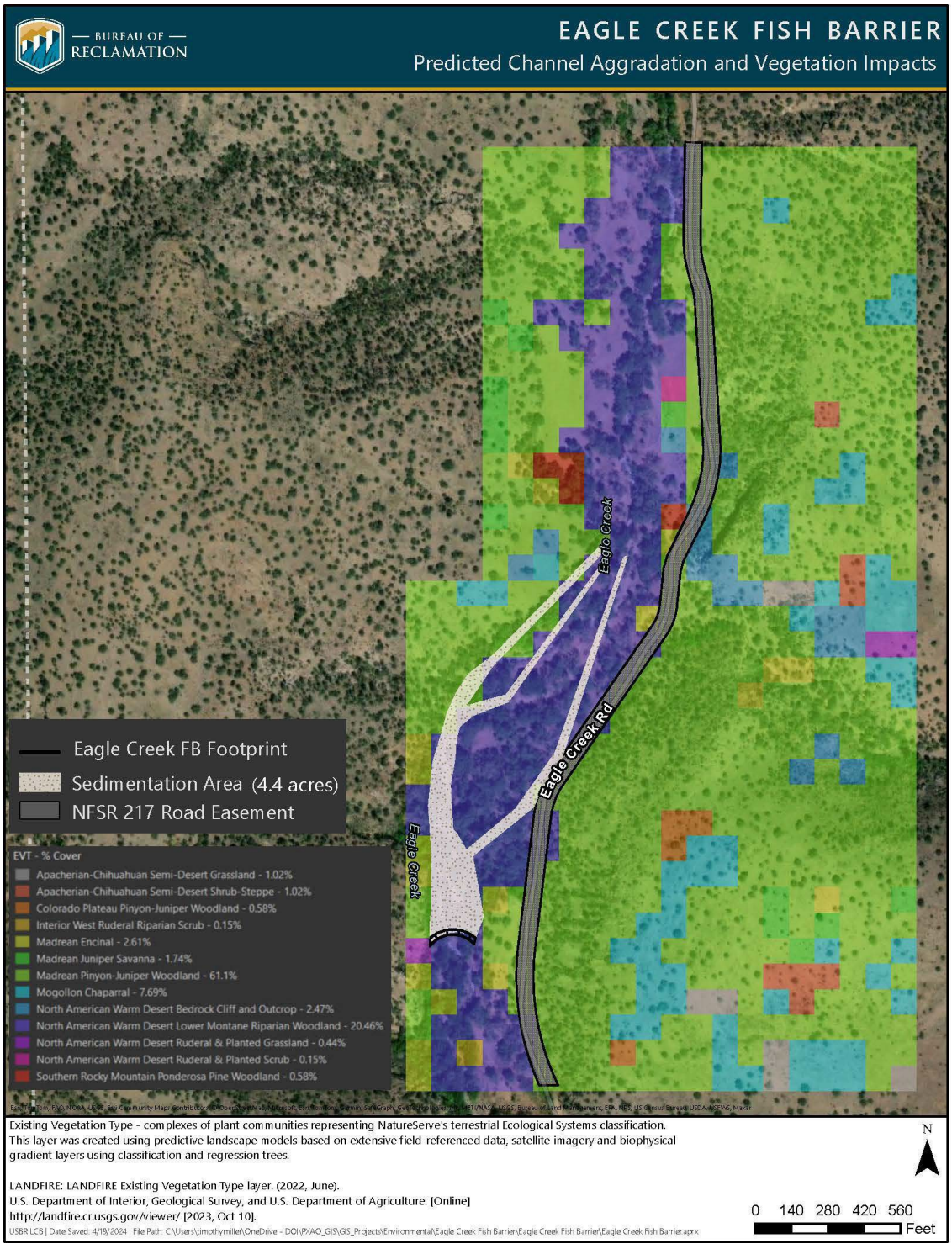

Figure 6. Predicted channel aggradation and vegetation impacts.

Fish Barrier Construction, and Operation and Maintenance.

Surface Water Quality and Quantity: During barrier construction, diversion and excavation activities would produce elevated levels of suspended sediment and turbidity for a short distance downstream of the work area. The actual footprint of the barrier is estimated at 0.3 acres. Excavation of channel substrates and other construction-related activity would contribute to temporary increased turbidity for a short distance downstream of the project area. Substantial increases in sedimentation during active construction would be averted through the application of pollution control best management practices (BMPs; see Section 2.1.4 Reclamation – Best Management Practices), such as diverting stream flow around the construction zone. Disturbances along the abutments would be confined to bedrock and boulders, minimizing the potential for bank destabilization. Construction would create localized disturbances on floodplain soils outside of the active channel within the work area. Storm runoff from the work area could wash fine sediment into the stream resulting in increased turbidity. Temporary impacts to 2.09 acres associated with the contractor use area may lead to short-term increases (1 to 5 years after construction) in sedimentation runoff after storm events. These conditions would diminish as disturbed soils stabilize and riparian vegetation recovers after construction. No long-term changes in water quality are anticipated.

Placement of the fish barrier at the proposed site would not affect total water yield to holders of downstream water rights. Mechanical backfilling and natural bedload deposition along the upstream side of the barrier would preclude any permanent pooling of water and allow stream flow to pass over the structure unimpeded. Short-term pooling of flow is considered non-consumptive because water is not removed from the stream system. However, hydraulic changes induced by the barrier would result in a slight increase in evaporative stream loss. Project-related evaporative water loss would not be expected to affect the quantity of water diverted downstream by claimants on Eagle Creek. An increase in evaporative water loss would slightly reduce the amount of water that is available for storage on the Gila River; however, this amount would be insignificant.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to water resources. Reclamation's proposed action would result in minor, localized short- and long-term adverse effects during and after construction. Both proposed actions are expected to have long-term beneficial effects on water resources by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper Eagle Creek and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.3 Geology and Soils

The effects of USFWS's and Reclamation's proposed actions are considered under this resource. Native fish repatriations and fish community monitoring are not analyzed because there would be no effect on geology and soils if these actions are implemented.

3.3.1 Affected Environment

CBA and Issuance of EOS Permit. Eagle Creek lies within the Central Highlands province, a transitional zone between the Colorado Plateau and the Basin and Range physiographic provinces (Chronic 1983). This transitional zone is composed of a series of narrow fault-bound valleys separated by rugged fault-bordered mountain ranges. Elevations within the Eagle Creek watershed range from 3,252 feet at the Gila River confluence to 5,140 feet above mean sea level at the proposed fish barrier site. The geology of the area is complex, with granitic and metamorphic rocks from the Proterozoic eon overlaid or intruded on volcanic and sedimentary rocks from the Mesozoic era into the Tertiary period.

Fish Barrier Construction, and Operation and Maintenance. The project area is located in the TS18 soils mapping unit, termed the Graham-Lampshire-House Mountain Association (Hendricks 1985). This association consists of shallow, gravelly, and cobbly, medium to fine-textured soils located on rolling to very steep hills and mountains. Soils were formed in residual materials weathered from various types of volcanic rock, including but not limited to basalt, ash-tuff, andesite, and dacite.

Upper Eagle Creek is at a transition point where volcanic andesite has extruded to the surface and created a bedrock constriction marked by a high cliff on the western bank and a high ridge on the eastern bank. The perennial channel is formed through alluvial deposition, primarily composed of various sized sediments, gravel, cobbles, and boulders. At the proposed fish barrier site, the left and right abutments would be constructed in an area formed by an outcrop of hard Andesite and loose boulders.

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities may result in short-term, minor disturbances to geology and soils.

3.3.2 Environmental Consequences

3.3.2.1 No Action

Under the no action alternative, there would be no change to soils and geologic features, since denying approval of the CBA and issuance of the EOS permit would not change Freeport's current and future management operations, and no fish barrier would be constructed. However, sedimentation from slope erosion, minimal vehicle and foot traffic on existing roads and trails, other land surfaces, and flood-induced scour would continue to affect soils in the stream corridor. These effects include aggradation and degradation of the active channel.

3.3.2.2 Proposed Action

CBA and Issuance of EOS Permit. Approval of the CBA and issuance of the EOS permit to Freeport would have no effect on soils or geology within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects to the geology and soils in Eagle Creek would continue as described in Section 3.3.1 Affected Environment.

Fish Barrier Construction, Operation, and Maintenance. Construction of the proposed fish barrier would directly affect approximately 2.4 acres in Eagle Creek. The concrete barrier would permanently impact approximately 0.10 acres (of the 0.31 acre construction footprint), and temporary impacts would be expected on approximately 2.09 acres designated as contractor use areas for material storage and equipment staging. Within the construction zone, approximately 6,286 cubic yards (cy) of alluvium would be excavated to prepare the foundation trench and construct the scour walls and apron. Native materials would be stockpiled in contractor use areas for reuse as backfill (see Figure 4). A combination of backfill and riprap would be placed in the channel above and below the fish barrier to prevent impoundment of surface flows and protect the barrier from blowouts during 100-year flood events. Fill depth would be approximately 15 – 20 feet at the barrier and diminish to less than 2 feet approximately 100 feet upstream and 100 feet downstream.

Minor, short-term adverse effects to soils would occur during the repeated movement of construction equipment, repeated use of contractor use areas, and emplacement of a temporary cofferdam to divert stream flow during construction activities. The local effects of the barrier include the aggradation of the active stream channel and a slight reduction in gradient, which will impact approximately 1,400 feet of channel upstream and affect an area of 4.4 acres (see Figure 6). Soil compaction and increased susceptibility of soils to wind and water erosion are expected during construction. Post-construction, stream-transported coarse material would be captured immediately upstream of the barrier, creating a shallow layer of bedload sediment over the backfill and riprap. Sediment accumulation induced by the barrier is expected to be negligible when compared to the total volume transported within the stream corridor. Adverse effects to total sediment yield and movement would be temporary, and pre-project conditions are expected to return once streambed aggradation stabilizes above the barrier. No long-term adverse effects on sediment transport within the stream would occur.

Infrequent (once per year or less) short-term adverse effects to soils are expected during routine O&M of the fish barrier, including soil compaction and increased susceptibility of soils to wind and water erosion are expected under the reduced area of the access easement (see Figure 6).

Effects Summary. In summary, USFWS's proposed action would have no effect to the geology and soils of the analysis area. Reclamation's proposed action would result in minor, localized short- and long-term adverse effects during and after construction. The long-term effects on geology and soil resources would be limited to the barrier's footprint, which spans 0.10 acres, and is expected to be negligible.

3.4 Biological Resources

3.4.1 Vegetation

The effects of USFWS's and Reclamation's proposed actions are considered under this resource. Native fish repatriations and fish community monitoring are not considered because there would be no effect to vegetation if these two actions are implemented.

3.4.1.1 Affected Environment

The Eagle Creek watershed is approximately 1242 square miles and is rugged and varied with scattered oaks (*Quercus* sp.) and junipers (*Juniperus* sp.) concentrated on steep, northerly-facing slopes, and jojoba (*Simmondsia chinensis*) serving as a major shrub along dry cliffs. The watershed also contains small sections of well-developed Plains Grassland Association (Brown and Lowe 1978; Minckley and Clark 1981). Eagle Creek itself is a second order stream with headwaters originating in Mixed Conifer Forest communities in the White Mountains of Arizona and extending south to its confluence with the Gila River (Minckley and Clark 1981).

