Import of Live Animals (ESA) Part E

1. Name and Address where permit is to be mailed:

Sylvan Heights Bird Park
PO Box 368
Scotland Neck, NC 27874
Attn: Dr. Dustin Foote

2. Point of contact for questions about application:

Dr. Dustin Foote
Director of Aviculture, Sylvan Heights Bird Park
Cell: 315.406.7070
Office: 252.826.3186
Email: dustin@shwpark.com

3. Have you or the business owners been assessed a penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the application is filed; been convicted, or entered a plea of guilty or nolo contendere, for a felony violation of the Lacey Act, the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act, forfeited collateral, or are currently under the charges for any violation of the laws mentioned above?

No

4. Type of Activity:

Import

5. Current Location of the animals:

The mergansers have been bred and are being held at Zoo Parque Itatiba, Brazil. See full address below.

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

6. Recipient/Sender physical address:

Paraíso das Aves
Av. ZooParque Itatiba

Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

7. a. Scientific Name:

Mergus octosetaceus

b. Common Name:

Brazilian Merganser

c. Approximate Hatch Dates:

Hatch days are below and are in DD/MM/YYYY format.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016 – 14/07/2022
Studbook #74 – ID: SP 11.0 AAA 002962 – 13/08/2022
Studbook #91 – ID: SP 11.0 AAA 002977 – 03/09/2023
Studbook #94 – ID: SP 11.0 AAA 002980 – 03/09/2023
Studbook #95 – ID: SP 11.0 AAA 002981 – 03/09/2023

Females:

Studbook #46 – ID: SP 11.0 AAA 001732 – 04/08/2020
Studbook #58 – ID: SP 11.0 AAA 002021 – 09/08/2021
Studbook #77 – ID: SP 11.0 AAA 002965 – 13/08/2022
Studbook #80 – ID: SP 11.0 AAA 002968 – 13/08/2022
Studbook #90 – ID: SP 11.0 AAA 002976 – 26/08/2023

d. Wild or Captive-born:

All 10 mergansers are captive-born birds produced from at-least F2 generation parents. Please see the attached studbook for lineage (Brazilian_Merganser_Studbook).

e. Quantity:

10 individuals

f. Sex:

5 pairs (5.5.0)

g. Permanent Markings and/or Identification (microchip, band, or studbook #):
Below is the international studbook number and closed band number ID for the 5 male and 5 female mergansers.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016
Studbook #74 – ID: SP 11.0 AAA 002962
Studbook #91 – ID: SP 11.0 AAA 002977
Studbook #94 – ID: SP 11.0 AAA 002980
Studbook #95 – ID: SP 11.0 AAA 002981

Females:

Studbook #46 – ID: SP 11.0 AAA 001732
Studbook #58 – ID: SP 11.0 AAA 002021
Studbook #77 – ID: SP 11.0 AAA 002965
Studbook #80 – ID: SP 11.0 AAA 002968
Studbook #90 – ID: SP 11.0 AAA 002976

8. a. Scientific Name:

Mergus octosetaceus

b. Common Name:

Brazilian Merganser

c. Name and Address of where animal was bred:

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

e. Hatch Dates
Hatch days are below and are in DD/MM/YYYY format.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016 – 14/07/2022
Studbook #74 – ID: SP 11.0 AAA 002962 – 13/08/2022
Studbook #91 – ID: SP 11.0 AAA 002977 – 03/09/2023
Studbook #94 – ID: SP 11.0 AAA 002980 – 03/09/2023

Studbook #95 – ID: SP 11.0 AAA 002981 – 03/09/2023

Females:

Studbook #46 – ID: SP 11.0 AAA 001732 – 04/08/2020
Studbook #58 – ID: SP 11.0 AAA 002021 – 09/08/2021
Studbook #77 – ID: SP 11.0 AAA 002965 – 13/08/2022
Studbook #80 – ID: SP 11.0 AAA 002968 – 13/08/2022
Studbook #90 – ID: SP 11.0 AAA 002976 – 26/08/2023

f. Name and Address of where parents are located:

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

g. Statement from the breeder that the animal was bred at the breeder's facility (including the facility name and address):

Attached document (Breeder_Statement) is from the Brazilian Merganser Project Manager, Robert Frank Kooij, who is the Director at Zooparque Itatiba.

Description and Justification for Requested Activity

The primary purpose of this requested activity is for the captive propagation for the conservation and survival of the species (part E section 13); however, we have also provided information for SHBPs approach to scientific research (part E section 11) and how education/display (part E section 12) could be considered a secondary purpose for the requested activity.

11. Scientific Research:

Parts a, b, c, d, e all considered N/A for this requested activity since there are no plans to engage in scientific research with this species. Sylvan Heights Bird Park (SHBP) will use every opportunity to contribute to the collective knowledge of Brazilian Merganser husbandry. While scientific research is not the purpose of the proposed activity, the following paragraph summarizes SHBP overall position in using its captive avian collection in scientific research.

As a part of SHBP general research policy (www.shwpark.com/conservation/research), SHBP does not engage in any invasive research, but may contribute to research projects that are non-invasive (i.e. genetic material collection during routine health assessments or behavioral observations). A primary example of this is SHBP's colony of Ruff Sandpipers (*Calidris pugnax*) that are part of a behavioral and genetic sequencing research project at East Carolina University. Due to this relationship, SHBP aviaries are inspected by the East Carolina University's Institutional Animal Care and Use Committee (IACUC) and the Association for the Assessment and Accreditation of Laboratory Animal Care, AAALAC International The attached inspection documents (AAALAC_SHBP_2020 and AAALAC_SHBP_2024) demonstrate SHBP's commitment to ethical research practices.

12. Conservation education and/or zoological display:

a. Objectives of the proposed activity in support of an education program:

The primary goal for SHBP in importing Brazilian Mergansers is the captive propagation for the conservation and survival of the species long term (question 13 of this application). However, SHBP also plans on eventually utilizing them for conservation education in a zoological display by incorporating a non-breeding pair of mergansers into a "water is life" themed exhibit that is opening in 2026. This pair of mergansers will be integral components of the importance and delicate nature of mountain river systems. As Brazilian Mergansers are selective in their habitat (needing fast moving, clear water with forested edges) they are very sensitive to deforestation, mining, pollution, and even ecotourism such as rafting (Brazilian_Merganser_Protocol).

The following three paragraphs are meant to provide background and justification for SHBP to use Brazilian Mergansers in a zoological display:

The Brazilian Merganser project began in 2006 on the initiative of Dr. Luís Fábio Silveira, who started negotiations with IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources). In 2011, ICMBio (Chico Mendes Institute for Biodiversity Conservation created the Brazilian Merganser National Action Plan (PAN), in partnership with the NGOs Terra Brasilis, Naturatins, and CerVivo, and the Museum of Zoology of the University of São Paulo. The main objective of the project is to permanently ensure the maintenance of *ex situ* Brazilian Merganser populations in the medium and long term, to stimulate population growth. SHBP have been an active partner and consultant since the initial 2006 negotiations. SHBP's Founder, Mike Lubbock, M.B.E attended both the 2006 and 2011 meetings, and SHBP has sent staff to Zooparque Itatiba in 2022 to learn about the captive husbandry requirements of Brazilian Mergansers. SHBP has also hosted Zooparque Itatiba staff, Terra Brasilis members, and ICMBio members in its Avian Husbandry and Management Program (www.shwpark.com/education/avian-husbandry-program or AHP_Information_Guide_SHBP).

The following paragraph is from page 5 of the attached Brazilian Merganser Protocol (Brazilian_Merganser_Protocol). *"As an ex-situ reproduction program is part of the Merganser PAN, all birds of this species must be housed in aviaries outside the public exhibition area. In accordance with the PAN, some individuals were authorized to be in exhibition at Zooparque Itatiba with the goal of working with the institution's environmental education department. However, it is only possible to work with the exposure of individuals that are not breeding pairs and are not part of the group capable of reproduction (according to the guidelines of the studbook). Therefore, to date, Zooparque Itatiba does not have any individuals on display. If a new institution starts working with the species, it must meet the same parameters as above, and it is not possible to have animals on display at the first moment."*

SHBP will only exhibit Brazilian Mergansers to the public when it receives permission from the Brazilian Merganser National Action Plan members. The only other facility selected to become partners of the Brazilian Merganser captive conservation program was the Prague Zoo in the Czech Republic who imported 5 pairs in 2024. Exhibiting birds was a secondary objective for Prague Zoo as well, and only after the Brazilian Mergansers were settled at Prague Zoo, did they received permission to display a non-breeding pair to the public.

b. Copies of educational materials incorporating the following information (Status in Wild, Current Threats, Conservation Efforts)

Since incorporating the Brazilian Mergansers into the 2026 "water is life" themed exhibit is not the primary objective of this importation, the educational materials have not been developed yet. However, included below are two examples of exhibit signage (Figure 1 and Figure 2) at SHBP about the endangered Whooping Crane (*Grus americana*) and the endangered White-winged Duck (*Asarcornis scutulata*). SHBP maintains both species on exhibit and they are a part of the educational messaging in the Park's programming. In addition, SHBP participates in the Association of Zoos and Aquariums (AZA) Species Sustainability Programs (SSP) for these species. Additionally, both Whooping Cranes and White-winged Ducks are a part of the daily "Keeper Talks" rotation where a keeper will engage with guests outside various exhibits. The Brazilian

Merganser signage would be like the examples below and include information about their status in the wild, current threats, and conservation efforts.

Figure 1: Whooping Crane Sign at SHBP, sign is approximately 36” wide by 24” tall.