CBA and Issuance of EOS Permit. The upland portion of the Covered Area falls within four vegetation communities: the Plains and Great Basin Grassland, the Madrean Evergreen Woodland, the Semidesert Grassland, and the Arizona Upland Subdivision Sonoran Desertscrub, as described in Brown (1994). The Plains and Great Basin Grassland habitat is characterized by precipitation that falls during the summer. Representative plant species include blue grama (*Bouteloua gracilis*), as well as other grama grasses, buffalo-grass *(Buchloë dactyloides*), Indian rice grass *(Oryzopsis hymenoides*), Plains lovegrass (*Koeleria cristata*) and others, as well as four-wing saltbush (*Atriplex canescens*), sagebrush (*Artemisia* spp.), cholla (*Opuntia* spp.), and others. The Madrean Evergreen Woodland presents a unique ecological setting marked by its mild winters and summer precipitation patterns. Within this habitat, one can find a diverse array of plant species contributing to its rich biodiversity. Among these are various oak species, including the Emory oak (*Quercus emoryi*) and Arizona white oak (*Q. arizonica*), alongside conifers such as *Pinus*, *Juniperus*, and *Cupressus* spp., as well as other hardwoods. The Semi Desert Grassland habitat is driven by average summer precipitation (typically between 250 mm and 450 mm) and its relationship with annual grass production. This vegetation community includes a variety of summer active perennial grasses, including the black grama (*Bouteloua eriopoda*), slender grama (*B. filiformis*), chino grama (*B. breviset*) spruce top grama (*B. chondrostioides*), bush muhly or hoe grass (*Muhlenbergia porten*), and dry-tropic stem and leaf succulents, including the sotols (*Dasylirion wheeleri, D. leiophyllum*), beargrasses (*Nolina microcarpa, N. texatia, N. erumpens*), the agaves (*Agave lechuguilla, A. parviflora, A. schottii, A. scabra, A. parryi*), and the yuccas (*Yucca baccata, Y. baileyi, Y. utahensis, Y. X schottii, Y. elata*, *Y. angustissima*) (Turner and Brown 1982, USDA 2024*).* The Arizona Upland Subdivision Sonoran Desert has a vegetation community driven by its summer rainfall. Even in the most arid parts, this community exhibits trees, tall shrubs and succulents, which may include foothill palo verde (*Cercidium microphyllum*), Thornber buckhorn cholla (*Cylindropuntia acanthocarpa var. thornberi*), cane cholla (*C. spinosior*), staghorn cholla (*C. versicolor*), chain fruit cholla (*C. fulgida*), teddy bear cholla (*C. bigelovii*), and many more *Opuntia* and *Mammillaria* species (Turner and Brown 1982, USDA 2024).

The majority of the project effects would occur in the streambed (contained within the active river channel) and would have a short-term effect on habitat classified as North American Warm Desert Lower Montane Riparian Woodland and Shrubland (NatureServe 2018). Riparian habitat within the analysis area consists mostly of native species, including Fremont cottonwood (*Populus fremontii*), Arizona sycamore (*Platanus wrightii*), narrowleaf cottonwood (*P. angustifolia*), canyon grape (*Vitis arizonica*), Arizona walnut (*Juglans major*), desert willow (*Chilopsis linearis*), coyote willow (*Salix exigua*), and western boxelder (*Acer negundo*). Vegetation within this land cover classification is made up of plants adapted to periodic flooding, scouring or soil deposition (NatureServe 2018), so habitat would

quickly redevelop within the disturbed areas along the active river channel following project activities.

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in temporary disturbances to vegetation.

Fish Barrier Construction, and Operation and Maintenance. The Eagle Creek fish barrier would be located within the Madrean Evergreen Woodland, and Plains and Great Basin Grassland vegetation communities (Brown 1994) but can be further differentiated into three land cover classes under LANDFIRE: Madrean Pinyon-Juniper Woodland, North American Warm Desert Lower Montane Riparian Woodland and Shrubland, and Mogollon Chaparral (see Figure 6). Madrean Pinyon-Juniper Woodland land cover class, occupying most of the analysis area for the fish barrier, is characterized by vegetation communities comprised of a combination of pinyons, junipers, and oaks, with variable substrates and an often dry and rocky soil. The understories are variable but typically dominated by shrubs or graminoids. The North American Warm Desert Lower Montane Riparian Woodland and Shrubland is a mid- to low-elevation (1,100-1,800 meters; 3,609- 5,905 feet) riparian corridor along perennial and seasonally intermittent streams. Similar to the previous land class cover, the vegetation is characterized by a mix of riparian woodlands and shrublands with cottonwood (*Populus* sp.), oak, and walnut (*Juglans* sp.) species as the dominating overstory community and willow (*Salix* sp.) and alder (*Alnus* sp.) species as the dominating understory community. Specific vegetation is dependent upon annual or periodic flooding and associated sediment scour within the land class cover. The Mogollon Chaparral land class is characteristic of mid-elevation transitional communities. Stands are often associated with more xeric and coarse-textured substrates such as limestone, basalt or alluvium and the dominant vegetation is characterized with oak, alder, and juniper species appearing commonly alongside other fire-adapted woody species (NatureServe 2018). Other land cover classes may occupy approximately 10 percent of the project area, however, due to the difficulty of classifying narrow categories of land cover classes, certainty of these smaller land cover classes is less than the three major classes identified here (Fremgen-Tarantino et al. 2021).

3.4.1.2 Environmental Consequences

3.4.1.2.1 No Action Alternative

Under the no action alternative, there would be no new effects to existing plant communities, since denying approval of the CBA and issuance of the EOS permit would not change Freeport's current and future management operations, and no fish barrier would be constructed. Existing patterns of vegetation loss and regeneration associated with natural flood events, fires, and human activities would prevail.

3.4.1.2.2 Proposed Action

CBA and Issuance of EOS Permit. USFWS's proposed action would have no effect on vegetation within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing impacts to the vegetation in Eagle Creek would continue.

Fish Barrier Construction, Operation, and Maintenance. The proposed barrier would permanently impact approximately 0.10 acres (of the 0.31-acre construction footprint) and short-term adverse effects to vegetation would be expected on approximately 2.09 acres, designated as contractor use areas for material storage and equipment staging. The contractor would be directed to avoid harming mature riparian trees and minimize impacts to other vegetation within the project area to the extent practicable; however, it is anticipated that a maximum of 4.4 acres of riparian habitat upstream of the fish barrier footprint could be impacted from construction activities (see Figure 6). Short-term adverse effects would occur at the contractor use areas, barrier construction zone, and access road. The sedimentation zone, which is part of the active stream channel, is expected to have a temporary impact on the habitat categorized as Interior Strand (Brown 1994). An access road would be established to facilitate access between the fish barrier construction zone and the staging area by clearing vegetation both between and within these zones. The staging of equipment and supplies within the staging area would result in localized trampling or crushing of vegetation. All disturbed areas would be stabilized and seeded with a native plant mixture following construction.

Approximately 0.02 acres of stream channel, from the fish barrier to approximately 50 feet downstream, would be utilized for excavation of the barrier site and stockpiling of the materials. Construction activities upstream of the barrier would occur within the sedimentation zone. Barrier construction would affect a mixed stand of riparian trees within approximately 100 feet upstream and 100 feet downstream of the fish barrier. Stream diversion and dewatering could potentially affect trees located just outside of the construction zone. However, construction would occur during the fall and/or winter when stream flow in this section of canyon is less likely.

Impacts to vegetation from fish barrier O&M activities would be short-term and minor and similar to the effects described above.

Effects Summary. In summary, USFWS's proposed action would have no effect on vegetation resources within the analysis area. Reclamation's proposed action would result in minor, localized short-term adverse effects to vegetation during and after construction. The long-term effects on vegetation would be limited to the barrier's footprint, which spans 0.10 acres, and is expected to be negligible.

3.4.2 Terrestrial Wildlife

The effects of USFWS's and Reclamation's proposed actions are considered under this resource. This section addresses terrestrial wildlife species with no status under the ESA, as special status species are discussed below under Section 3.4.5 Special Status Species - Threatened and Endangered Species.

3.4.2.1 Affected Environment

CBA and Issuance of EOS Permit. The upland portion of the Covered Area falls within four vegetation communities: the Plains and Great Basin Grassland, the Madrean Evergreen Woodland, the Semidesert Grassland, and the Arizona Upland Subdivision Sonoran Desertscrub, as described in Brown (1994).

Wildlife within the Plains and Great Basin Grassland vegetation community includes burrowing owl (*Athene cunicularia*), grasshopper sparrow (*Ammodramus savannarum*), and Gunnison's prairie dog (*Cynomys gunnisoni*). Wildlife representative of the Madrean Evergreen Woodland vegetation community include white-nosed coati (*Nasua narica*), white-tailed deer (*Odocoileus virginianus)*, cottontail (*Sylvilagus floridanus*), western bluebird (*Sialia mexicana*), and Townsend's big-eared bat (*Corynorhinus townsendii pallenscens*). Wildlife expected of the Semidesert Grassland vegetation community may include the black-tailed jack rabbit (*Lepus californicus*), spotted ground squirrel (*Xeropermophilus spilosoma*), hispid pocket mouse (*Perognathus hispidus*) and the ubiquitous coyote (*Canis latrans*). Wildlife representative of the Arizona Upland Subdivision Sonoran Desertscrub are expected to be similar to those previously described with the addition of desert mule deer (*Odocoileus hemionous crooki*), javelina (*Dicotyles tajacu*), and gray fox (*Urocyon cinereoargenteus*).

Typical reptiles with the potential to occur or overlap across all four vegetation communities are dominated by snakes and lizards (Brennan and Holycross 2009). Snakes include Smith's black-headed snake (*Tantilla hobartsmithi*), ring-necked snake (*Diadophis punctatus*), nightsnake (*Hypsiglena torquate*), gophersnake (*Pituophis catenifer*), striped whipsnake (*Masticophis taeniatus*), common kingsnake (*Lampropeltis pyromelana*), Sonoran mountain kingsnake (*L. pyromelana*), black-necked gartersnake (*Thamnophis cyrtopsis*), black-tailed rattlesnake (*Crotalus molossus*), and the Arizona black rattlesnake (*C. cerberus*). Lizards include the eastern collared lizard (*Crotaphytus collaris*), Ornate tree lizard (*Urosaurus ornatus*), plateau lizard (*Sceloporus tristichus*), desert spiny lizard (*S. magister*), greater short-horned lizard (*Phrynosoma hernandesi*), Gila spotted whiptail (*Aspidoscelis flagellicauda*), plateau striped whiptail (*A. velox*), many-lined skink (*Eumeces multivirgatus*), great plains skink (*E. obsoletus*), and the Madrean alligator lizard (*Elgaria kingii*).

Amphibians with the potential to occur or overlap across all four vegetation communities are composed of frogs, toads, and Arizona's only native salamander species, the tiger salamander (*Ambystoma tigrinum*, Brennan and Holycross 2009). Frogs and toads include the Mexican spadefoot (*Spea multiplicate*), red-spotted toad (*Bufo punctatus*), Arizona toad (*B. microscaphus*), Woodhouse's toad (*B. woodhousii*), canyon treefrog (*Hyla arenicolor*), Arizona treefrog (*H. wrightorum*), western chorus frog (*Pseudacris triseriata*), American bullfrog – introduced, nonnative (*Rana catesbeiana*), and the lowland leopard frog (*R. yavapaiensis*).

Wildlife use of riparian habitat is disproportionate to the amount of habitat available (Ohmart and Anderson 1986). Riparian areas occupy less than 0.5 percent of Arizona's total land area vegetation, but they provide habitat for 60 percent to 75 percent of the State's resident wildlife (Arizona Riparian Council 2024). Riparian areas have been recognized as important habitat for neotropical migrants such as the summer tanager (*Piranga rubra*), Bell's vireo (*Vireo bellii*), and yellow warbler (*Dendroica petechia*). Large mammals such as black bear (*Ursus americanus*), javelina, bobcat (*Felis rufus*),

gray fox, coyote, white-nosed coati, and mule deer may utilize riparian habitat as movement corridors. Small mammals typically found in low elevation riparian areas include white-throated woodrat (*Neotoma albigula*), striped skunk (*Mephitis mephitis*), and spotted skunk (*Spilogale gracilis*).

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in short-term, minor disturbances if terrestrial wildlife are present.

Fish Barrier Construction, and Operation and Maintenance. The Eagle Creek fish barrier would be located within Madrean Evergreen Woodland (Turner and Brown 1982). Wildlife characteristics of this vegetation community would be consistent with those described in the previous section.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within the previously described communities. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.2.2 Environmental Consequences

3.4.2.2.1 No Action Alternative

Under the no action alternative, there would be no new effects to existing terrestrial wildlife, since denying approval of the CBA and issuance of the EOS permit would not change Freeport's current and future management operations, and no fish barrier would be constructed. Existing levels of human and natural disturbance to terrestrial wildlife would continue.

3.4.2.2.2 Proposed Action

CBA and Issuance of EOS Permit. Approval of the CBA and issuance of the EOS permit to Freeport would have no effect on terrestrial wildlife within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing adverse effects to the terrestrial wildlife in Eagle Creek would continue with short-term, and highly localized minor disturbances to terrestrial wildlife from existing O&M activities.

Fish Barrier Construction, Operation, and Maintenance. Adverse effects to terrestrial wildlife from construction of the fish barrier would be localized, short-term and minor relative to the amount of habitat along the approximately 58.5-mile reach of Eagle Creek. Primary concerns to terrestrial wildlife during construction are potential for injury or death of slow-moving small mammals and reptiles from the operation of construction equipment, as well as temporary noise-related displacement or disturbance to wildlife from construction and campsite activities. Avian species and large mammals would be capable of avoiding these areas during construction. Construction activities would occur during the fall/winter and direct impacts to breeding or nesting birds would be avoided.

Overall, the concrete barrier would permanently impact approximately 0.10 acres (of the 0.31-acre construction footprint) of stream and riparian habitat and temporarily impact approximately 2.09 acres of terrestrial habitat designated as contractor use areas for material storage and equipment staging. The contractor would be directed to avoid harming mature riparian trees and minimize impacts to other vegetation within the project are if possible; however, it is anticipated that a maximum of 0.31 acres of riparian habitat within the fish barrier construction footprint could be affected from construction (see Figure 4). The fish barrier could create a hindrance to upstream and/or downstream movement of small mammals and herpetofauna within the stream channel; however, these effects would be localized as the home ranges of species potentially affected are relatively small, and many species are capable of overland travel along the slopes of the canyon and adjoining uplands. The barrier would have a negligible effect to the movement of large mammals.

Effects to terrestrial wildlife from fish barrier O&M activities would be minor and similar to the effects described above. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriations and Fish Community Monitoring. Native fish repatriation and fish community monitoring requires that small numbers of personnel be working in stream habitat for short durations of time, typically 1 week or less per year. Overall, impacts to terrestrial wildlife from these activities would be negligible, consisting of short-term, highly localized, and minor disturbances that result from human presence during monitoring and stocking events.

Effects Summary. In summary, USFWS's proposed action would have no effect on terrestrial wildlife within the analysis area. Reclamation's proposed action would result in minor, short-term adverse effects to terrestrial wildlife during and after construction. The long-term effects to terrestrial wildlife would be limited to temporary disturbances during construction and O&M, and are expected to be negligible.

3.4.3 Fish and Aquatic Wildlife

The effects of USFWS's and Reclamation's proposed actions are considered under this resource.

3.4.3.1 Affected Environment

CBA and Issuance of EOS Permit. The Covered Area consists of several, disconnected parcels along lower and upper Eagle Creek that feature perennial aquatic habitat with varied aquatic communities. Extensive fish surveys have been conducted within Eagle Creek from 1989 to 2023, employing various techniques like electrofishing, seine nets, baited minnow traps, dip nets, and hook and line to sample fish. As described in Section 1.2.2, Eagle Creek from Willow Creek to its confluence with Gila River is predominantly inhabited by nonnative fishes, including smallmouth bass, green sunfish, and channel catfish. Conversely, upstream of Willow Creek, the fish community is dominated by native fishes, including desert sucker, Sonora sucker, longfin dace, speckled dace, roundtail chub, and Gila chub (Marshall and Marshall 2024; Reap et al 2023). Although endangered loach minnow and spikedace are presumed present due to historical detections, they have not been detected since

1997 and 1989, respectively (Hickerson et al. 2020; Marshall and Marshall 2024). Threatened narrow-headed gartersnake are also presumed present within Eagle Creek; the most recent detection was in 2013 at the confluence of Sheep Wash during an annual fish survey (Ehlo et al. 2013). Limited monitoring specific to narrow-headed gartersnake has been completed recently along Eagle Creek.

A seasonally intermittent stretch of approximately three miles is present upstream of the confluence of Willow Creek within a broad alluvial valley. This intermittent stretch of Eagle Creek appears to currently limit encroachment of nonnative fish into upper Eagle Creek and its tributaries. However, movement of nonnative species upstream could still potentially occur during wet periods (e.g., during snow melt and monsoon season), and nonnative species such as smallmouth bass are frequently captured just downstream of Willow Creek with the most recent captures in 2023 (Marshall and Marshall 2024).

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in short-term, minor disturbances if fish and aquatic wildlife are present.

Fish Barrier Construction, and Operation and Maintenance. The proposed fish barrier site is within upper Eagle Creek, above the intermittent stretch described above. The existing fish community within this reach consists exclusively of native species, including desert sucker, Sonora sucker, longfin dace, speckled dace, roundtail chub, and Gila chub (Marshall and Marshall 2024). Loach minnow and spikedace are presumed present in this reach; however, these species have not been detected within Eagle Creek since 1989 and 1997, respectively (Hickerson et al. 2020; Marshall and Marshall 2024). All reported spikedace detections are below the Willow Creek confluence (downstream of the proposed fish barrier site).

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within the previously described communities. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.3.2 Environmental Consequences

3.4.3.2.1 No Action Alternative

Under the no action alternative, there would be no new effects to the existing aquatic and fish communities since denying approval of the CBA and issuance of the EOS permit would not change Freeport's current and future management operations, and no fish barrier would be constructed. However, the potential for invasion by nonnative fishes from lower into upper Eagle Creek would remain a threat to the persistence of native fishes.

3.4.3.2.2 Proposed Action

CBA and Issuance of EOS Permit. USFWS's proposed action would have no new effects on fish and aquatic communities within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects to fish and aquatic communities would continue with short-term, and highly localized minor adverse effects to aquatic wildlife from property management activities. The implementation of conservation actions described within Freeport's Management Plan and the CBA have been determined by the USFWS to provide net conservation benefits to the Covered Species and the associated aquatic community and would result in long-term beneficial effects to fish and aquatic communities.

Fish Barrier Construction, Operation, and Maintenance. A total area of 0.31 acres of stream habitat would potentially be affected by the construction of the fish barrier. The greatest risk to fish and aquatic wildlife during the fish barrier construction process would occur pre- and post-construction when stream flow of Eagle Creek (within the fish barrier construction footprint; see Figure 4) is diverted and restored. Primary excavation, formwork construction, concrete placement, and backfilling would occur in the dry/dewatered streambed, so activities outside of the stream diversion would not affect fish and aquatic wildlife. To divert the stream, the contractor would construct and maintain temporary diversion and protective works necessary for diversion and care of the stream during construction, including, but not limited to, cofferdams, channels, flumes, drains, and sumps. The contractor would be permitted to use any method approved by a government inspector; however, the use of siphons to reduce the length of stream impacted, if a gravity flow diversion system is used, is the preferred method. Typical river flows during the project timeline would likely remain unchanged outside the proposed project area; however, within the construction footprint aquatic habitat would be temporarily altered or removed until stream flow is restored. Potential increases to turbidity during the setup and removal of the stream diversion would be minor and short-term and is not anticipated to have long-term adverse effects. In addition, immediately prior to stream diversion activities, a permitted fish biologist would survey the stream for federally listed native fish and aquatic species and relocate captured individuals upstream or downstream of the action area (see Table 2).

Following construction, the fish barrier itself would block upstream fish passage, including native fishes, and interrupt connectivity of designated critical habitat of listed fish species above and below the barrier. As such, movement of fish and genetic material from below the barrier to above the barrier would no longer occur. Fish would be able to move from upstream to downstream over the barrier (by choice or during flood flows) allowing for some mixing of genetic material below the barrier, minimizing some of the indirect effects. Movement and larval drift of native fish varies by species. For example, Booth et al. (2014) reported that sucker species in New Mexico were limited to movements of 0.1 miles or less; whereas Brouder et al. (2000) noted that most roundtail chub movements were within 0.6 miles or less. Additionally, Bestgen et al. (1985) reported that most larval drift occurred during daylight when drift distances are short with suckers accounting for a large majority of drift in the New Mexico, Salt, and Gila River tributaries during Spring 1984 and 1985, respectively. However, since the proposed fish barrier site is upstream of an intermittent reach of Eagle Creek, this effect would be somewhat localized and confined to seasonal periods of flow. It is anticipated that the losses of fish (larval and adult individuals) and genetic material to drift

and downstream movement would be minimal and would be exceeded by losses of fish due to predation by and competition with nonnative fishes if the fish barrier is not constructed.

Genetic communication among diverse populations is desirable to maintain long-term (hundreds of generations) genetic health of a species by allowing influx of novel genes that may better enable a species to adapt to changing environments. However, the condition of stream systems within the Gila River Basin over the past century has deteriorated to the point that little, if any, communication among tributary fish populations occurs through connecting mainstem river corridors (such as the Gila River). Presence of several nonnative fish predators in mainstem rivers like the Gila River, coupled with fragmentation of river drainages via stream diversions, channelization, groundwater pumping, reservoirs, etc., render long-distance movements of fishes among streams within a drainage unlikely (Fagan et al. 2002). The dire conservation status of many native fishes has rendered the need to protect remaining populations more immediate than ensuring that longer-term evolutionary needs are met (Novinger and Rahel 2003). If obstacles presented by the presence of nonnatives can be removed in the future, the need for the barrier would be eliminated, and it could be removed.

Possible indirect effects following fish barrier construction include localized changes to habitat types (e.g., riffle to pool habitat) within proximity to the fish barrier from sedimentation, downcutting, and/or scour of the channel. Minor long-term adverse effects to instream habitats in the sedimentation zone immediately upstream from the fish barrier would primarily occur from lowering the local stream gradient. As such, certain habitat types such as steep-gradient riffles would be less likely to re-form immediately upstream of the barrier. Decreases in mean sediment size and increases in channel sinuosity and braiding are other possible localized effects associated with a lower gradient. Downstream scour effects from various barrier designs would be physically modeled at Reclamation's Denver Technical Center hydraulic lab, and the design selected would minimize the effects described above.