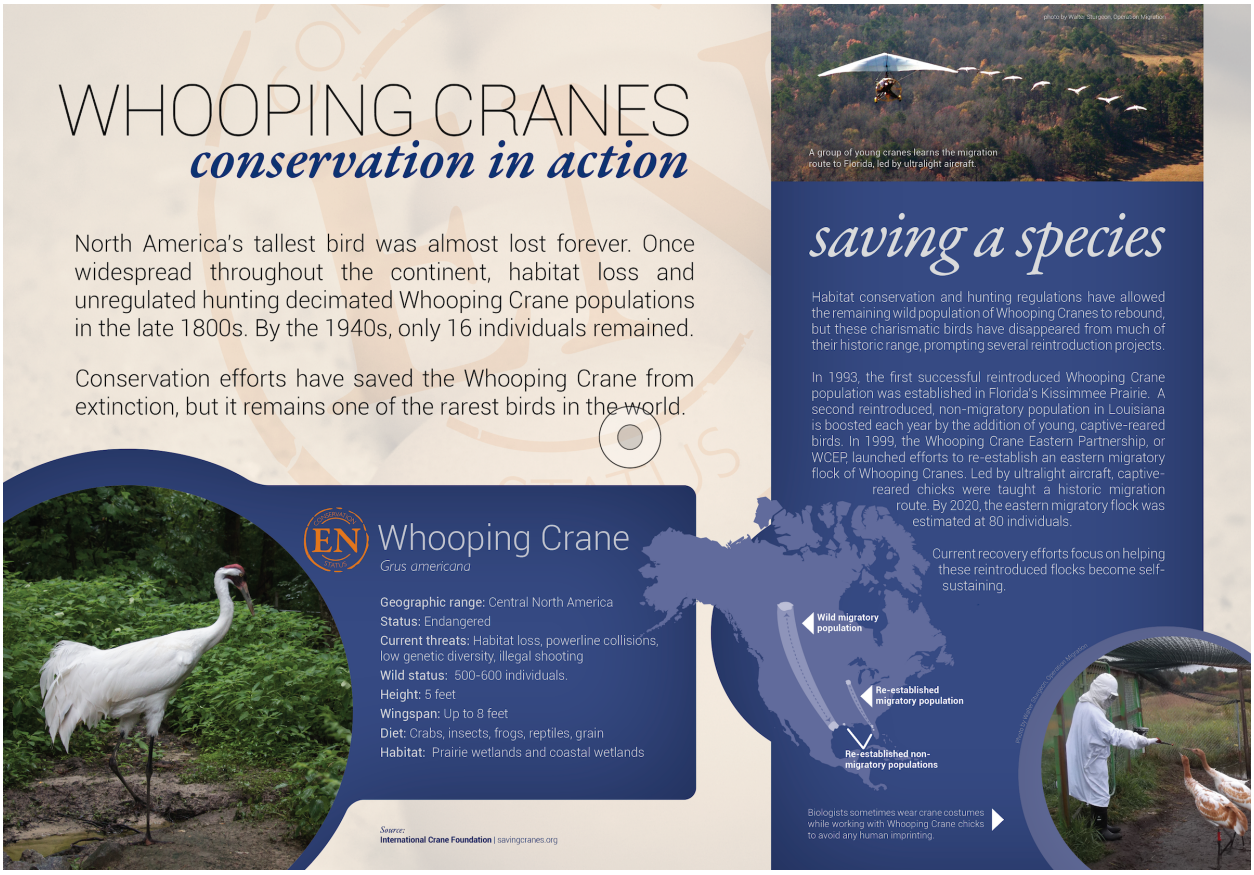


Figure 2: White-winged Wood Duck sign at SHBP, sign is approximately 36” wide by 24” tall.

13. Captive propagation for the conservation and survival of the species:

Captive propagation for the conservation and survival of the Brazilian Merganser is the primary objective of the proposed activity and will be accomplished by establishing a captive reserve population in North America. As outlined in the Brazilian Merganser National Action Plan, the *ex-situ* maintenance of the Brazilian Merganser is essential for the conservation of the species. Maintenance under human care allows the compilation of new data and information, enabling the creation of management models aimed at the *ex-situ* conservation of the species and helping in the recovery of its conservation status. The maintenance of *ex-situ* populations serves as genetic backup and these populations are of fundamental importance to work as re-stocking for future releases and reintroductions.

International partnerships are critical for the health and growth of captive breeding programs. Sharing expertise, diversifying stakeholders, and promoting awareness are all benefits from these partnerships. Prior to 2024, the entire captive Brazilian Merganser population was housed at one facility in Brazil, Zoo Parque Itatiba. SHBP and Prague Zoo were both selected by the Brazilian Merganser National Action Plan as international partners to ensure captive populations would exist outside of Brazil as contingency plans. The Brazilian Merganser National Action Plan is still working on identify stakeholders within Brazil. However, there are limited facilities within their native range that have the knowledge, financial ability, or stability to continue propagating or holding Brazilian Mergansers. To date, the Brazilian Merganser National Action Plan has approached multiple facilities within Brazil and have not found suitable placements for the birds being propagated at Zooparque Itatiba. This is another reason why SHBP was approached to participate in the breeding program.

SHBP has over 50 years of being recognized as an authority on breeding waterfowl and is one of the only facilities in the world that has the leadership and experience to maintain and propagate this unique species of merganser. In 2009, SHBP received the first captive breeding award in North America for the endangered Chinese Merganser (*Mergus squamatus*), the only other threatened species in the Mergus genus. In 2011, SHBP also received the first captive breeding for the Goosander (*M.m.merganser*) in North America, another large member of the Mergus genus.

The staff at ZooParque Itatiba are the only individuals that currently have captive experience breeding the Brazilian Merganser. However, SHBP staff have visited ZooParque Itatiba to learn about their captive husbandry. Furthermore, Zooparque Itatiba staff have visited SHBP and participated in Sylvan Heights Avian Husbandry Program to enhance their knowledge on waterfowl propagation. For more information about the program please see the attached guide (AHP_Information_Guide). While visiting SHBP, Zooparque Itatiba staff gave presentations on the care of Brazilian Mergansers.

The 10 mergansers we are requesting to import are being selected to provide a genetically diverse founding population in North America. This North American population will be a part of the international studbook that is managed for maintaining genetic viability. As the captive component of the Brazilian Merganser National Action Plan, the captive birds are meant to

provide a reservoir for releasing captive bred offspring. When suitable areas are identified by the Brazilian Merganser National Action Plan, captive mergansers that are selected for release would be raised appropriately and conditioned to survive in the wild. The 10 birds we are requesting to import would be the founders for a contingency population for the captive Brazilian Merganser population. Since a goal of the world captive Brazilian Merganser population is to be able to release birds into suitable habitats, the North American captive population is a safeguard for the future of the wild Brazilian Merganser Populations. The National Action plan has already determined that without reintroduction efforts, the species will not survive in the wild. As such, the plan has determined that international partners should be identified as a safeguard in the event the captive population in Brazil declines.

SHBP is committed to its agreement between Zooparque Itatiba, the Chico Mendes Institute for Biodiversity Conservation, and the Brazilian Merganser National Action Plan. If the partnership required Brazilian Mergansers back from SHBP, for either the Zooparque Itatiba's captive program or for wild reintroductions by the Brazilian Merganser National Action Plan, SHBP would go through the necessary steps to export birds back to Brazil. There are several realistic scenarios where the future North American captive population or the 10 birds we are requesting to import would be relied on to provide birds back into the captive Brazilian population as breeders who would then produce offspring for release. Scenario 1: large loss of birds in Brazilian captive population due to disease. Scenario 2: large loss of birds in Brazilian captive population due to chaotic event i.e. natural disaster, weather, theft, etc. Scenario 3: specific loss of birds in Brazilian captive population with genetic representatives in North America. In these scenarios, the 10 birds we are requesting to import and/or their future progeny would be available to the Brazilian Merganser National Action Plan.

There are fewer realistic scenarios where birds bred in North America would be released directly into their native range. Birds raised in their native habitat would be better suited for surviving in the wild. However, if this was an objective that the Brazilian Merganser National Action Plan ever proposed, SHBP would participate. It should be noted that the 10 birds we are requesting to import are all at least 2nd generation captive bred birds that were not raised to be released, but to be a part of the captive breeding program. As such, these birds would ultimately be ill suited for release due to their familiarity with people. Birds that are to be released will be raised in isolation, so they are unfamiliar with people.

In conclusion, the 10 birds we are requesting to import are to provide a safeguard for the captive population in Brazil, a captive population which was initiated for the purpose of reintroducing Brazilian Mergansers into the wild, while maintaining this species in captivity in the event of extinction. These 10 birds are the founders of a contingency plan for the prevention of the extinction of the Brazilian Merganser in their native range.

a. A description of how the species will be propagated (breeding pairs).

The maintenance of the Brazilian Merganser in captivity began in 2011 with the first collection of eggs in the Serra da Canastra National Park, in the State of Minas Gerais. The eggs were hatched

at the Scientific and Cultural Breeding Center of Poços de Caldas-MG. Under the egg collection protocol developed by Brazilian Merganser National Action Plan, additional wild egg collections have been carried out to establish a genetically diverse captive population. The eggs from these collections were sent to Zooparque Itatiba. In 2016, the Zooparque Itatiba became the headquarters of the *ex-situ* program. The *ex-situ* Brazilian Merganser captive conservation program is extremely important for maintaining a population that will serve as genetic backup and re-stocking for future releases and reintroductions. The Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol) serves as a standard for all institutions that participate in the project and includes relevant propagation information.

The Brazilian Merganser is monogamous and will be kept in solitary breeding pairs. A breeding pair will not accept any other Brazilian Mergansers or other species of waterfowl in the same aviary. Because of this type of territorial behavior, SHBP will only keep one pair of mergansers in each breeding aviary. Pairs will be determined by average kinship in the international studbook.

The five breeding aviaries at SHBP are 20' wide by 36' long by 9' tall. There is a complete visual barrier between the aviaries so pairs cannot interact. Like Zooparque Itatiba, SHBP is using a thick shade cloth as a screen between enclosures. Most *in situ* nests are in tree trunks and high riverbanks. Two wooden nests are used in each enclosure, one lower and the other higher of the ground, however both close to the water. The nests are standardized and SHBP have followed the model used by Zooparque Itatiba and the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol). Like other large mergansers, woodchips as a substrate will be used in the nest.

b. Documentation showing your participation in an established breeding program (example: current breeding plan outline your role in the program and letter from the breeding coordinator confirming your participation in this breeding program.)

The following paragraph is from page 11 of the December 2023 Brazilian Merganser Update produced by Zooparque Itatiba (Update_Brazilian_Merganser_December_2023) "*Considering the importance of expanding the ex-situ population, it is crucial that new institutions can integrate in the program and keep the captive mergansers under human care. Therefore, two international institutions have become members of the Brazilian Merganser Conservation Program and studbook: Prague Zoo and Sylvan Heights Bird Park. These institutions are partners of Zooparque Itatiba and have been supporting the program and sponsoring the ex-situ activities since the beginning. Both signed the agreements necessary and committed with it, and with that, they agreed that the birds belong to the project.*"

SHBP participates in over 20 Association of Zoos and Aquariums (AZA) Species Sustainability Programs (SSP). Please see the attached letter (SHBP_Sustainability_Letter_2024) from the Saddle-billed Stork Program Coordinator, Marcie Herry, to the AZA Animal Population Management Committee, that outlines our role and participation in this breeding program.

c. How your breeding stock is managed to maintain genetic vitality including avoidance breeding, considerations of average kinship, differences in paternal and material average blood relationships, carrying capacity of your facility, disposition of progeny).

SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship. SHBP has a target adult population of 20 mergansers, which includes 5 breeding pairs and 5 reserve pairs. In addition, SHBP can hold 20 adolescent mergansers in four groups for a total carrying capacity of 40 individuals. Once SHBP successfully breeds Brazilian Mergansers and with the guidance of the Brazilian Merganser Conservation Program and Studbook, SHBP plans to send out birds to other suitable facilities such as the Fort Worth Zoo, Pinola Conservancy, and Dry Creek Waterfowl. SHBP will only send out mergansers to facilities that have been approved by the international studbook and follow the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol).

d. Plans and agreements for future reintroduction if applicable.

In 2023, 2 wild male Brazilian Mergansers were captured by the Brazilian Merganser National Action Plan members and equipped with transmitters to understand where young birds are dispersing (Brazilian_Merganser_Update_Dec2024) in Serra da Canastra, Brazil. One male was believed to be predated in 2023 and the transmitter of the adult male stopped sending signals in 2024. He was confirmed alive but missing the transmitter. Even though two transmitters were lost, the first test using a satellite transmitter was deemed successful. It was important to test the accuracy of the location points provided by Argos and see whether it would meet the needs it had, so it can be used as tool for the reintroduction program. In addition, new materials have been tested on captive birds to avoid any future losses of a transmitter falling off. In December 2024, three wild males (including two juveniles) were fitted with transmitters. Over the next few months these birds will be monitored to gain more knowledge about the species and about what is happening to them once they leave their family in search of new territories.

In the attached (Brazilian_Merganser_Update_Dec2024), the Brazilian Merganser National Action Plan will continue tracking the wild mergansers and redouble efforts in breeding the captive population. “This is a very important step for us, because next year our goal is to continue to elaborate a pilot project for the reintroduction of the Brazilian Merganser in the wild alongside with ICMBio and the researchers of National Action Plan (PAN).” Part of the redoubling of effort into the captive breeding program is establishing contingency populations of captive birds at SHBP and Prague Zoo, so that Zooparque can feel safer focusing their efforts on producing mergansers suitable for release.

14. Please provide how proposed activity will enhance or benefit the wild population within its native range (direct or indirect conservation efforts, provide documentation, signed MOU demonstrating your commitment to supporting the program and how the program contributes directly to the species).

The attached MOU from January 7th, 2023, between the Chico Mendes Institute for Biodiversity Conservation and SHBP demonstrates our commitment to working with Brazilian Mergansers, both in captivity and in the wild (SHBP_Letter_of_Commitment). The captive populations are necessary, as sources for reintroductions, as opportunities to understand more about this species, and as symbols to engage with the public on this species' precarious status. Also attached is a letter (Luis_Sao_Paulo_Letter_2024) from the Museum of Zoology at the university of Sao Paulo Vice-director Dr. Luis Fabio Silveira on SHBP's involvement with the Brazilian Merganser National Action Plan.

15. Resumes outlining the technical experience of each caretaker working with, maintain, and/or propagating species, as it relates to the proposed activities, including experience with similar species:

SHBP employs fourteen husbandry staff which includes the Director of Aviculture, the Breeding Center General Curator, the Curator of Grounds, 4 Lead Aviculturists, 3 Aviculturists, and 5 Bird Keepers. All staff are trained and supervised by the Director of Aviculture and the Attending Veterinarian, with support from the Breeding Center General Curator. SHBP has bred Common Mergansers (*Mergus merganser*), Chinese Merganser (*Mergus squamatus*), Hooded Merganser (*Lophodytes cucullatus*), Smew (*Mergus albellus*), and Red-breasted Mergansers (*Mergus serator*). Sylvan is a part of the AZA SSP for *M. squamatus*. All staff are familiar and experienced with the care of waterfowl and in particular mergansers. The 10 mergansers we are requesting to import will be cared for by the Director of Aviculture, the Breeding Center General Curator, the Attending Veterinarian, and the primary Lead Aviculturist. Their four resumes are attached along with brief overviews of their experience with species of merganser.

Dr. Dustin Foote, SHBP Director of Aviculture (Resume_Director_of_Aviculture_Dustin_Foote)

Dr. Foote spent time training at Zoo Parque Itatiba in 2022 and learning about the husbandry requirements of the Brazilian Merganser (*M.octosetaceus*) by the zoo staff who are in charge of the merganser breeding program. Based on this, along with his experience with breeding Chinese Mergansers (*M.squamatus*), Dr. Foote designed the merganser breeding aviaries at SHBP that were constructed in 2024. He has extensive experience with husbandry requirements of the Common Mergansers (*M.merganser*), Chinese Merganser (*M.squamatus*), Hooded Merganser (*L.cucullatus*), Smew (*M. albellus*), and Red-breasted Mergansers (*M.serator*), all gained during his time at SHBP from 2012-2024. He is a board member of the International Wild Waterfowl Association and serves as the Conservation and Grants chair. As the Director of Aviculture at SHBP, Dr. Foote oversees the daily care of the living collection, which includes husbandry, medical care, nutrition, and propagation.

Nick R. Hill, SHBP Breeding Center General Curator (Resume_Curator_Nick_Hill)

Mr. Hill has over 45 years of experience breeding rare and difficult species of waterfowl which includes all other members of the Mergus genus; Chinese Merganser (*M.squamatus*), Goosander (*M.m.merganser*), Common Merganser (*M.m.americanus*),

Red-breasted Merganser (*M.serator*), and Smew (*M.albellus*). He and SHBP founder, Mike R. Lubbock, M.B.E, were directly responsible for SHBP receiving the North American first breeding of the endangered Chinese Merganser (*M.squamatus*) and the Goosander (*M.m.merganser*). Mr. Hill oversees the daily care of 150 species of waterfowl at one of the largest waterfowl breeding centers in the world.

Tammy Stanton, SHBP Lead Aviculturist (Resume_Lead_Aviculturist_Tammy_Stanton)

Mrs. Stanton has experience with large merganser species that originated during her internship at Sylvan Heights Waterfowl Breeding Center in 2007. She has worked with Chinese Mergansers (*M.squamatus*) and Common Mergansers (*M.merganser*), and her experience includes aviary design, nutritional needs, daily husbandry, behavior, breeding, and nesting. While at Palm Beach Zoo from 2004-2008, she gained experience with Red Breasted Mergansers (*M.serator*) and continued to work with Common Mergansers (*M.merganser*), Hooded Mergansers (*L.cucullatus*), and Smew (*M.albellus*). During her time there, Palm Beach had the second largest collection of waterfowl in North America. During her time at Palm Beach Zoo and Busch Gardens Tampa Bay (2004-2024), she worked with the AZA Anseriformes Taxon Advisory Group and stayed up to date on conservation programs and captive population statuses in North America which included the Chinese Merganser (*M.squamatus*). While working at Busch Gardens Tampa, she worked in the wildlife rehabilitation program and would assist with the care of Red Breasted Merganser (*M.serator*) that would need temporary housing and medical treatment before being released. This required knowledge about nutritional needs, husbandry, and safe handling of the birds daily

Dr. Dorcas O'Rourke, SHBP Veterinarian (Resume_Attending_Vet_Dorcas_ORourke)

Dr. O'Rourke has worked as a consultant for SHBP since 2014 and has served as the park's Attending Veterinarian since 2019. She is responsible for the medical care of all birds at SHBP, which includes Chinese Merganser (*M.squamatus*), Common Merganser (*M.merganser*), Red-breasted Merganser (*M.serator*), Smew (*M.albellus*), and Hooded Merganser (*L.cucullatus*). Dr. O'Rourke is onsite regularly once a week and as needed for emergency care, and is available by phone, text, and email at other times. Dr. O'Rourke and Dr. Foote compiled SHBP's Program of Veterinary Care which outlines standard medical procedures and emergency procedures (Program_of_Vet_Care).

As a facility, SHBP has over 50 years of experience breeding waterfowl and has worked with and bred over 75% of the world's waterfowl (135 of the 178 species). Most of the waterfowl species that SHBP has not worked with are either polar species like scoters (*Melanitta*) or endemic species outside aviculture such as the Blue Duck (*Biziura lobata*). Since there is only one facility in the world that currently has experience breeding Brazilian Mergansers, we highlighted two examples that we believe relate in taxonomy and avicultural requirements to the Brazilian Merganser and that SHBP has extensive experience with.

Taxonomic example: SHBP has regular success breeding and rearing Hooded Mergansers (*Lophodytes cucullatus*) for more than 30 years, a species that is closely related to the Brazilian

Merganser. We spend roughly 2-3 months rearing them before they are moved to a less hands-on aviary. This year, we raised 53 out of 56 hatched. They are fed a higher protein diet than our other waterfowl for rearing, and based on experience over the years, they are put on wet brooders (temperature-controlled space with a constantly flowing water pool) younger than many other species to allow them to practice diving behavior as early as is safe. This helps to prevent development issues with natural behaviors as well as uropygial glands. The 3 mortalities were due to yolk sack absorption issues among one clutch of birds, potentially due to unfavorable nesting conditions (wet nesting area due to heavy rainfall).

Avicultural Example: SHBP has regular success breeding and rearing Harlequin Ducks (*Histrionicus histrionicus*) for over a decade, a species that has similar avicultural requirements to the Brazilian Merganser. We spend roughly 4-6 months rearing them in our duckeries before they are moved to an outdoor aviary. This year we raised 6 with no mortality. They are fed a higher protein diet than our other waterfowl for rearing, and based on experience through the years, they are put on wet brooders (temperature- controlled space with a constantly flowing water pool) younger than many other species to allow them to practice diving behavior as early as is safe, to prevent development issues with natural behaviors as well as uropygial glands. Through years of different configurations, we have found that their breeding behavior is heavily encouraged due to moving water in their aviaries, and we have water features in all the aviaries where we have breeding adults set up.

16. Current inventory of the species at importer facility

SHBP does not currently maintain any Brazilian Mergansers onsite and there are no locations outside Brazil and Prague Zoo in the Czech Republic that do. For a complete inventory of all species held at SHBP, please see the attached USDA inspection report #INS-0001051151 from June 20th, 2024, (USDA_2024_Inspection_Inventory).