Impacts to fish and aquatic wildlife from fish barrier O&M activities would be minor and similar to the effects described above. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriation and Fish Community Monitoring. Native fish repatriation and fish community monitoring requires small numbers of personnel in the stream habitat for short durations of time, typically 1 week or less per year. Effects to existing fish and aquatic wildlife from these activities would be short-term, highly localized, with minor disturbances resulting from an increase in personnel and field gear in the area during monitoring and translocation events. Activities associated with repatriation of listed fishes may directly affect stocked individuals (i.e., through stress and/or mortality); however, long-term effects are expected to be solely beneficial for these species.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects. Reclamation's proposed action would result in minor, localized short- and long-term adverse effects during and post-construction. Both proposed actions are expected to have long-term beneficial effects on fish and aquatic communities by preventing upstream invasions of nonnative fishes and

other undesirable aquatic biota into upper Eagle Creek and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.4.4 Migratory Birds and Bald and Golden Eagles

The effects of USFWS's and Reclamation's proposed actions are considered under this resource.

3.4.4.1 Affected Environment

CBA and Issuance of EOS Permit. The major vegetation type within the Covered Area, Plains and Great Basin Grassland, is characteristic of nesting habitat for mountain plover (*Charadrius montanus*), lark bunting (*Calamospiza melanocorys*), and grasshopper sparrow (*Ammodramus savannarum*). Other grassland species such as the western meadowlark (*Sturnella neglecta*), prairie falcon (*Falco mexicanus*) and burrowing owl may also be found within this habitat type in the action area and surrounding landscapes (Turner and Brown 1984). Other species within the action area may include those strongly associated with the Madrean Evergreen Woodland community, which may include the Montezuma quail (*Cyrtonyx montezumae*), white-winged dove (*Zenaida asiatica*), mourning dove (*Z. macroura*), broad-billed hummingbird (*Cynanthus latirostris*), acorn woodpecker (*Melanerpes formicivorus*), ash-throated flycatcher (*Myiarchus cinerascens*), sulphur-bellied flycatcher (*Myiodynastes luteiventris*), bushtit (*Psaltriparus minimus*), northern mockingbird (*Mimus polyglottos*), and canyon towhee (*Melozone fusca*; Powell and Steidl 2015). Additional species may include the American kestrel (*Falco sparverius*), loggerhead shrike (*Lanius ludovicianus*), black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), and Gila woodpecker (*Melanerpes uropygialis*). These species are all associated with the Semidesert Grassland or Arizona Upland Subdivision Sonoran Desertscrub vegetation communities (Brown 1994).

Migratory bird species identified in the Covered Area under the USFWS Information for Planning and Consultation (IPaC) database (USFWS 2024) include the black-chinned sparrow (*Spizella atrogularis*), black-throated gray warbler (*Setophaga nigrescens*), olive-sided flycatcher (*Contopus cooperi*), phainopepla (*Phainopepla nitens lepida*), plumbeous vireo (*Vireo plumbeus*), red-faced warbler (*Cardellina rubrifrons*), and Virginia's warbler (*Leiothlypis virginiae*). The Covered Area also falls within the golden eagle (*Aquila chrysaetos*) year-round range and contains appropriate foraging habitat (i.e., open grassland and steppe-like vegetation communities (Katzner et al. 2020) with potential nesting habitat present throughout the lower extent of the Covered Area and limited potential nesting habitat present throughout the upper extent of the Covered Area (AZGFD 2024; NatureServe and Heritage Network Partners 2021). There are no known bald eagle (*Haliaeetus leucocephalu*s) nests within the Covered Area (unpublished data, AZGFD 2022).

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in short-term, minor disturbances if migratory birds and eagles are present.

Fish Barrier Construction, Operation, and Maintenance. Resident and migratory birds, including but not limited to the species identified above, are present at the location of the proposed fish barrier. Eagles protected under the Bald and Golden Eagle Protection Act (BGEPA) were not identified in

the USFWS IPaC species list, and no known nesting locations occur within the project area (USFWS 2023).

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within the previously described communities. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.4.2 Environmental Consequences

3.4.4.2.1 No Action Alternative

Under the no action alternative, there would be no new effects to existing migratory birds or eagles, since denying approval of the CBA and issuance of the EOS permit would not change Freeport's current and future management operations, and no fish barrier would be constructed. Existing levels of human and natural disturbance to migratory birds or eagles would prevail.

3.4.4.2.2 Proposed Action

CBA and Issuance of EOS Permit. USFWS's proposed action would not result in new effects on migratory birds or golden eagles within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects in Eagle Creek would continue with short-term, and highly localized minor adverse effects to migratory birds and golden eagles from property management activities.

Fish Barrier Construction, Operation, and Maintenance. Potential effects to migratory birds or eagles from fish barrier construction, operation, and maintenance are anticipated to be consistent with those described under Section 3.4.2.2 Environmental Consequences. Fish barrier construction would take place between mid-October to mid-March when migratory birds are not breeding in the vicinity of the project area. Impacts to vegetation from construction activities could temporarily affect food and habitat resources; however, these effects would be localized to a small area and is expected to recover through natural regeneration prior to the spring arrival of migratory birds.

Although golden eagles could potentially use the project area for foraging and wintering, the proposed project would not result in take as defined by the BGEPA. Effects to golden eagles would be negligible and would not cause (1) injury to an eagle, (2) a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior.

Native Fish Repatriations and Fish Community Monitoring. Native fish repatriation and fish community monitoring requires a small number of personnel in the stream habitat for short durations of time, typically 1 week or less per year, and may occur during migratory bird and eagle breeding season. Impacts to migratory birds and eagles from these activities would be short-term, highly localized,

and minor disturbances resulting from an increase in personnel in the area during monitoring and stocking events.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to migratory birds or bald or golden eagles. Existing O&M activities would continue with minor short-term, and highly localized adverse effects to migratory birds and negligible effects to bald or golden eagles. Reclamation's proposed action would result in minor, localized short-term disturbance effects during and after construction. Long-term effects to migratory birds and eagles would be negligible.

3.4.5 Special Status Species - Threatened and Endangered Species

The effects of USFWS's and Reclamation's proposed actions are considered under this resource.

3.4.5.1 Affected Environment

The USFWS IPaC database (USFWS 2024) was queried to generate a list of federally threatened and endangered species with potential to occur in the project area. Table 5 lists the special status species that are reasonably expected to occur in the Covered Area for the EOS permit and the project area of the proposed fish barrier. According to the IPaC report, there is designated critical habitat for Gila chub in the project area (USFWS 2024); designated critical habitat for loach minnow, spikedace, narrow-headed gartersnake, yellow-billed cuckoo, and Mexican spotted owl is present along Eagle Creek, but falls outside of the Covered Area and fish barrier site.

The following listed species identified in IPaC or recognized to occur in Greenlee County were determined not to be affected by the proposed project as the project area lacked suitable habitat or the current range for the species is outside of the project area: Apache trout (*Oncorhynchus apache*), Gila trout (*Oncorhynchus gilae*), Gila topminnow, razorback sucker, lesser long-nosed bat (*Leptonycteris yerbabuena*), Mexican wolf (*Canis lupus baileyi*), Mexican spotted owl (*Strix occidentalis lucida*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), northern Mexican gartersnake (*Thamnophis eques megalops*), monarch butterfly (*Danaus plexippus*), or southwestern willow flycatcher (*Empidonax traillii extimus*).

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations. These activities result in short-term, minor disturbances if special status species are present.

Table 5. Federally Threatened and Endangered Species Reasonably Expected to Occur in the Action Area

Common Name Scientific Name	Listing Status	Status in EOS Permit Area	Status at Fish Barrier Site
Narrow-headed Gartersnake *Thamnophis rufipunctatus*	Threatened	Yes	Yes
	Designated Critical Habitat	No	No
Gila Chub *Gila intermedia*	Endangered	Yes	Yes
	Designated Critical Habitat	Yes	Yes
Loach Minnow *Tiaroga cobitis*	Endangered	Presumed presence; likely to be reintroduced	Presumed presence; likely to be reintroduced
	Designated Critical Habitat	No; area excluded from CH under Freeport Management	No; area excluded from CH under Freeport Management Plan
Spikedace *Meda fulgida*	Endangered	Presumed presence; likely to be reintroduced	Presumed presence; likely to be reintroduced
	Designated Critical Habitat	No; area excluded from CH under Freeport Management	No; area excluded from CH under Freeport Management Plan
Yellow-billed Cuckoo *Coccyzus americanus*	Threatened	Yes	Yes
	Designated Critical Habitat	No	No

3.4.5.1.1 Narrow-headed Gartersnake

CBA and Issuance of EOS Permit. The narrow-headed gartersnake (NHGS) was listed as threatened in 2014 (USFWS 2014) with final critical habitat designated in 2021 (USFWS 2021a). Within Eagle Creek, all designated critical habitat for NHGS occurs outside the action area approximately 8.81 miles downstream and encompasses 84 acres along a 2-mile reach. This portion of Eagle Creek was designated as it was considered occupied by the species at the time of listing and contains all five physical and biological features, although crayfish and nonnative, spiny-rayed fish are present within this reach (USFWS 2021a).

NHGS is historically documented throughout Eagle Creek with the earliest museum records dating back to 1934 near Clifton, AZ (CUMV 1778) and Eagle Creek School (UAZ 26456; approx.

3.7 miles south of proposed barrier site). In July 1987, Philip Rosen completed a comprehensive survey for NHGS along 21.1 miles of Eagle Creek (Rosen and Schwalbe 1988). A total of 29 NHGS (17 adults, 12 neonates) were detected within lower and middle Eagle Creek; however, no NHGS were observed in upper Eagle Creek. At this time, it was concluded that an 8-mile reach of Eagle Creek (P-Bar Ranch to lower Reservoir) supported a viable, high-density population of NHGS, whereas the species was considered rare or absent in the upper half of Eagle Creek (Rosen and Schwalbe 1988). In 2004 and 2005, no NHGS were detected during survey efforts throughout Eagle Creek and the Covered Area (Holycross 2006). In 2013, outside of the Covered Area one adult NHGS was incidentally documented in Eagle Creek at its confluence with Sheep Wash during annual fish surveys (ASUHEP000069; Ehlo et al. 2013). Since 2013, annual fish surveys in lower, middle, and upper Eagle Creek have failed to detect the species; however, there is a general lack of gartersnake-specific monitoring along Eagle Creek.

USFWS acknowledges that the NHGS population in Eagle Creek is likely not viable; however, given the lack of species-specific surveys in recent years, there is insufficient evidence at this time to support a determination of extirpation (USFWS 2014). As such, available habitat, in the form of NHGS home ranges, is being used as a surrogate to analyze potential environmental consequences from the proposed project. Under the CBA, USFWS defined NHGS home ranges as 5.5 acres (based on Nowak 2006 and Jennings and Christman 2012) and calculated the maximum number of NHGS home ranges within a 100-mile buffer (to incorporate streamside habitat) of an 8.4-mile reach of Eagle Creek. This equated to a baseline of 682 acres of riparian habitat, or a maximum of 124 NHGS home ranges, protected above the proposed fish barrier on both Freeport and non-Freeport lands. Below the fish barrier, this equated to 4,060 acres of riparian habitat, or 738 NHGS home ranges; however, only 1,894 of those acres, or 344 home ranges, fall within Freeport lands and the Covered Area.