17. Number of years the species has been maintained at the facility.

N/A

18. Number of hatches at the facility.

N/A

19. Number of mortalities at the facility.

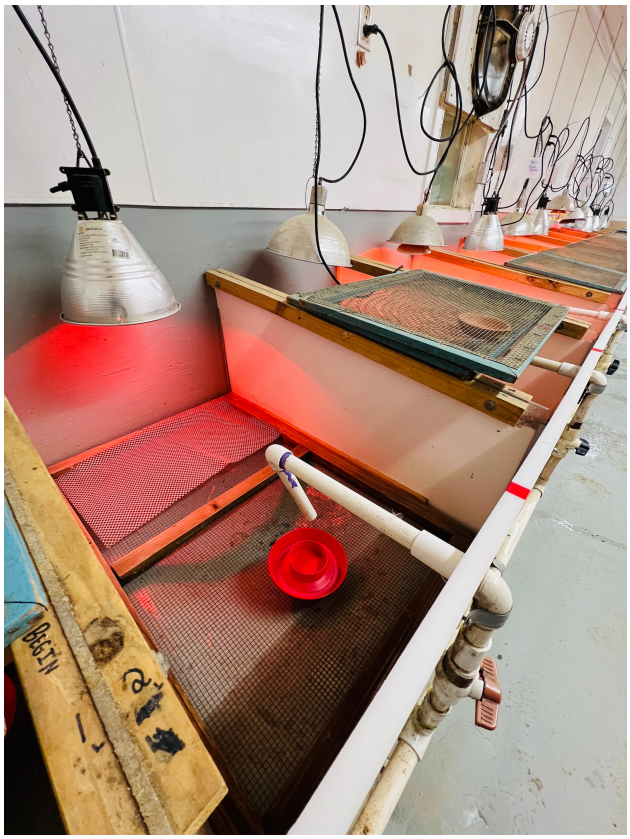
N/A

20. A detailed description, diagrams/photos the clearly depict existing facilities where the wildlife will be maintained. Dimensions, construction materials, protection from elements.

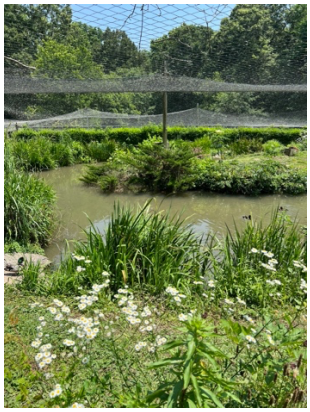
The five breeding aviaries at SHBP are 20’ wide by 36’ long by 9’ tall. There is a complete visual barrier between the aviaries so pairs cannot interact. SHBP uses well water that is on a continual flow through system and stays at 50 degrees Fahrenheit in both winter and summer. The aviaries are made from chain-link with a heavy nylon netted top. Small gauge wire is placed in a L shape along the bottom to prevent anything from digging into the aviary. Electric wire is also used to prevent predators.

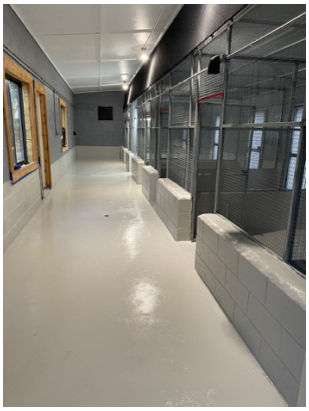
Picture 1: Breeding Aviaries with ponds.

Pictures 2 & 3: Rearing facilities for waterfowl at SHBP.



Picture 4: Waterfowl aviaries and indoor holding at SHBP.





21. Approximate carrying capacity of species at facility.

SHBP has a target adult population of 20 mergansers, which includes 5 breeding pairs and 5 reserve pairs. In addition, SHBP can hold 20 adolescent mergansers in four groups for a total carrying capacity of 40 individuals. Once SHBP successfully breeds Brazilian Mergansers and with the guidance of the Brazilian Merganser National Action Plan and international studbook, SHBP plans to send out birds to other suitable facilities such as the Fort Worth Zoo, Pinola Conservancy, and Dry Creek Waterfowl. SHBP will only send out mergansers to facilities that have been approved by the international studbook.

22. Transport conditions comply with IATA, provide type, size, and construction of shipping container, arrangements for watering/carrying for wildlife during transport.

SHBP will use the same IATA approved shipping containers outlined on page 13 of the Brazilian Merganser Protocol (Brazilian_Merganser_Protocol) and that were also used in the successful export of Brazilian Mergansers from Brazil to the Czech Republic in 2024. SHBP is contracting Mersant International, LTD to oversee the transport of the Brazilian Mergansers we are requesting permission to import. Mersant International is a reputable broker in the zoo community, and they will be responsible for receiving the birds from Sao Paulo at JFK, transporting the birds to the USDA/APHIS veterinary inspection, and then transporting the birds to the USDA quarantine Center in Newburgh, New York. Once released from quarantine, the birds will be picked up by SHBP staff and transported by vehicle directly back to North Carolina.

Attachments:

1. Brazilian_Merganser_Studbook (page 2)
2. Breeder_Statement (page 4)
3. AAALAC_SHBP_2020 (page 5)
4. AAALAC_SHBP_2024 (page 5)
5. Brazilian_Merganser_Protocol (pages 5, 6, 12, 13, 20)
6. AHP_Information_Guide_SHBP (page 6)
7. Update_Brazilian_Merganser_December_2023 (page 12)
8. SHBP_Sustainability_Letter_2024 (page 12)
9. Brazilian_Merganser_Update_Dec2024 (page 13)
10. SHBP_Letter_of_Commitment (page 14)
11. Luis_Sao_Paulo_Letter_2024 (page 14)
12. Resume_Director_of_Aviculture_Dustin_Foote (page 14)
13. Resume_Curator_Nick_Hill (page 14)
14. Resume_Lead_Aviculturist_Tammy_Stanton (page 15)
15. Resume_Attending_Vet_Dorcas_ORourke (page 15)
16. Program_of_Vet_Care (page 15)
17. USDA_2024_Inspection_Inventory_SHBP (page 16)

Program of Veterinary Care
For
Sylvan Heights Bird Park

1st edition prepared by:

Director of Aviculture: Dustin Foote, PhD
Attending Veterinarian: Dorcas O'Rourke, DVM

October 20th, 2023

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IV. SUMMARY

I. INTRODUCTION

Sylvan Heights Bird Park (SHBP) has the humane and legal obligations to provide proper husbandry, veterinary medical treatment, and preventive medical and nutritional programs for its birds. Zoos and aquariums in the United States are required to have an attending veterinarian who will provide adequate veterinary care for the bird collection and to assure that certain minimal standards of veterinary care are in place according to the Animal Welfare Act of 1966 and the subsequent amendments that are enforced by the United States Department of Agriculture (USDA). Maintaining standards of veterinary care requires professional supervision of veterinary medical programs by a licensed veterinarian who has special training and experience in non-domestic animal medicine. Avian health is ensured by those who provide husbandry, prepare diets, monitor behavior, and maintain environmental quality.

In the United States, the Animal Welfare Act states that "Each zoo and aquarium shall assure that the attending veterinarian has appropriate authority to ensure the provision of adequate veterinary care and to oversee the adequacy of other aspects of animal care and use". As such, the attending veterinarian, with consultation of the other animal management staff, is responsible for the design, implementation, and surveillance of the veterinary care program at SHBP.

SHBP works closely with the Department of Comparative Medicine in the Brody School of Medicine at East Carolina University. A formalized memorandum of understanding outlines the agreement to develop, promote, and implement mutually beneficial projects and activities that allow both organizations to achieve their respective missions. Due to this, some of SHBP's collection birds are used for non-invasive research that has led to a close relationship between SHBP and ECU staff members.

II. VETERINARY CARE

SHBP's veterinary medical program emphasizes disease prevention and avian wellbeing to include nutritional, behavioral, and reproductive health. All birds in the collection are observed daily either by the person in charge of avian management, or by someone working under the direct supervision of this person. All staff are trained to recognize abnormal behavior and clinical signs of illness and are knowledgeable concerning the diets, husbandry, and restraint procedures for the birds under their care. Diseased, injured, or stressed birds are reported promptly so that they can be assessed for their need for veterinary medical care.

A. Staff/Personnel

i. Veterinary Coverage: <u>Dorcas O'Rourke, DVM</u>

The attending veterinarian is responsible for the medical and surgical care of the birds and is fully acquainted with the entire bird collection, care staff, and avian facilities. The veterinarian will arrange for the availability of other suitably experienced veterinarians to be on call when they themselves are unavailable. The veterinarian makes regularly scheduled visits once a month to SHBP in addition to any visits required to perform medical care.

ii. Veterinary Program Coordinator: <u>Dustin Foote, PhD</u>

The SHBP staff person serves as the veterinary program coordinator and supervises the veterinary care program under the direction of the veterinarian. The veterinary program coordinator makes note of which birds require examination by the veterinarian and accompanies the veterinarian during rounds and treatments. The program coordinator is also responsible for overseeing prescribed treatments, maintenance of medical equipment, and supervising drug inventories. The veterinary program coordinator is trained to deal with emergencies until the veterinarian arrives, able to direct the restraint of the birds, is responsible for administration of post-surgical care, and is skilled in maintaining appropriate medical records. The veterinary program coordinator communicates frequently and directly with the veterinarian to ensure that there is a timely transfer of accurate information about medical issues.

iii. Support Personnel

1. Husbandry

Director of Aviculture: Dustin Foote, PhD
Responsible for the direction and care of the living collection. Coordinates with curator and lead aviculturists to ensure birds, exhibits, and grounds are properly cared for.

Curator of Grounds/Aviaries: Nick Nees
In close coordination with the director, responsible for the design, construction, and maintenance of exhibits as well as the supervision of avicultural team during the director's absence.

Lead Aviculturists: Morgan Early, Zeek Craven
Work with the director on changes/concerns within their areas of responsibility and to communicate with all staff members on changes in feeds, bird movements, breeding, or medical concerns. Lead aviculturists are responsible for communicating exhibit concerns to senior staff.

Aviculturists: Up to six full time staff members
Maintain and care for birds within the park and to perform a variety of activities relative to the assigned area of responsibility. Works with lead aviculturists to implement husbandry, breeding, and maintenance objectives.

Bird Keepers: Up to six full time staff members
To maintain and care for birds within the park and to perform a variety of activities relative to the assigned area of responsibility.

2. Clerical

Registrar: Taylor Silcox

To maintain records using the program Species360. Registrar works closely with husbandry staff to incorporate daily records that include husbandry, breeding, maintenance, medical, etc.