Fish Barrier Construction, and Operation and Maintenance. As mentioned above, given the lack of species-specific surveys in recent years, there is insufficient evidence at this time to support a determination of extirpation within the project area. As such, NHGS are assumed present in the project area and available habitat, in the form of NHGS home ranges, is being used as a surrogate to analyze potential environmental consequences from the proposed project.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within areas potentially occupied by NHGS. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.5.1.2 Gila Chub

CBA and Issuance of EOS Permit. The Gila chub was listed as endangered with critical habitat in 2005 (USFWS 2005). Within the Eagle Creek drainage, critical habitat for Gila chub is designated along 24.4 miles of Eagle Creek, from its confluence with an unnamed tributary upstream to its confluence with East Eagle Creek, and within East Eagle Creek to its headwaters just south of Highway 191. Within the Covered Area, critical habitat is designated along 1.7 miles of Eagle Creek. Upper Eagle

Creek meets several primary constituent elements (PCE) and features permanent pools with interconnected riffle/run areas, sufficient vegetation cover, and low levels of detrimental nonnative species.

On April 7, 2017, USFWS published a notice in the FR (USFWS 2017) that recent genetic information indicated that Gila chub, the Lower Colorado Basin DPS of roundtail chub, and headwater chub (*Gila nigra*) were one species, rather than three. This species is now collectively called the roundtail chub. However, at this time, Gila chub remains a listed species and will be considered separately as such for purposes of this EA until its status changes.

Eagle Creek is considered historically occupied by Gila chub from the Willow Creek confluence upstream to the confluence of East Eagle Creek; however, collections of the species during annual fish surveys of this reach have varied across the years. In 1987, and then from 1989 through 1995, no Gila chub were collected in Eagle Creek. Beginning in 1996 and continuing through 2009, Gila chub were occasionally collected during survey efforts, with most of these collections occurring in the upper portion of the creek and its tributaries. After 2009, Gila chub were not captured during survey efforts in upper Eagle Creek until 2015 and 2016, when AZGFD and WestLand captured chub near the Honeymoon Campground, approximately 6 miles upstream of the proposed fish barrier site (Robinson and Crowder 2015; Robinson 2016; WestLand Resources 2016). No Gila chub were captured in 2017 and 2018, but in 2019 a single chub was captured approximately 0.5 miles below the proposed fish barrier site (Marshall 2020). In 2020, a single Gila chub was captured near Honeymoon Campground (Kesner et al. 2020); additional project-related surveys in November 2020 by AZGFD near Honeymoon Campground upstream to the confluence with East Eagle Creek captured 110 Gila chub (Hickerson et al. 2021). In 2022, annual fish surveys failed to detect Gila chub in Eagle Creek, although three roundtail chub were captured near Sheep Wash (Marshall and Marshall 2023).

At present, Gila chub would likely be found in the upper reach of Eagle Creek and its tributaries, such as East Eagle Creek (which has been designated critical habitat for the species), where there are few nonnative fish. From RM 49 downstream to the Willow Creek confluence, Gila chub could be present in the Covered Area, but in low numbers, likely due in part to the seasonally intermittent flows in this area. Due to the lack of recent detection and the predominance of nonnative species downstream of the proposed fish barrier site, under the CBA the baseline was analyzed using stream miles, with 15.75 stream miles of potential Gila chub habitat in upper Eagle Creek within the Covered Area.

Fish Barrier Construction, and Operation and Maintenance. As mentioned above, Gila chub are mostly likely to be present in the upper reach of Eagle Creek and its tributaries where there are few nonnative fish. From RM 49 downstream to the Willow Creek confluence, flows in Eagle Creek are seasonally intermittent and much of the area downstream of the proposed fish barrier site (RM 51.1) is predominantly comprised of nonnative species. Given these sub-optimal habitat conditions, combined with the lack of consistent detections of the species during annual surveys, Gila Chub are not considered to be present at and below the proposed fish barrier site. However, the proposed fish barrier site is located within designated critical habitat for this species.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within areas potentially occupied by Gila chub and within designated critical habitat. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.5.1.3 Loach Minnow

CBA and Issuance of EOS Permit. Loach minnow was originally listed as threatened in 1986 (USFWS 1986) but was uplisted as endangered with critical habitat in 2012 (USFWS 2012). Critical habitat was also initially designated for loach minnow in 1994, 2000, and 2007; however, these designations were set aside and remanded due to legal issues (USFWS 2007, USFWS 2012). Within the Eagle Creek drainage, critical habitat for loach minnow is designated along 16.5 miles of Eagle Creek, from its confluence with the Gila River to East Eagle Creek, and East Eagle Creek to its headwaters just south of Highway 191. These areas contain several PCEs and feature permanent pools with interconnected riffle/run areas and sufficient vegetation cover; although, low levels of nonnative species persist in these reaches as well. Additional suitable habitat for loach minnow exists in Eagle Creek; however, approximately 17.1 miles of Eagle Creek on the San Carlos Apache Reservation and 13.3 miles of Eagle Creek on Freeport-owned lands (i.e., Covered Area) were excluded from the final critical habitat designation for the species due to conservation management plans developed in lieu of the designation (USFWS 2012).

Within Eagle Creek, loach minnow detections have been variable and inconsistent across the years with populations seeming to vanish and reappear. Collections in Eagle Creek in 1950 captured loach minnow near Sheep Wash, but loach minnow were absent in surveys during the 1970s and 1980s (UMMZ 162744, Minckley and Clarkson 1979, Marsh et al. 1990). Beginning in 1990, annual fish surveys have been conducted on Eagle Creek by Freeport and other entities. Loach minnow were detected again in Eagle Creek in 1994, 44 years after their initial detection (Marsh et al. 1994). Loach minnow were again detected in 1995, 1996, and 1997 above the Willow Creek confluence at the first road crossing below Honeymoon Campground. Loach minnow have not been documented in Eagle Creek since 1997 (Marsh et al 2003; Hickerson et al. 2021) and eDNA samples collected within Eagle Creek and tributaries during 2019 and 2020 were negative for the species (USFWS unpublished data 2020; Young et al. 2018).

Given the loach minnow's unpredictable history in Eagle Creek, it is possible that the species may persist in extremely low numbers or in areas where access is limited by landownership. However, if present, loach minnow would most likely occur in the upper reach of Eagle Creek and its tributaries where there are few nonnative fish. From RM 49 downstream to the Willow Creek confluence, flows in Eagle Creek are seasonally intermittent and much of the area downstream of the proposed fish barrier site (RM 51.1) is predominantly comprised of nonnative species. Given these sub-optimal habitat conditions, combined with the lack of detections over the past 2 decades, it is highly unlikely that loach minnow would be present in the Covered Area. Within the CBA, the USFWS determined there are 11 stream miles of suitable loach minnow habitat in upper Eagle Creek. Additionally, it is anticipated that loach minnow would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population.

Fish Barrier Construction, and Operation and Maintenance. As mentioned above, it is highly unlikely that loach minnow would be present in the Covered Area, which includes the proposed fish barrier site. Given the sub-optimal habitat conditions from RM 49 downstream to the Willow Creek confluence, combined with the lack of consistent detections of the species during annual surveys, loach minnow are not considered to be present at and below the proposed fish barrier site. However, it is anticipated that loach minnow would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings, including loach minnow, would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur in locations presumed or historically occupied by loach minnow and/or within designated critical habitat. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.5.1.4 Spikedace

CBA and Issuance of EOS Permit. Spikedace was originally listed as threatened in 1986 (USFWS 1986) but was uplisted as endangered with critical habitat in 2012 (USFWS 2012). Critical habitat was also initially designated for spikedace in 1994, 2000, and 2007; however, these designations were set aside and remanded due to legal issues (USFWS 2007, USFWS 2012). Within the Eagle Creek drainage, critical habitat for spikedace is designated along 16.5 miles of Eagle Creek, from its confluence with the Gila River to East Eagle Creek, and East Eagle Creek to its headwaters just south of Highway 191. These areas contain several PCEs and feature permanent pools with interconnected riffle/run areas and sufficient vegetation cover; although, low levels of nonnative species persist in these reaches as well. Additional suitable habitat for spikedace exists in Eagle Creek; however, approximately 17.1 miles of Eagle Creek on the San Carlos Apache Reservation and 13.3 miles of Eagle Creek on Freeport-owned lands (i.e., Covered Area) were excluded from the final critical habitat designation for the species due to conservation management plans developed in lieu of the designation.

Within Eagle Creek, spikedace detections have been variable and inconsistent across the years with populations seemingly to vanish and reappear. Collections in the 1950s, 1970s, and early 1980s failed to document spikedace in Eagle Creek; however, for a brief period in the mid to late 1980s, spikedace were collected in Eagle Creek below the Willow Creek confluence (Marsh et al. 1991). Bestgen 1985 (as cited in Marsh et al. 1990) reported that 12 juvenile spikedace were caught in Eagle Creek in 1985. In 1987, 398 spikedace were caught from Sheep Wash downstream to Freeport's diversion dam, and one spikedace was caught below the diversion dam (Marsh et al. 1990). No spikedace were captured above Sheep Wash in 1987 (Papoulias et al. 1988). In 1989, two spikedace were caught in Eagle Creek. Since 1989, no spikedace have been captured in Eagle Creek during annual fish surveys conducted by Freeport and other entities. Additionally, environmental DNA (eDNA) samples collected within Eagle Creek and tributaries during 2019 and 2020 were negative for the species (USFWS unpublished data 2020; Young et al. 2018).

Given the spikedace's unpredictable history in Eagle Creek, it is possible that the species may persist in extremely low numbers or in areas where access is limited by landownership. If present, spikedace would most likely occur in the upper reach of Eagle Creek and its tributaries where there are few nonnative fish. From RM 49 downstream to the Willow Creek confluence, flows in Eagle Creek are seasonally intermittent and much of the area downstream of the proposed fish barrier site (RM 51.1) is predominantly comprised of nonnative species. Given these sub-optimal habitat conditions, combined with the lack of detections over the past 2 decades, it is highly unlikely that spikedace would be present in the area covered by the EOS permit. Within the CBA, the USFWS determined there are 11 stream miles of suitable spikedace habitat in upper Eagle Creek (USFWS 2024). Additionally, it is anticipated that spikedace would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population.

Fish Barrier Construction, and Operation and Maintenance. As mentioned above, it is highly unlikely that spikedace are present in the proposed barrier location. In addition, all known spikedace detections have been below the Willow Creek confluence (downstream of the proposed fish barrier site). Given the lack of consistent detections of the species during annual surveys, spikedace are not considered to be present at and below the proposed fish barrier site. However, it is anticipated that spikedace would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings, including spikedace, would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur in locations presumed or historically occupied by spikedace and/or within designated critical habitat. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.5.1.5 Yellow-billed Cuckoo

CBA and Issuance of EOS Permit. The yellow-billed cuckoo (YBCU) was listed as threatened in 2014 (USFWS 2014) with critical habitat designated in 2021 (USFWS 2021b). Within Unit 28 (AZ-26), critical habitat for YBCU encompasses 5,836 acres along the Gila River, Eagle Creek, and San Francisco River. This unit is part of the core area identified in the conservation strategy for designating critical habitat for the YBCU as it contains breeding habitat, an adequate prey base, and hydrologic processes that provide for maintaining and regenerating breeding habitat. In addition, the unit also functions as a movement corridor and migratory stop-over habitat for YBCU. Additional suitable habitat for YBCU exists in Unit 28; however, approximately 1,436 acres of Unit 28 on the San Carlos Apache Reservation and 1,257 acres of Eagle Creek on Freeport-owned lands (i.e., Covered Area) were excluded from the final critical habitat designation for the species.