B. Infection Control and Personnel Safety

All staff must take precautions to prevent cross-contamination between bird areas as they move about SHBP. Personnel safety standards conform to all local, state, and federal regulations concerning occupational health and safety in the workplace. Staff are aware of the potential hazards associated with handling birds (bites, kicks, scratches, etc.). In addition, they are familiar with the chemicals (anesthetic agents, medications, disinfectants, etc.), microbiological (including allergens) and physical hazards (radiation, etc.) found in the workplace. Safety and personal protective equipment are properly maintained. Safety Data Sheets (SDS) are available for staff use on-site for all drugs and chemicals used in the facility.

C. Veterinary Program

i. General Considerations

Veterinary medical and surgical care is provided for all birds at SHBP. This care meets contemporary practice standards of zoo and aquarium veterinary care. Medical procedures, including those conducted without the use of anesthetics, analgesics, or tranquilizers, are supervised by a person qualified to assess the risks involved, and are done only in consultation with the veterinarian, and in accordance with local, state, and federal laws.

Medications are used in accordance with local, state, regional, provincial, and federal regulations and are administered in accordance with the relevant veterinary practice act. Procedures for the use of drugs should include at minimum the following: those persons authorized to administer animal drugs, situations in which they are to be utilized, location of animal drugs and those persons with access to them, and emergency procedures in the event of accidental human exposure. All controlled substances are stored in a securely locked container of substantial construction appropriate for the types of drugs in the inventory. Outdated drugs will be marked as such and stored separately from all other drugs.

ii. Anesthesia

Physical restraint without sedation is limited to short, nonpainful procedures or longer procedures in species/individuals that are exceptionally tolerant to manual restraint.

iii. Surgery

SHBP has an on-site area available for minor surgical procedures located in the Green Barn. Separate surgical facilities are available at ECU, Creekside Animal Hospital, and NC State Veterinary School.

Surgery can only be performed by a veterinarian. In an emergency, staff appropriately trained by the veterinarian can perform surgical first aid.

iv. Clinical Pathology

SHBP uses two diagnostic laboratory services, the department of Comparative Medicine at East Carolina University and the North Carolina Veterinary Diagnostic Laboratory System (NCVDLS). Diagnostic capabilities include access to cytology, microbiology, parasitology, hematology, blood chemistry, urinalysis, serology, and other appropriate laboratory procedures.

SHBP has a microscope available in-house to perform fecal examinations and diagnostic cytology of blood, tissue, and body fluids when immediate examination is necessary. Equipment is properly maintained and calibrated by the veterinary program coordinator.

v. Necropsy

Not all deceased specimens will be sent for clinical necropsy, only individuals that have been deemed necessary by the attending veterinarian and veterinary program coordinator where the cause of death is in question. In-house necropsies can be performed by the attending veterinarian and/or veterinary program coordinator as necessary.

SHBP has a refrigerator for holding dead birds that is physically separate from live bird holding and food supply storage. The carcass will be transported to ECU Department of Comparative Medicine or NCVDLS for a postmortem examination as soon as possible and no longer than 24 hours after death.

A reasonable effort is made to distribute postmortem specimens to institutions for further research, museum collections, universities, or SHBPs education collection. Disposition of dead birds and their parts will meet all legal restrictions. It is the responsibility of the veterinary program coordinator to oversee the distribution of postmortem specimens to prevent the distribution of infectious materials. Dead specimens not used will be incinerated or disposed of as deemed suitable by the veterinarian in accordance with local, state, and federal regulations.

vi. Medical Records

Complete medical records will be maintained on all birds in SHBP's collection that have received veterinary attention. The records indicate all treatments (types of medication, dosage, duration), surgical procedures, anesthetic procedures (type of agent, dosage, effect), results of all laboratory tests (parasitological, hematologic, bacteriologic, etc.), and immunization records with all relevant dates. The same information, when appropriate, should be recorded for groups of birds that are not individually accessioned and are subjected to group treatments or diagnostic evaluations. Copies of these medical records will accompany birds when they are transferred to another institution or be sent in advance of shipment.

Medical records will be maintained under the direction of the veterinary program coordinator. The medical records will be computerized for easy retrieval and review by the veterinarian. Morbidity and mortality trends will be monitored to evaluate avian health and to develop or modify preventive health or husbandry procedures.

All birds will have some form of permanent identification if practical. Methods of identification can include transponders, wing tags, toe clipping, leg bands, and photography.

vii. Preventive Medicine

Preventive medicine is important because it is often difficult to recognize and treat illness in birds. These programs include quarantine as required, risk-based health assessments, parasite surveillance procedures and control, immunization, infectious diseases screening, and periodic reviews of diets, husbandry techniques, and vermin control.

During routine bird movements, staff will provide quick assessments for birds already in the hand and report any abnormal findings to the attending veterinarian and the veterinary program coordinator. These "fast checks" will include examination for ectoparasites around the vent, wings, and other relative areas. The nares, ears, mouth, eyes, abdomen, and feet will all be examined. A keel score will be noted and scores outside norm that are not species or individual appropriate will be reported. (Influencing factors can include species, sex, age, pinioning, amputation, and hydration.) When possible, weights will also be taken however these fast checks should not overly delay routine bird movements.

Keel score system:

1 Emaciated, keeling severely and sharply.
2 Keeling, only small amount of muscled dipped to either side of keel.
3 Keel is palpable but muscled firm to either side.
4 Muscled appears straight across over keel, keel is palpable between muscle.
5 Cleavage, keel not palpable, muscle mounded to either side of keel.

viii. Parasite Control

Fecal examinations are conducted annually on groups of birds to detect and direct treatment of parasite infections before clinical signs appear. Bi-annual fecals are done for any birds being used by ECU researchers by their department of comparative medicine technicians. The veterinarian will request additional fecal exams based on facilities and birds' history and/or susceptibilities. More frequent exams may be required on those groups recognized to be infected with parasites or considered to be more susceptible to parasite associated disease (i.e. gamebirds). Fecal examination will be repeated as necessary following treatment to evaluate efficacy. Care will be taken in the movement of birds or perching from one exhibit to another to prevent exposure or spread of parasites.

ix. Immunization

The attending veterinarian will determine what vaccinations are appropriate for each species in the collection. Vaccinations administered will be based on the disease status of domestic and wild animals in the area surrounding the facility. The type, serial and/or lot number, and source of product should be recorded in the individual medical records.

x. Disease Surveillance

Specific screening protocols for diseases will depend on the nature and prevalence of disease either in the vicinity of the facility and government regulations. SHBP's Avian Influenza Response Guidelines are included at the end of this document.

xi. Risk Analysis

Disease risk analysis is applied to the transfer of birds between institutions consists of several individual steps. These include pathogen hazard identification, risk assessment and risk management along with risk communication which occurs throughout the process.

Pathogen hazard identification is performed by SHBP for diseases that they wish to keep out of their collection. If no pathogen hazards are identified, then no risk assessment or risk management is needed, and animal transfers can occur without the need for further risk mitigation.

If pathogen hazards are identified, then each hazard undergoes risk assessment to determine the consequences of introducing it into the receiving collection.

Following pathogen hazard identification and risk assessment, risk management using risk mitigation is performed to lower the risk of pathogen introduction SHBP's collection. Risk mitigation can involve preshipment procedures and diagnostics, preshipment isolation, post-arrival isolation (quarantine), and post-arrival procedures and diagnostics (e.g. quarantine exam and testing). Risk mitigation will focus on the preshipment part of the animal transfer.

Where hazard identification, risk assessment, and sufficient risk mitigation is performed prior to transfer, the animal can be transferred directly into SHBP's collection without the need for quarantine isolation and further testing. This can improve animal welfare during the transfer process. Where risk mitigation cannot be performed prior to transfer, traditional quarantine practices will be used.

xii. Quarantine

Upon arrival all birds are inspected for injuries or disease. During quarantine the following procedures will be performed by qualified staff: examination, necessary clinical and laboratory tests, treatment for external and internal parasites as needed, evaluation of psychological well-being, and verification of permanent identification. The duration of quarantine will be agreed upon by the attending veterinarian and the veterinary program coordinator.

Any bird that dies during quarantine will receive a complete postmortem examination including histopathology unless the cause of death is known.

xiii. Special considerations for birds that cannot be isolated.

Because some birds have unique care and environmental requirements, it may not be feasible to duplicate the appropriate enclosures in a separate location for quarantine. These birds must have a health history and status thoroughly characterized at the sending institution for disease transmission risk assessment since they may have to be kept near

SHBP's collection animals. Efforts will be made to prevent direct physical contact, contact by aerosolization or drainage, or potential fomite transmission. Staff working in that area will tend to the quarantined bird last when no further contact with collection birds is necessary. A set of cleaning and feeding utensils will be dedicated to the quarantined bird and not used on other collection birds.

xiv. Methods to prevent disease transfer during quarantine.
If a risk analysis indicates the need for isolation of the incoming bird(s), the length of that isolation and any disease testing to be done should be based on the specific diseases of concern. The degree of separation should be such that potential communicable disease agents may not be transmitted to other susceptible animals. In most cases this requires facilities remote from the main exhibit areas. Access should be restricted to prevent transport of infectious agents by zoo or aquarium personnel. All personnel working in quarantine facilities must observe established protocols such as personal hygiene and disinfection of footwear, clothing, and equipment. A bactericidal/virucidal footbath should be placed near the entrance to the quarantine area to prevent spread of potential pathogens by footwear. This footbath must be changed regularly as many products are inactivated by organic debris. Alternatively, disinfectant sprays or footwear dedicated to use only in quarantine may be utilized. Animal care in the quarantine facility is to be performed by personnel assigned exclusively to that area, rather than one who will be working in other areas as well. Feeding utensils and containers, cleaning utensils, and any cage furnishings are to remain in the quarantine facility (not used elsewhere). Boots, gloves, masks, personal protective equipment

(PPE) or other protective clothing used while working with the quarantined bird will be dedicated to the area and not used elsewhere. Waste removed from this bird area will be disposed of in such a way as to prevent exposure to other areas of SHBP.

Any bird that is severely stressed by quarantine procedures (e.g. social isolation, confinement etc. may require a risk assessed, harm/benefit analysis for earlier release or modification of the facilities, if approved by the veterinarian in consultation with veterinary program coordinator and staff. Local, state, or federal regulations may also dictate quarantine length and procedures.

xv. Zoonosis
If a zoonotic disease is diagnosed within the facility the veterinarian, in consultation with the veterinary program coordinator will inform and educate personnel about disease transmission and prevention. In the case of a reportable disease, the veterinarian will inform all appropriate governmental health authorities.

The veterinarian will consult with pertinent staff in all areas where the public is allowed physical contact with collection animals to assess and minimize the risk for the transfer of zoonotic diseases and plan preventive measures. For further information, see MMWR, Compendium of Measures to Prevent Disease Associated with Animals in Public Settings.

1. **Landing Zone**

D. Management Issues

SHBP management decisions including but not limited to bird shipments, nutrition, husbandry, pest control and euthanasia will involve the attending veterinarian, who will work closely with the veterinary program coordinator.

i. Emergency Care

ii. Holidays

SHBP is staffed 365 days of the year with a minimum of 4 full time husbandry staff.

iii. Weather Events

iv. Capture

The capture of birds will be under the supervision of the veterinary program coordinator or by a trained staff member that minimizes the stress and threat to an individual and/or group.

v. Animal Shipments

The attending veterinarian is responsible for preparing and signing the Certificate of Veterinary Inspection (Health Certificate). Pre-shipment visual and/or physical examination is performed by the signing veterinarian to ensure that birds may be safely transported and are free of clinical symptoms of infectious diseases. Any tests required by regulations of the receiving state or country will be performed. The consignor and consignee share the responsibility for health care prior to, during, and after shipment of animals. Complete medical records will be made available to the receiving institution prior to shipment.

vi. Nutrition

When possible, the use of species specific, commercially prepared animal diets will be utilized as the basis for SHBP nutrition program. To ensure nutritional efficacy, review of dietary husbandry practices will be conducted by qualified individuals in consultation with a veterinarian and veterinary program coordinator. Changes will be recorded and maintained for future evaluation as part of the preventative animal health care.

Diets for individual animals will be modified to match physiological status e.g., hatchling vs. adult vs. breeding vs. growing and when feasible, will be based upon data obtained from peer reviewed publication or dietary guidelines established in Animal Care Manuals. Dietary considerations will also account for consumption. Current and historic diets on all animals will be recorded and maintained.

Commercial Diets: Waterfowl feed is stored in two locations at SHBPs and is milled by Carolina Classics Catfish (CCC) in Winterville, NC. SHBP contracts CCC to produce its waterfowl pellet every 8-12 weeks and then transport the bulk

diet to two commercial feed storage units. Mazuri feed is ordered monthly and current diets include Ratite Diet, Large Bird Diet, Small Bird Diet, Small Bird Breeder, Softbill Diet, Crane Diet, Diving Duck Diet, Seaduck, Gamebird Maintenance, and Flamingo Breeder. These commercial diets are kept in appropriate storage areas and kept on average 4-6 weeks. Diets past their use by dates are discarded.

Seed: White proso millet, black sunflower, and assorted nuts are all sourced from food or animal grade vendors and kept in appropriate storage areas for up to 4-6 weeks.

Produce: The local Food Lion provides SHBP with all expired produce daily. Produce is examined by staff prior to use. Fruit and vegetables that are high in nutrition and low in sugar are used (i.e. Blue Berries, Apples, Papaya, Mango). Produce is typically kept less than 3 days. Frozen or fresh fruit is purchased as needed.

Insects: Insects are purchased bi-monthly from Rainbow Mealworms and kept on a nutritious gut-loading diet prior to being fed out. Insect colonies are examined daily for pests and kept in a temperature-controlled room.

Rodents: Mice and rats are purchased monthly from RodentPro and kept frozen for up to 2-3 months. Rodents are thawed 24hrs prior to being feed.

Fish: Capelin, menhaden, trout, bluegill, bass, are purchased through food grade vendors such as SamRust or Nixon Fishery every 4-6 weeks. Frozen fish are kept up to 2-3 months and are thawed 12 hours prior to use. Local fish is sourced from fisherman and fed un-frozen when possible.

Other Protein: Quail and day-old-chicks are also purchased through RodentPro and kept up to 2-3 months. They are thawed 24hrs prior to being fed.

Supplements: Fish and rodents are all dusted with a multivitamin to replaced nutrients lost during frozen storage.

vii. Sanitation and Disinfection

Sanitation and disinfection protocols have been developed in consultation with the veterinarian. Sanitation includes removal of soiled materials (bedding, feed, enrichment items, and waste material) followed by thorough cleaning to remove excessive dirt and debris. Once the organic material is removed, the area is then disinfected to reduce or eliminate microbes. Disinfectants are chosen based on target organisms and safety of use in the animal or food area being disinfected. The frequency and amount of cleaning and disinfection will vary depending upon the animal's needs and physiological condition. Cleaning utensils are assigned to specific areas and not transferred between areas. All feed and water containers are routinely cleaned and disinfected.

viii. Pest Control

SHBP has a formal integrated pest management program, that is approved by the attending veterinarian. Pest control is implemented in all areas of the SHBP. This program aims to prevent, control, or eliminate pests. Pesticides are used in accordance with government regulations and whenever possible, less toxic, or non-toxic agents will be given preference. SHBP contracts Peoples Termites and Pest Control, Inc. (Peoples) to supplement the pest control actions taken by staff. Peoples contract and SDS sheets located at the end of this document.

ix. Euthanasia

SHBP ensures that all birds are euthanized in accordance with the most current guidelines. See: AAZV Guidelines for Euthanasia of Non-domestic Animals and American Veterinary Medical Association (AVMA) Panel on Euthanasia.

Euthanasia is performed by personnel who are knowledgeable and skilled in performing the procedure. Euthanasia techniques will not interfere with postmortem examinations, when possible. The decision to euthanize a bird must be mutually agreed to by the attending veterinarian and veterinary program coordinator.

Euthanasia may be necessary or appropriate where:

a. The bird poses a serious and unavoidable threat to human safety.
b. In the opinion of the staff responsible for an individual bird's health and welfare, the bird is suffering from a disease, age-related ailments, detrimental psychological state, or severe pain and/or stress which cannot be adequality alleviated.
c. It enables containment of a disease spread to birds or humans.
d. Current housing of a bird presents ongoing welfare concerns, and the only alternative is permanent transfer to accommodation which cannot assure an acceptable level of welfare for the bird, and which cannot be improved within a short or mutually agreed interval.

III. Veterinary Facilities

A. On-Site

SHBP has a primary treatment room located in its Green Barn that allows for isolation of birds receiving medical care and facilitates observation and treatment of sick and injured birds. Traffic within this area is kept to a minimum.

B. Off-Site

IV. SUMMARY

aaalac INTERNATIONAL

5205 Chairman's Court, Suite 300
Frederick, MD USA 21703

November 18, 2020

Dorcas P. O'Rourke, D.V.M., M.S.
Professor and Chair
and Attending Veterinarian
Department of Comparative Medicine
The Brody School of Medicine
East Carolina University
212 Ed Warren Life Sciences Building
Greenville, NC 27834

Dear Dr. O'Rourke:

The AAALAC International Council on Accreditation has reviewed the report of the recent site visit to East Carolina University, Greenville, North Carolina. The Council commends you and the staff for providing and maintaining an exemplary program of laboratory animal care and use. Especially noteworthy were the strong administrative engagement by senior administration to ensure an excellent animal care and use program, evidenced in part by the Brody School of Medicine's strategic provision of space for vivarium expansion and Institutional Animal Care and Use Committee (IACUC) support, funding for individually ventilated caging, biosafety cabinets and renovations to the Life Sciences Building biocontainment suites; the exceptional IACUC, including the nonaffiliated members and administrative staff, under the outstanding leadership of the Chair and Vice Chair; the knowledgeable and dedicated veterinarians and veterinary technicians, evidenced in part by the high quality and prompt veterinary medical care; the knowledgeable and collegial manner of the animal care staff; the superb working relationship among the Department of Comparative Medicine (DCM) staff and individuals in safety and facilities services; the detailed and clearly written standard operating procedures; the excellent records, including those for health care, training, and IACUC functions; the robust oversight of satellite housing areas and the strong working relationship among the DCM staff and investigators, including the unique relationship with the Sylvan Heights, a satellite facility; the outstanding training program for all participants in the animal program; the comprehensive social and environmental enrichment programs; and the thorough and well written Program Description. The Council is pleased to inform you that the program conforms with AAALAC International standards as set forth by the *Guide for the Care and Use of Laboratory Animals*, NRC 2011. Therefore, **FULL ACCREDITATION** shall continue.

Council has no recommendations to offer for improvement of the animal care and use program at this time. We look forward to following your program activities and wish you continued success.

AAALAC International requires an Annual Report detailing changes made during the year in accredited units. In the interim, AAALAC International expects to be apprised in a timely manner of significant programmatic changes or concerns should they occur. Please note that, at your request, AAALAC International will provide your institution with a separate letter simply verifying that your animal care and use program is accredited.

Sincerely,

Gaylen L. Edwards

Gaylen L. Edwards, D.V.M., Ph.D.
President, Council on Accreditation

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5205 Chairman's Court, Suite 300
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July 12, 2024

Karen A. Oppelt, D.V.M.
Clinical Assistant Professor
Department of Comparative Medicine
East Carolina University
The Brody School of Medicine
600 Moye Boulevard
212 Ed Warren Life Sciences Building
Greenville, NC 27834

Dear Dr. Oppelt:

The AAALAC International Council on Accreditation has reviewed the report of the recent site visit to East Carolina University, Greenville, North Carolina. The Council commends you and the staff for providing and maintaining an exemplary program of laboratory animal care and use. Especially noteworthy were the well-maintained and clean facilities; the excellent program of husbandry and veterinary care, evidenced in part by healthy animals and detailed medical records; the thorough surgical and post-operative records maintained by Principal Investigators (PIs) and their teams; the active Institutional Animal Care and Use Committee (IACUC), especially the nonaffiliated members and the commitment to IACUC member teambuilding; the effective and robust quality assurance program; the comprehensive and innovative environmental enrichment program; the allocation of resources to maintain a compassion fatigue room for animal care program personnel; and the effective collaboration with, and expertise at the Sylvan Heights Bird Center. The Council is pleased to inform you that the program conforms with AAALAC International standards as set forth by the *Guide for the Care and Use of Laboratory Animals*, NRC 2011. Therefore, **FULL ACCREDITATION** shall continue.