Limited surveys for YBCU have been conducted in the Eagle Creek drainage; however, these surveys have resulted in positive detections of the species throughout the drainage, including with the Covered Area. Along lower Eagle Creek, YBCU were detected by BLM in 2018 (n=6) and Westland Resources in 2023 (n=2) downstream of RM 10 (BLM 2018; Westland Resources 2023c). YBCU have also been regularly documented along the Gila River near the confluence of Eagle

Creek (unpublished data, USFWS 2018b). Along upper Eagle Creek, YBCU were most recently detected in 2014 (n=1), 2015 (n=3), and 2016 (n=3) (Westland Resources 2014a; Westland Resources 2015b, Andresen 2016). The YBCUs documented in 2014 and 2015 were located at or near the proposed fish barrier site (RM 51.1); whereas the 2016 detections were near the confluence of Willow Creek (RM 44). Habitat varies across these survey locations, however it is primarily composed of native riparian and xeroriparian tree and shrub species.

Fish Barrier Construction, and Operation and Maintenance. As mentioned above, YBCU were detected at or in proximity to the proposed fish barrier site in 2014 and 2015. The 2014 detection was observed during a single survey with no evidence of breeding; estimated canopy cover and approximate canopy height was 25 to 50 percent and approximately 56 ft, respectively (Westland Resources 2014a). Riparian habitat within this reach is described in more detail in Section 3.4.1.1 Affected Environment.

Native Fish Repatriations and Fish Community Monitoring. Native fish stockings would occur upstream of the proposed fish barrier site under the purview of AZGFD and USFWS, in cooperation with Reclamation, USFS, and Freeport. Exact stocking locations have not yet been determined but would occur within areas potentially occupied by YBCU. Fish community monitoring would occur throughout the Eagle Creek watershed.

3.4.5.2 Environmental Consequences

3.4.5.2.1. No Action Alternative

Under the no action alternative, there would be no change to special status species or habitat as Freeport's current and future management operations would continue and no fish barrier would be constructed. However, the potential for invasion by nonnative fishes from lower into upper Eagle Creek would remain a threat to the persistence of listed aquatic and semi-aquatic species and their critical habitat.

3.4.5.2.2 Proposed Action

3.4.5.2.2.1 Narrow-headed Gartersnake

CBA and Issuance of EOS Permit. USFWS's proposed action would have no new effects on NHGS within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects to NHGS in Eagle Creek would continue with short-term, and highly localized minor adverse effects to NHGS from property management activities. The implementation of conservation actions described within Freeport's Management Plan and the CBA would provide a net conservation benefit to the Covered Species and the associated aquatic community within the Covered Area.

Fish Barrier Construction. Potential effects to NHGS aquatic, riparian, and adjacent habitat would be consistent with those described under Section 3.4.2.2 Environmental Consequences and Section 3.4.3.2 Environmental Consequences. Due to a lack of species-specific surveys in recent years, it is

unknown if NHGS is present in the analysis area; therefore, this analysis will primarily focus on changes to available habitat as a surrogate to analyze potential environmental consequences. Construction of the proposed fish barrier would also occur between mid-October to mid-March which falls within the NHGS brumation or dormant season (November to March; Nowak 2006), and, if present, NHGS movement would be minimal during the proposed project timeline. However, implementation of BMPs (see Table 2) would further reduce the magnitude of potential effects.

The concrete barrier would permanently impact approximately 0.10 acres (of the 0.31-acre construction footprint) and temporary impacts would be expected on approximately 2.09 acres, designated as contractor use areas for material storage and equipment staging. As mentioned above, USFWS defined a NHGS home range as 5.5 acres under the CBA. Given the size and locations of the project activities (see Figure 4), habitat within one estimated NHGS home range would be permanently affected (fish barrier footprint) and temporary adverse effects would occur within one to two home ranges located within the contractor use area. Since the area of effect is small, construction would be of short-term, and aquatic and riparian habitat would remain upstream and downstream of the proposed construction, operation, and maintenance area, effects to NHGS from habitat loss would be negligible. Conversely, the proposed action is anticipated to protect a maximum of 124 gartersnake home ranges above the proposed fish barrier on both Freeport and non-Freeport lands.

Effects from changes to the Eagle Creek flow regime as described in Section 3.4.3.2 Environmental Consequences are anticipated to be negligible for NHGS. The proposed action could result in temporary adverse effects to the prey base for NHGS when salvaging and translocating native fish above or below the fish barrier site during construction. However, fish would be moved short distances and for the short duration of the proposed project. Any effects to prey base for NHGS would be short-term and negligible.

Although the status of NHGS within the proposed fish barrier site is uncertain, it is anticipated that prey and habitat conditions for the species may improve at and immediately upstream of the fish barrier following its construction as the area will be protected from nonnative fish movement. This change could result in population of NHGS increasing within the analysis area. Overall, effects to NHGS from fish barrier O&M activities would be short-term and minor, similar to the effects described previously. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriation and Fish Community Monitoring. Native fish repatriation and fish community monitoring requires small numbers of personnel in the stream habitat for short durations of time, typically 1 week or less per year. Impacts to NHGS or habitat from these activities would be short-term, highly localized, and minor disturbances resulting from an increase in personnel and field gear in the area during monitoring and translocation events. In addition, repatriation of listed fishes may provide benefit to NHGS, if present, by increasing native prey availability upstream of the fish barrier.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to NHGS. Existing O&M activities would continue with minor short-term, and highly localized adverse effects to NHGS. Reclamation's proposed action would result in minor, localized short- and long-term adverse effects to NHGS during and after construction. Both proposed actions are expected to have minor to moderate long-term beneficial effects on NHGS by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper Eagle Creek, increasing potential prey base, and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.4.5.2.2.2 Gila Chub

Potential effects to Gila chub from USFWS and Reclamation's proposed actions are anticipated to be consistent with those described under Section 3.4.3.2 Environmental Consequences. Effects specific to Gila chub and its critical habitat are further described below.

CBA and Issuance of the EOS permit. USFWS's proposed action would have no new effects on Gila chub within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects to Gila chub in Eagle Creek would continue with short-term, and highly localized minor adverse effects to Gila chub from property management activities. The implementation of conservation actions described within Freeport's Management Plan and the CBA would provide a net conservation benefit to the Covered Species and the associated aquatic community within the Covered Area.

Fish Barrier Construction, Operation, and Maintenance. It is unlikely that Gila chub are present at or below the proposed fish barrier site. However, if Gila chub are present in upper Eagle Creek and individuals move into the fish barrier site during stream diversion activities, they would be forced to move upstream or downstream of the construction zone resulting in displacement or mortality. Following construction, the fish barrier would serve as a barrier to upstream fish passage, including Gila chub, and interrupt connectivity of designated critical habitat above and below the barrier. Indirect effects could include severing the existing Gila chub population and localized changes to habitat types (e.g., riffle to pool habitat) within proximity to the fish barrier from sedimentation, downcutting, and/or scour of the channel. Permanent effects to 0.10 acres of critical habitat would occur within the fish barrier footprint. Overall, minor to moderate long-term beneficial effects are expected as approximately 8.4 miles of Eagle Creek, as well as its tributaries Salt House Creek, Chitty Canyon, and East Eagle Creek, would be protected from invasion of nonnative fish. Within this reach, 18.6 miles of critical habitat for Gila chub within Eagle Creek and East Eagle Creek would be protected.

Although Gila chub are not considered likely present at or below the fish barrier site, it is anticipated that habitat conditions for the species may improve at and immediately upstream of the fish barrier following its construction as the area would be protected from nonnative fish movement. Adverse effects to Gila chub and its critical habitat from fish barrier O&M activities would be short-term, highly localized, and minor, similar to the effects described previously. If any substantial maintenance or repair activities are required, the action may require supplemental compliance

documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriation and Fish Community Monitoring. Impacts to Gila chub and its critical habitat from native fish repatriation and fish community monitoring would be short-term, highly localized, and minor disturbances resulting from a small increase in personnel and field gear in the area during monitoring and translocation events. Activities associated with monitoring (i.e., electrofishing or netting) may directly affect Gila chub (i.e., through stress and/or mortality); however, long-term effects of the overall project are expected to be solely beneficial for these species. No modification of critical habit would occur from these activities.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to Gila chub or it's critical habitat if present in the Covered Area. Freeport's existing O&M activities would continue with minor, short-term, and highly localized adverse effects. Reclamation's proposed action would result in minor localized short- and long-term adverse effects to Gila chub and its critical habitat during and after construction. Conversely, both proposed actions are expected to have minor to moderate long-term beneficial effects on Gila chub by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper Eagle Creek and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.4.5.2.2.3 Loach Minnow

Potential effects to loach minnow USFWS and Reclamation's proposed actions are anticipated to be consistent with those described under Section 3.4.3.2 Environmental Consequences. Impacts specific to loach minnow and its critical habitat are further described below.

CBA and Issuance of the EOS permit. USFWS's proposed action would have no new effects on loach minnow within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing effects to loach minnow in Eagle Creek would continue with short-term, and highly localized minor adverse effects to loach minnow from property management activities. The implementation of conservation actions described within Freeport's Management Plan and the CBA would provide a net conservation benefit to the Covered Species and the associated aquatic community within the Covered Area.

Fish Barrier Construction, Operation, and Maintenance. It is highly unlikely that loach minnow are present at or below the fish barrier site. However, if loach minnow are present in upper Eagle Creek and individuals move into the fish barrier site during stream diversion activities, they would be forced to move upstream or downstream of the construction zone resulting in displacement or possible mortality. No critical habitat for loach minnow is present within the fish barrier construction footprint; however, critical habitat is designated above and below the fish barrier site outside the Covered Area. As such, the fish barrier would interrupt connectivity of these sections of critical habitat. Overall, the proposed action would result in minor to moderate long-term beneficial effects for loach minnow as approximately 8.4 miles of Eagle Creek would be protected from invasion of

nonnative fish. Within this reach, approximately 7.3 miles of critical habitat for loach minnow within Eagle Creek would be protected.