Council acknowledges receipt of the correspondences dated March 28 and March 13, 2024 detailing actions taken relative to concerns expressed by the site visitors during the exit briefing. Specifically, the items addressed satisfactorily included: enhancing posted signage for personnel protective equipment (PPE) requirements to include animal room doors at satellite facilities, ensuring all PIs utilizing satellite facilities were familiar with PPE requirements, and providing refresher training for laboratory personnel and creating guidance documents on appropriate MS-222 use and zebrafish euthanasia.

Council has no further recommendations to offer for improvement of the animal care and use program at this time. We look forward to following your program activities and wish you continued success.

AAALAC International requires an Annual Report detailing changes made during the year in accredited units. In the interim, AAALAC International expects to be apprised in a timely manner of significant programmatic changes or adverse events should they occur. Please note that, at your request, AAALAC International will provide your institution with a separate letter simply verifying that your animal care and use program is accredited.

Sincerely,

Patricia L. Foley, D.V.M.
President, Council on Accreditation

PLF:mkr
000677

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fax: 301.696.9627

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www.aaalac.org

Avian Husbandry & Management Program

Sylvan Heights
Waterfowl Park

SCOTLAND NECK, NORTH CAROLINA
www.shwpark.com

Program Design:

The Sylvan Heights Avian Husbandry & Management Program is an internship designed for zoo and wildlife management professionals (or equivalent experiences) who desire to increase their knowledge and proficiency in aviculture. In some cases, college level students, who have demonstrated a genuine desire to enter into a career centered on wildlife care or research, may be accepted into the program.

The program is designed to be beneficial to zoo and wildlife professionals who desire to receive continuing education, advanced avicultural training or seek to broaden their career experience. The program is conducted at the Sylvan Heights Waterfowl Center in Scotland Neck, North Carolina, and was designed by the Center's Director, Mike Lubbock, incorporating his innovative and highly successful techniques in avian breeding and care.

Upon successful completion of the program, participants will receive a Certificate of Proficiency in Avian Husbandry & Management from the Sylvan Heights Waterfowl Center.

Program Schedule:

The program duration is a minimum of one week and a maximum of two weeks, between April and July when waterfowl breeding is at the highest level. The basic curriculum, described below, is conducted in sessions scheduled by Sylvan Heights Waterfowl Center. (The Session Schedule is available at www.shwpark.com.)

Space in the program is limited.

Although Anseriformes are a specialty, other birds such as cranes, parrots and pheasants also reside at the Avian Breeding Center and may be included in the curriculum when requested in advance by the applicant or the institution the applicant represents. Specific time frames may be required if certain species have been selected to be studied. Additional study topics may also include specific research or aviculture techniques.

Program Requirements:

- 18 years of age
- Capable of lifting 50 lbs.
- Able to work outdoors in a rustic environment
- Assist staff with the morning care and maintenance routine at the Center
- Must have your own health insurance
- Minimum one-week stay is required
- Must apply and be accepted into the program

Tuition and Costs:

Tuition for the one-week program is [redacted]

Housing and meals will be provided in Scotland Neck, NC for those who have been accepted in the program and who continue to meet the program requirements. As an alternative (or during times when space in the program is limited), interns may seek accommodations at local motels, and would then be responsible for their own lodging and transportation.

A non-refundable deposit of [redacted] is required within 30 days of acceptance in the program. The balance of the tuition payment must be received prior to the arrival of the intern at the Center. If the intern must leave the program for any reason, the tuition, minus th[redacted]posit, will be refunded on a prorated basis, within 30 days.

Program Description:

Interns are given intensive, hands-on training in all aspects of captive breeding and management of Anseriformes. The curriculum is centered on topics emphasized in the manual which is provided to all program interns. Curriculum topics are discussed and demonstrated on an informal basis at the preserve. For each topic, the intern is provided extensive time to shadow staff instructors as they work, and where possible, engages in direct application of the techniques learned. There is no classroom work or formal lectures.

During a portion of each day, interns help in maintaining bird-related facilities at the main preserve. These functions may include, but are not limited to, food preparation and distribution, aviary cleaning and horticultural maintenance. This is part of the curriculum and serves to help the student become oriented and receive an extensive husbandry-related background.

Upon successful completion of the program, participants will receive a Certificate of Proficiency in Avian Husbandry & Management from the Sylvan Heights Waterfowl Center, a copy of Frank S. Todd's *Handbook of Waterfowl Identification*, and a copy of Mike Lubbock's *Avian Husbandry & Management Manual*.

LEARNING OBJECTIVES

Bird Identification / Behavior / Conservation

- Sylvan Height's large collection of waterfowl is ideal for basic identification
- Behavioral observations and sub-species cross comparison
- Receive copy of Frank S. Todd's *Handbook of Waterfowl Identification*
- Waterfowl conservation through captive management

Nutritional Requirements

- Seasonal differences
- Continental differences
- Breeding vs. non-breeding requirements
- Size of feeding bowls

Nesting Habitat

- Species variation
- Genetic management
- Full-winged vs. pinioned
- Nesting box designs and placement
- Pair vs. flock breeding
- Selection of birds for breeding
- Landscape requirements
- Aviary design

Egg Handling

- Substitution (dummy) eggs
- Sterile conditions
- Collection techniques
- Time of day consideration
- Outdoor candling in aviaries

Incubation Techniques

- Utilizing brooding hens
- Egg candling
- Use of artificial incubators
- Incubator types and manufacturers

Sexing Waterfowl

- Juveniles and adults
- Vent sexing

- DNA sexing through blood sample

Rearing Techniques

- Species-specific issues
- Hand raising vs. parent raising
- Feeding preferences
- Seasonal considerations
- Brooder (Rearing Unit) capacity
- Maintenance and cleaning of brooders (rearing units)
- Introduction to water
- Preening for waterproofing
- Temperature considerations

Veterinary Care

- Basic care
- Antibiotics
- Worming medication
- Bio-security program

Aviary Requirements

- Building ponds
- Pond sizes and depths
- Well water
- River water
- Cleaning ponds

Avicultural Management

- Selecting birds to maintain flock compatibility
- Selecting birds to be kept alone as pairs
- Pair bonding
- Adolescents to adults
- Breeding age
- Hybridization and mutation

ABOUT THE STAFF

The staff at Sylvan Heights Waterfowl Center conducts the training for the Avian Husbandry & Management Program. Many zoological and wildlife professionals as well as students travel to the Center to take advantage of the vast amount of avicultural experience assembled here. A short career biography for each staff member involved in training interns is provided below.

MIKE LUBBOCK is the Director of the Sylvan Heights Waterfowl Center and Program Director for the Avian Husbandry & Management Program.

Mike's professional career with birds began at the Wildfowl & Wetlands Trust (WWT) in Slimbridge, England, where he held the positions of Assistant Curator and Director of Aviculture. While at the WWT, Mike continually refined and improved waterfowl propagation techniques and did a considerable amount of fieldwork. The ultimate goal of establishing his own collection became a reality upon arriving in North Carolina and founding Sylvan Heights Waterfowl Center.

Mike is currently on the Board of Directors of the International Wild Waterfowl Association and Vice President of the Carolina/Virginia Pheasant & Waterfowl Society. He is also the Executive Director of the Sylvan Heights Waterfowl Society, which operates in association with the North Carolina Zoological Society. In addition to many World and North American First Breeding Awards, Mike has also been honored with the Jean DeLacour Avicultural Award and, was inducted into the International Wild Waterfowl Association's Hall of Fame.

Mike's passion is the preservation of threatened waterfowl on a global basis. In addition to his involvement with the previously mentioned groups and societies, he is active in many conservation efforts worldwide. He helped in founding the Venezuelan Waterfowl Foundation, which provides fieldwork and educational support for the preservation of the Torrent Duck, Orinoco Goose and Merida Teal. He is a member of the Brazilian Merganser Recovery Team, developed under the Wildfowl & Wetlands Trust Threatened Waterfowl Specialist Group to preserve the critically endangered Brazilian Merganser. Also, in 2003, in conjunction with the NC Zoological Society, Mike founded the Sylvan Heights Rare & Endangered Species Breeding Fund, designed to provide financial support to obtain and breed the world's most critically threatened avian species.

ALI LUBBOCK is the Assistant Director of Sylvan Heights and oversees many of the administrative duties for the Center. Over the many years of working at her husband's side, she has developed considerable avicultural skills of her own. Ali serves as Secretary for the International Wild Waterfowl Association and was inducted into the International Wild Waterfowl Association's Hall of Fame. Ali has also been honored with the prestigious Jean DeLacour Avicultural Award

NICK HILL, the Curator of Aviculture at Sylvan Heights Waterfowl Center, is responsible for the general husbandry of the world's largest waterfowl collection, as well as other birds, such as cranes, pheasants, curassows and parrots. Nick came to Sylvan Heights from the United Kingdom with 20 years of avicultural experience, during which time he interned and volunteered at the Center many times. He has a variety of experience in designing aviaries, breeding and rearing birds, field expeditions and consulting for animal-related television and movie productions.

Nick's lifetime of experience with birds from all parts of the globe is remarkable—from cold climate penguins and sea ducks to tropical birds. He has achieved First Breeding Awards for some extremely rare psittacines (parrot types) and is very experienced in

incubator and egg hatching skills, for which he received the prestigious Southwick Memorial Award from the International Wild Waterfowl Association.

Highlights of Nick's previous experience include:

- Assistant Curator at Birdland Zoo Gardens in the U.K.
- Made 3 expeditions to Falkland Islands to collect penguin, seabird and waterfowl eggs for captive research projects
- Accomplished European First Breedings of the Black Browed Albatross and Palm Cockatoo
- Helped to train Snow Geese for the BBC nature documentary, "*Flight of the Snow Geese"* and trained King Penguins for Universal Studio's movie, "*Batman Returns"*

DUSTIN FOOTE is the General Curator at Sylvan Heights Bird Park. He came to Sylvan Heights from Ithaca, New York with an interest in birds instilled from an early age. His initial introduction to Sylvan Heights was as an Avian Husbandry & Management Program intern from Cornell University, where he graduated with a degree in Animal Science.

NOTE:
Questions regarding the Avian Program or the application process should be directed through email to ali@shwpark.com, or call Ali Lubbock at (252) 826-3186.

United States Department of Agriculture
Animal and Plant Health Inspection Service

[redacted]

Inspection Report

[redacted]

No non-compliant items were identified during this Pre-License inspection.

This is a First Pre-License Inspection for a Class C license. The inspection and exit briefing were conducted with the applicant. The applicant is ready to be licensed under the AWA.

A copy of your license will be sent to you without any additional action on your part. If you have not received your license within 30 days, please contact the USDA at 970-494-7478.