Although loach minnow is not considered present at or below the fish barrier site, it is anticipated that loach minnow would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population. Following any translocation efforts, annual monitoring will be conducted and inform presence within Eagle Creek. As such, adverse effects to loach minnow from fish barrier O&M activities could occur, but would be short-term, minor and similar to the effects described previously. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriation and Fish Community Monitoring. Adverse effects to loach minnow and its critical habitat from native fish repatriation and fish community monitoring would be short-term, highly localized, and negligible resulting from a minor increase in personnel and field gear in the area during monitoring and translocation events. Activities associated with repatriation and monitoring of loach minnow may directly affect stocked individuals or their offspring (i.e., through stress and/or mortality); however, long-term effects are expected to be solely beneficial for loach minnow. Should translocation efforts be successful, there would be substantial beneficial effects to loach minnow by increasing and stabilizing populations within Eagle Creek. No effect to designated critical habitat would occur from these activities.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to loach minnow if present in the Covered Area. Existing O&M activities would continue with minor short-term, and highly localized adverse effects to loach minnow. Reclamation's proposed action would result in minor localized short- and long-term adverse effects to loach minnow during and after construction. Both proposed actions are expected to have long-term beneficial effects to loach minnow by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper Eagle Creek and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.4.5.2.2.4 Spikedace

Potential effects to spikedace from USFWS and Reclamation's proposed actions are anticipated to be consistent with those described under Section 3.4.3.2 Environmental Consequences and Section 3.4.5.2 Environmental Consequences.

Although spikedace is not considered present at or below the fish barrier site, it is anticipated that spikedace would be translocated into Eagle Creek upstream of the constructed fish barrier to restore the population. As such, impacts to spikedace from fish barrier O&M activities could occur, but would be minor and similar to the effects described previously. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Effects Summary. In summary, USFWS's proposed action would not cause new adverse effects to spikedace, if present in the Covered Area. Existing O&M activities would continue with minor short-term, and highly localized adverse effects to spikedace. Reclamation's proposed action would result in minor localized short- and long-term adverse effects to spikedace during and after construction. Both proposed actions are expected to have minor to moderate long-term beneficial effects on spikedace by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper Eagle Creek and through implementation of conservation actions described within Freeport's Management Plan and the CBA.

3.4.5.2.2.5 Yellow-billed Cuckoo

Potential effects to YBCU from USFWS and Reclamation's proposed actions are anticipated to be consistent with those described under Section 3.4.2.2 Environmental Consequences. Effects specific to YBCU and its critical habitat are further described below.

CBA and Issuance of EOS Permit. USFWS's proposed action would have no new effects on YBCU within the Eagle Creek watershed. Freeport's current and future management operations are expected to remain the same, and existing disturbances to YBCU in Eagle Creek would continue with minor short-term and highly localized adverse effects to YBCU from property management activities.

Fish Barrier Construction, Operation and Maintenance. Detections of cuckoos near the proposed fish barrier site have been documented within the last decade, and existing riparian vegetation likely provides suitable breeding habitat for the species. However, fish barrier construction would take place between mid-October to mid-March when YBCU is likely not present in Arizona and construction activities would avoid the nesting season (June 15 – September 15).

The concrete barrier would permanently impact approximately 0.10 acres (of the 0.31-acre construction footprint) and temporary adverse effects would be expected on approximately 2.09 acres, designated as contractor use areas for material storage and equipment staging. Implementation of BMPs would minimize effects to mature riparian trees and other vegetation within the project area if possible; however, it is anticipated that a maximum of 0.31 acres of riparian habitat within the fish barrier footprint would be adversely affected during construction activities. Following construction, habitat is expected to recover through natural regeneration. In addition, suitable YBCU habitat is available in adjacent areas upstream and downstream of the barrier site.

Effects to YBCU from fish barrier O&M activities would be minor and short-term, similar to the effects described above. If any substantial maintenance or repair activities are required, the action may require supplemental compliance documentation (e.g., NEPA; ESA - Section 7, etc.) by Reclamation, in coordination with Freeport and USFWS, prior to work.

Native Fish Repatriation and Fish Community Monitoring. Native fish repatriation and fish community monitoring requires a small number of personnel in the stream habitat for short durations of time, typically 1 week or less per year, and may occur during the YBCU breeding season. Impacts to

YBCU from these activities would be short-term, highly localized, and minor disturbances resulting from an increase in personnel in the area during monitoring and stocking events.

Effects Summary. In summary, USFWS's proposed action would have minor short-term effects on YBCU, primarily occurring when Freeport conducts existing O&M activities. Reclamation's proposed action would permanently affect YBCU habitat within the fish barrier footprint (approximately 0.10 acres), but natural revegetation of disturbed areas is expected to occur in the long-term. While construction of the fish barrier would disturb a small amount of potential foraging and breeding habitat for the species, mature riparian corridors are abundant in the surrounding region. Therefore, long-term effects from both proposed actions would be negligible.

3.5 Cultural Resources

The effects of Reclamation's proposed action is considered under this resource. USFWS's proposed action and native fish repatriations and fish community monitoring are not analyzed further as these actions have no potential to affect cultural resources.

3.5.1 Affected Environment

Fish Barrier Construction, Operation, and Maintenance. A Class I literature search and a Class III pedestrian survey were conducted by archaeologists following Arizona State Museum (ASM) and Arizona State Historic Preservation (SHPO) standards and guidelines. The literature search provided baseline information on cultural resources in the vicinity of the proposed action area and a surrounding one-mi buffer. This literature search included AZSITE records, historic maps, and General Land Office records. The history and previous research on cultural resources for this project area are available in Buckles and Hooper 2016.

The entire area of potential effect (APE), approximately 15 acres, has been adequately surveyed by qualified archaeologists via a Class III pedestrian survey using 20-meter interval transects (Buckles and Hooper 2016 and Van Gijlswijk 2023). This APE includes 1,000 feet upstream and downstream of the proposed barrier site, staging, and access. This survey resulted in the identification of seven (7) cultural resources in the APE: AZ W:11:34(ASM), AZ W:11:35(ASM), AZ W:11:36(ASM), AZ W:11:37(ASM), AZ W:11:38(ASM), AZ W:11:39(ASM), and Eagle Creek Road (see Table 6).

Details regarding the historic significance of cultural resources identified in the APE and avoidance measures developed in consultation with interested parties (e.g., SHPO and interested Native American Tribes) pursuant to the National Historic Preservation Act (NHPA), as amended (54 U.S.C. 306108) are provided in Table 6 below.

Reclamation has determined that AZ W:11:34(ASM), a prehistoric Mogollon masonry structure, is eligible for listing in the National Register of Historic Places (NRHP) under Significance Criterion D. AZ W:11:35(ASM), a prehistoric lithic scatter; AZ W:11:36(ASM), a mid-twentieth century waste pile; AZ W:11:37(ASM), a mid-twentieth century waste pile; AZ W:11:38(ASM) an early twentieth-century diversion dam; and AZ W:11:39(ASM), a historic road segment with an erosion-control

feature are not eligible for listing in the NRHP under any of the Significance Criteria (i.e., A-D, inclusive). Reclamation is leaving Eagle Creek Road unevaluated for listing in the NRHP and would treat this cultural resource as NRHP-eligible for the purpose of compliance with the NHPA. Additionally, Reclamation consulted with interested Native American Tribes. This consultation effort did not result in the identification of properties of religious and/or cultural significance or sacred sites that could be affected by this undertaking.

Within the Covered Area, Freeport conducts O&M activities of its existing water infrastructure and related facilities along Eagle Creek as part of their mining and municipal water operations.

Table 6. Cultural Resources within the Project Area

Site Number	Site Type	NRHP Eligibility	Avoidance Measure
AZ W:11:34(ASM)	Prehistoric Mogollon masonry structure, flaked stone, and pottery artifacts	Eligible (Criterion D)	Prior to any ground-disturbance, establish buffered avoidance area with orange construction fence.
AZ W:11:35(ASM)	Prehistoric lithic artifact scatter	Not Eligible	N/A
AZ W:11:36(ASM)	Mid-twentieth century waste pile	Not Eligible	N/A
AZ W:11:37(ASM)	Mid-twentieth century waste pile	Not Eligible	N/A
AZ W:11:38(ASM)	Early-twentieth century diversion dam	Not Eligible	N/A
AZ W:11:39(ASM)	Historic road segment with an erosion-control feature	Not Eligible	N/A

3.5.2 Environmental Consequences

3.5.2.1 No Action

Under the no action alternative, there would be no change to existing conditions for cultural resources. Environmental and human-caused factors, such as livestock and recreational trampling, road use, artifact collection, and streambed erosion would continue to affect any resources in the area. Current land use and management practices would continue as described in previous sections.

3.5.2.2 Proposed Action

Fish Barrier Construction, Operation, and Maintenance. The efforts to identify cultural resources for this project resulted in the determination that archaeological site AZ W:11:34(ASM) is eligible for listing in the NRHP, and Eagle Creek Road is left unevaluated and treated as eligible for listing in the NRHP. To minimize potential effects to cultural resources, implementation of BMPs (see Table 2) such as avoidance of archaeological site AZ W:11:34(ASM) via the creation of a buffered avoidance area around the site would occur. Additionally, prior to and during the construction of the fish barrier, AZ W:11:34(ASM) would be fenced with temporary, high-visibility construction fencing to ensure that it remains protected. No road improvements would occur to Eagle Creek Road as a result of this undertaking. Furthermore, all vehicles and equipment used on the road would be similar to the vehicles and agricultural equipment that typically use this road.

Effects Summary. In summary, Reclamation and USFWS made a finding, in consultation with interested parties, of No Adverse Effect to historic properties pursuant to NHPA. As such, the proposed actions would have no effects to cultural resources.

4.0 Cumulative Effects

A cumulative effect is defined under NEPA as:

> "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. § 1508.1(g)(3)).

Past, present, and reasonably foreseeable future actions that incrementally add to the potential cumulative impacts of the Proposed Action and No Action alternatives are considered in this EA. The intent of this analysis is to capture the total effects of several actions over time that would be missed by evaluating each action individually.

4.1 Past, Present, and Reasonably Foreseeable Future Actions

For each resource topic, the cumulative effects analysis area (CEAA) is the same as the analysis area for direct and indirect environmental effects of USFWS's and Reclamation's proposed action. The temporal scale for the cumulative effects analysis is through calendar year 2075, which is commensurate with the 50-year term of the CBA.

The cumulative effects of past actions contributed to and are accounted for in the baseline conditions of the affected environment for each resource in Section 3.0 Affected Environment and Environmental Consequences. For this analysis, "reasonably foreseeable" actions are considered where there is a proposed action or existing decision (e.g., draft NEPA document, record of decision, or issued permit), a commitment of resources or funding, or a formal proposal (e.g., a permit request). Actions that are highly probable based on known opportunities or trends (e.g., residential development in urban areas) are also considered. Speculative future developments (such as those that are not formally proposed or do not have sufficient project details to inform analysis) are not considered. Reclamation and USFWS conducted a desktop review of potential present and future actions in the vicinity of the proposed action(s). Resources examined include local news sources, USFS data available in the Schedule of Proposed Actions for the ASNFs (USFS 2024) and Graham and Greenlee County information (Graham County 2024, Greenlee County 2024).

The cumulative effects analysis includes actions that meet the following criteria:

- The action impacts a resource potentially affected by the proposed action(s).
- The action causes impacts within all or parts of the same geographic scope of the proposed action(s).
- The action causes impacts within all or part of the temporal scope for the potential impacts from the proposed action(s).

Reasonably foreseeable future projects and actions considered in the cumulative effects analysis are listed in Table 7.

Impacts to the resources analyzed in Section 3.0 Affected Environment and Environmental Consequences would mostly be localized to the analysis area for the proposed fish barrier, with most of the effects occurring during the construction period. Apart from utilizing the same access road (NFSR 217), the projects identified below do not directly overlap the project area, but they may contribute to indirect cumulative impacts that extend beyond the project area. The impacts of projects that comprise the cumulative scenario combined with the Proposed Action could contribute to cumulative effects on certain resources, as discussed below.

Table 7. Past, Present, and Reasonably Foreseeable Future Actions

Project Name	Description	Status/Schedule	Project Location
Freeport O&M Activities	Intermittent O&M conducted on private land for existing facilities: one residence, two water diversions, and one pump station.	Occurs intermittently, as needed.	Eagle Creek, Greenlee County.
Apache-Sitgreaves National Forests Public Motorized Travel Management Plan – EIS	A proposal to designate motorized travel routes in areas on federal lands within the Apache-Sitgreaves National Forests in order to comply with the Travel Management Rule (36 C.F.R. § 212).	In Progress. Estimated FEIS NOA in Federal Register August 2024. Implementation estimated for December 2024.	Apache, Greenlee, and Navajo Counties.
Apache-Sitgreaves National Forests Horton Fire Restoration	Restoration work is proposed in the moderate and high severity burned areas to include salvage logging and native species plantings.	Completed. Implementation estimated for August 2024.	Greenlee County. The affected area includes south of FS-26 road to the FS-576 road. Bounded by FS-24 road to the west and US Hwy 191 to the East.
Apache-Sitgreaves National Forests Eagle Creek Grazing Management – EA	Allotment analysis for development of Allotment Management Plans and term grazing permits.	In Progress. Decision estimated for 2025. Implementation estimated for February 2025.	Greenlee County. Allotments located within the Eagle Creek area. AD Bar/Hogtrail, Baseline/Horsesprings, Dark Canyon, Double Circle, East Eagle, Mesa, Mud Springs, Tule Allotments.
Apache-Sitgreaves National Forests Bee Canyon Cattle Exclusion Structures & Water Supply Improvements	Roughly 18,720-ft of fencing (11,250-ft new and 7,470-ft existing) and relocation of 3 cattleguards is proposed to create a barrier excluding cattle from riparian habitat within Bee Canyon. 1 new water tank/drinker and 5,137 ft pipeline also proposed.	In Progress. Scoping started February 2024. Implementation estimated for October 2024.	Bee Canyon in Greenlee County Near Eagle Creek Road.

4.1.1 Water Resources

The effects of the proposed actions, as described in Section 3.2.2 Environmental Consequences, in combination with the RFFAs, would contribute to short-term increases in sediment production, minor changes in fluvial geomorphology, and localized effects on water quality from natural and human-induced events. It is anticipated that natural slope erosion, channel scour, and sediment runoff would stabilize 1 to 2 years after barrier construction, and the incremental cumulative effects to water resources would be negligible.

4.1.2 Geology and Soils

The effects of the proposed actions, as described in Section 3.3.2 Environmental Consequences, in combination with the RFFAs, would contribute to short- and long-term increases in localized surface disturbance, loss of soil productivity, and increased erosion potential within the analysis area. Furthermore, the long-term permanent impact to fluvial geomorphology would be confined to the barrier's footprint, which amounts to 0.10 acres of the active stream channel. These effects would be minimized to the fullest extent practicable through implementation of erosion control measures and BMPs (see Table 2).

4.1.3 Biological Resources

4.1.3.1 Vegetation

The effects of the proposed actions, as described in Section 3.4.1.2 Environmental Consequences, in combination with the RFFAs, would involve construction activities, such as clearing and heavy equipment traffic, which could result in minor impacts to vegetation in the barrier footprint and temporary work areas. However, over the long term, cumulative effects to vegetation in the analysis area would be negligible because temporarily disturbed areas would be reseeded and stabilized after construction, as described in Section 2.1.4 Reclamation – Best Management Practices. In addition, natural regeneration of riparian vegetation would continue to occur, and disturbance effects would be negligible.

4.1.3.2 Terrestrial Wildlife

The effects of the proposed actions, as described in Section 3.4.2.2 Environmental Consequences, in combination with the RFFAs, could lead to increased disturbance and temporary displacement effects on terrestrial wildlife and habitat in the analysis area, primarily during the construction and O&M phases of these actions. However, over the long term, cumulative effects to terrestrial wildlife would be negligible as maintenance activities and RFFAs would be infrequent, highly localized, and short-term in nature. Any long-term effect to habitat, outside of the 0.10-acre permanent footprint of the fish barrier, would be negligible.

4.1.3.3 Fish and Aquatic Wildlife

The effects of the proposed actions, as described in Section 3.4.3.2 Environmental Consequences, in combination with the RFFAs, could lead to localized, short-term adverse effects on fish and aquatic wildlife through temporary disturbance and displacement and changes in water quality, primarily during the construction and O&M phases for these actions. However, similar to Section 4.1.3.2 Terrestrial Wildlife above, long-term adverse effects to fish and aquatic wildlife would be negligible as maintenance activities and RFFAs would be infrequent, highly localized, and short-term in nature. Overall, potential cumulative adverse effects on native aquatic species would be largely offset by the beneficial effects of protecting a portion of Eagle Creek from the upstream movement and invasion of nonnative aquatic species.

4.1.3.4 Migratory Birds and Bald and Golden Eagles

The effects of the proposed actions, as described in Section 3.4.4.2 Environmental Consequences, in combination with the RFFAs, could contribute to temporary disturbance and displacement effects on migratory birds and their associated habitat, primarily during the construction phases for these actions. However, over the long-term, cumulative adverse effects to migratory birds and their available habitat would be negligible as maintenance actions and RFFAs would be infrequent, highly localized, and short-term in nature. These effects would be minimized by planning construction activities outside of the migratory bird nesting season and implementing BMPs (see Table 2).

4.1.3.5 Special Status Species – Threatened and Endangered Species

Narrow-headed gartersnake

The effects of the proposed actions, as described in Section 3.4.5.2 Environmental Consequences, in combination with the RFFAs, could lead to adverse effects on NHGS and their habitat by disturbing, displacing, or crushing individuals, primarily during the construction phases of these actions. Over the long-term, cumulative adverse effects to NHGS would be negligible because maintenance activities and RFFAs would be infrequent, highly localized, and short-term in nature. The cumulative beneficial effects of protecting upper Eagle Creek from the movement and invasion of nonnative aquatic species would likely offset the adverse effects to NHGS.

Gila chub, loach minnow, and spikedace

The effects of the proposed actions, as described in Section 3.4.5.2 Environmental Consequences and similar for all federally-listed fish species, in combination with the RFFAs, could lead to adverse effects on Gila chub, loach minnow, and spikedace and their aquatic habitat. Short- and long-term adverse effects from increased sedimentation, disturbance, and displacement would be highly localized to construction activities and road use for these actions. Over the long-term, cumulative adverse effects to federally-listed fish species would be negligible because maintenance activities and RFFAs would be infrequent, highly localized, and short-term in nature, and the sedimentation effects on water quality would be expected to stabilize in 1 to 2 years. The proposed actions would

provide a substantial benefit towards the listed species' recovery, offsetting temporary, short-term adverse effects from barrier construction.

Yellow-billed cuckoo

The effects of the proposed actions, as described in Section 3.4.5.2 Environmental Consequences, in combination with the RFFAs, may result in the temporary displacement of migrating individuals during construction activities and habitat loss when removing riparian vegetation. Stress from noise and disturbance during construction actions could temporarily displace YBCU or affect nesting success. These adverse effects would be negligible through avoidance of construction during the nesting season (June 15 – September 15), natural regeneration of riparian vegetation after short-term disturbance, and implementation of BMPs (see Table 2).

4.1.4 Cultural Resources

The effects of the proposed actions, as described in Section 3.4.5.2 Environmental Consequences, in combination with the RFFAs, would have negligible short- and long-term cumulative effects. Cultural resources within the APE would continue to be affected by natural and human-caused disturbances such as flooding, wildfire, livestock grazing, road use, and outdoor recreation. Over time, disturbance events may conceal, expose, or remove undiscovered and previously documented artifacts and features such as those identified in Section 3.5.1 Affected Environment. This project would neither promote nor minimize these types of impacts to cultural resources. Long-term effects to cultural resources would be negligible.

5.0 Consultation and Coordination

5.1 List of Preparers

Members of the Reclamation and USFWS teams that contributed to the preparation of this EA are listed in Table 8.

Table 8. List of Preparers

Reclamation	
Name	**Position / Role**
Dominic Graziani	Supervisory Natural Resource Specialist
Kent Mosher	Fish Biologist
Elizabeth Grube	Fish Biologist
Jessica Axsom	Archaeologist
Jeremy Welch	Natural Resource Specialist
Timothy Miller	GIS Cartographer
Danny Falcon	Supervisory Civil Engineer
Jessica Herndon-Ladewig	Realty Specialist
USFWS	
Name	**Position / Role**
Mary Fugate	Assistant Field Supervisor
Ryan Gordon	Fish and Wildlife Biologist
Michelle Durflinger	Fish and Wildlife Biologist

5.2 Tribal Consultation and Agency Coordination

5.2.1 Tribal Consultation

On April 8, 2024, Reclamation sent scoping letters to nine tribes: Ak-Chin Indian Community, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, Tonto Apache Tribe, and the White Mountain Apache Tribe.

Pursuant to Section 106 of the NHPA (54 U.S.C. 306108), which requires federal agencies to consider the effects of their actions on historic properties, a cultural resources inventory was conducted for the proposed project, which constitutes a federal undertaking. In compliance with Section 106 of the NHPA, Reclamation will consult on NRHP eligibility and effects with the Arizona SHPO and interested Native American tribes.

Reclamation did not receive any responses to the scoping letter (see Section 1.6.1 Public Scoping and Tribal Consultation). On March 27, 2024, Reclamation initiated the Section 106 consultation process with each of the Tribes. The consultation initiation included a letter along with physical copies of the Cultural Resources Inventory Report for review. Three responses were received during the Section 106 consultation period.

The SHPO concurred with the finding of *no adverse effect* to historic properties on April 5, 2024; the White Mountain Apache Tribe, Salt River Pima-Maricopa Indian Community, and the Ak-Chin Indian Community also concurred with the finding of *no adverse effect* to historic properties.

5.2.2 List of Agencies and Interested Parties Contacted

The following entities were sent public scoping letters and a Notice of Availability of the Draft EA for public comment:

Local and County Agencies:

Graham County Board of Supervisors
Greenlee County Board of Supervisors
Gila County
Navajo County
Town of Clifton
City of Safford

State Agencies:

Arizona Department of Water Resources
Arizona State Historic Preservation Office
Arizona Game and Fish Department
Arizona State Lands Department

Federal Agencies:

U.S. Army Corps of Engineers (Arizona Branch Chief)
U.S. Bureau of Indian Affairs (Western Regional Office)
U.S. Bureau of Land Management (Safford Field Office)
USDA Forest Service (Tonto and Apache-Sitgreaves National Forests)
U.S. Fish and Wildlife Service (Arizona Ecological Services Field Office)

Conservation, Environmental, and Recreation Organizations:

Arizona Public Service
Arizona Riparian Council
Arizona Wildlife Federation
Center for Biological Diversity
Central Arizona Water Conservation District
Defenders of Wildlife

Gila Watershed Partnership of Arizona
Marsh and Associates, LLC
Salt River Project
Sierra Club - Grand Canyon Chapter
Sky Island Alliance
Sonoran Audubon Society
The Nature Conservancy
The Wilderness Society
Trout Unlimited
University of Arizona
Upper Eagle Creek Watershed Association
White Mountain Audubon Society

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