Additional Inspectors:

Kristina D'Apice, VETERINARY MEDICAL OFFICER

[redacted]

United States Department of Agriculture
Animal and Plant Health Inspection Service

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Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

Count	Scientific Name	Common Name
000001	*Eudromia elegans*	ELEGANT CRESTED-TINAMOU
000002	*Casuarius casuarius*	SOUTHERN CASSOWARY / DOUBLE-WATTLED CASSOWARY
000001	*Dromaius novaehollandiae*	EMU
000001	*Alectura lathami*	AUSTRALIAN BRUSHTURKEY
000004	*Callipepla gambelii*	GAMBEL'S QUAIL
000012	*Rollulus rouloul*	CRESTED PARTRIDGE
000005	*Lophophorus impejanus*	HIMALAYAN MONAL
000002	*Lophura nycthemera*	SILVER PHEASANT
000001	*Lophura edwardsi*	EDWARDS'S PHEASANT / VIETNAM PHEASANT
000002	*Crossoptilon auritum*	BLUE EARED-PHEASANT
000004	*Phasianus colchicus*	RING-NECKED PHEASANT / COMMON PHEASANT
000002	*Chrysolophus amherstiae*	LADY AMHERST'S PHEASANT
000002	*Polyplectron bicalcaratum*	GRAY PEACOCK-PHEASANT
000001	*Chrysolophus pictus*	GOLDEN PHEASANT
000001	*Polyplectron inopinatum*	MOUNTAIN PEACOCK-PHEASANT / ROTHSCHILD'S PEACOCK-PHEASANT
000005	*Argusianus argus*	GREAT ARGUS
000003	*Pavo muticus*	GREEN PEAFOWL / INDONESIAN PEAFOWL / PEAHEN / PEACOCK
000006	*Chauna torquata*	SOUTHERN SCREAMER / CRESTED SCREAMER
000007	*Branta canadensis*	CANADA GOOSE
000008	*Dendrocygna arborea*	WEST INDIAN WHISTLING-DUCK
000043	*Dendrocygna autumnalis*	BLACK-BELLIED WHISTLING-DUCK
000016	*Dendrocygna arcuata*	WANDERING WHISTLING-DUCK
000022	*Dendrocygna bicolor*	FULVOUS WHISTLING-DUCK
000045	*Dendrocygna viduata*	WHITE-FACED WHISTLING-DUCK
000008	*Anser anser*	GRAYLAG GOOSE
000016	*Dendrocygna eytoni*	PLUMED WHISTLING-DUCK
000016	*Dendrocygna javanica*	LESSER WHISTLING-DUCK
000005	*Thalassornis leuconotus*	WHITE-BACKED DUCK
000012	*Anser caerulescens*	SNOW GOOSE
000004	*Anser canagicus*	EMPEROR GOOSE
000011	*Anser indicus*	BAR-HEADED GOOSE
000007	*Anser rossii*	ROSS'S GOOSE
000011	*Branta leucopsis*	BARNACLE GOOSE
000001	*Branta bernicla*	BRANT / BRANT GOOSE
000017	*Branta ruficollis*	RED-BREASTED GOOSE
000029	*Branta sandvicensis*	HAWAIIAN GOOSE / NE-NE
000010	*Cereopsis novaehollandiae*	CAPE BARREN GOOSE
000008	*Cygnus atratus*	BLACK SWAN
000009	*Cygnus melancoryphus*	BLACK-NECKED SWAN
000007	*Cygnus olor*	MUTE SWAN
000004	*Cygnus buccinator*	TRUMPETER SWAN
000023	*Stictonetta naevosa*	FRECKLED DUCK
000047	*Aix galericulata*	MANDARIN DUCK
000101	*Aix sponsa*	WOOD DUCK / CAROLINA DUCK
000015	*Amazonetta brasiliensis*	BRAZILIAN TEAL
000040	*Anas acuta*	NORTHERN PINTAIL
000015	*Anas luzonica*	PHILIPPINE DUCK

United States Department of Agriculture
Animal and Plant Health Inspection Service

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Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

000045	*Anas bahamensis*	WHITE-CHEEKED PINTAIL
000019	*Anas flavirostris*	YELLOW-BILLED TEAL
000022	*Bucephala clangula*	COMMON GOLDENEYE
000032	*Callonetta leucophrys*	RINGED TEAL
000009	*Chenonetta jubata*	MANED DUCK / AUSTRALIAN WOOD DUCK
000034	*Anas bernieri*	BERNIER'S TEAL / MADAGASCAR TEAL
000018	*Anas capensis*	CAPE TEAL
000017	*Marmaronetta angustirostris*	MARBLED TEAL
000014	*Anas castanea*	CHESTNUT TEAL
000031	*Anas crecca*	GREEN-WINGED TEAL / COMMON TEAL
000035	*Anas georgica*	YELLOW-BILLED PINTAIL
000023	*Anas poecilorhyncha*	INDIAN SPOT-BILLED DUCK
000009	*Anas melleri*	MELLER'S DUCK
000014	*Anas platyrhynchos*	MALLARD
000021	*Anas rubripes*	AMERICAN BLACK DUCK
000018	*Histrionicus histrionicus*	HARLEQUIN DUCK
000006	*Anas undulata*	YELLOW-BILLED DUCK
000012	*Anas fulvigula*	MOTTLED DUCK
000022	*Aythya nyroca*	FERRUGINOUS DUCK
000018	*Anas laysanensis*	LAYSAN DUCK
000007	*Anas zonorhyncha*	EASTERN SPOT-BILLED DUCK
000020	*Aythya affinis*	LESSER SCAUP
000008	*Bucephala albeola*	BUFFLEHEAD
000015	*Chloephaga rubidiceps*	RUDDY-HEADED GOOSE
000023	*Aythya americana*	REDHEAD
000016	*Aythya australis*	HARDHEAD / WHITE-EYE
000007	*Aythya valisineria*	CANVASBACK
000011	*Aythya ferina*	COMMON POCHARD
000025	*Aythya fuligula*	TUFTED DUCK
000002	*Aythya marila*	GREATER SCAUP
000012	*Aythya novaeseelandiae*	NEW ZEALAND SCAUP
000011	*Cairina moschata*	MUSCOVY DUCK
000016	*Cyanochen cyanoptera*	BLUE-WINGED GOOSE
000010	*Oressochen melanopterus*	ANDEAN GOOSE
000001	*Mergus merganser*	COMMON MERGANSER
000011	*Malacorhynchus membranaceus*	PINK-EARED DUCK
000007	*Oressochen jubatus*	ORINOCO GOOSE
000013	*Netta erythrophthalma*	SOUTHERN POCHARD
000022	*Netta peposaca*	ROSY-BILLED POCHARD
000027	*Netta rufina*	RED-CRESTED POCHARD
000012	*Anseranas semipalmata*	MAGPIE GOOSE
000054	*Phoenicopterus ruber*	AMERICAN FLAMINGO
000004	*Chalcophaps indica*	ASIAN EMERALD DOVE / GREY-CAPPED EMERALD DOVE
000002	*Scopus umbretta*	HAMERKOP
000018	*Nettapus auritus*	AFRICAN PYGMY-GOOSE
000019	*Plectropterus gambensis*	SPUR-WINGED GOOSE
000015	*Tadorna variegata*	PARADISE SHELDUCK
000005	*Nettapus coromandelianus*	COTTON PYGMY-GOOSE / INDIAN PYGMY GOOSE
000011	*Tadorna tadorna*	COMMON SHELDUCK
000011	*Columba guinea*	SPECKLED PIGEON
000012	*Vanellus miles*	MASKED LAPWING

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Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

000001	*Pluvianus aegyptius*	EGYPTIAN PLOVER / CROCODILE-BIRD
000010	*Nettapus pulchellus*	GREEN PYGMY-GOOSE
000001	*Recurvirostra americana*	AMERICAN AVOCET
000033	*Calidris pugnax*	RUFF
000001	*Psittacus erithacus*	CONGO AFRICAN GREY PARROT / GRAY PARROT
000053	*Oxyura jamaicensis*	RUDDY DUCK
000002	*Asarcornis scutulata*	WHITE-WINGED DUCK
000006	*Oxyura maccoa*	MACCOA DUCK
000012	*Oxyura vittata*	LAKE DUCK
000007	*Pteronetta hartlaubii*	HARTLAUB'S DUCK
000013	*Mareca strepera*	GADWALL
000005	*Vanellus vanellus*	NORTHERN LAPWING
000013	*Polytelis anthopeplus*	REGENT PARROT
000004	*Copsychus malabaricus*	WHITE-RUMPED SHAMA
000010	*Sarkidiornis melanotos*	KNOB-BILLED DUCK / AFRICAN COMB DUCK
000004	*Anthropoides paradiseus*	BLUE CRANE / STANLEY CRANE
000026	*Himantopus himantopus*	BLACK-WINGED STILT
000001	*Rhyticeros undulatus*	WREATHED HORNBILL
000002	*Somateria mollissima*	COMMON EIDER
000018	*Otidiphaps nobilis*	PHEASANT PIGEON
000001	*Porphyrio alleni*	ALLEN'S GALLINULE
000012	*Tachyeres patachonicus*	FLYING STEAMER-DUCK
000019	*Mareca sibilatrix*	CHILOE WIGEON
000011	*Spatula platalea*	RED SHOVELER
000033	*Caloenas nicobarica*	NICOBAR PIGEON
000021	*Mareca americana*	AMERICAN WIGEON
000001	*Claravis pretiosa*	BLUE GROUND DOVE
000003	*Balearica regulorum*	GRAY CROWNED-CRANE / AFRICAN CROWNED-CRANE / GOLDEN CROWNED-CRANE
000032	*Eudocimus ruber*	SCARLET IBIS
000018	*Mareca penelope*	EURASIAN WIGEON
000015	*Spatula clypeata*	NORTHERN SHOVELER
000013	*Spatula discors*	BLUE-WINGED TEAL
000040	*Spatula cyanoptera*	CINNAMON TEAL
000001	*Tauraco erythrolophus*	RED-CRESTED TURACO
000001	*Ciconia abdimii*	ABDIM'S STORK
000044	*Spatula hottentota*	BLUE-BILLED TEAL / HOTTENTOT TEAL
000039	*Phoeniconaias minor*	LESSER FLAMINGO
000011	*Columba livia*	ROCK PIGEON
000001	*Pteroglossus viridis*	GREEN ARACARI
000029	*Spatula querquedula*	GARGANEY
000014	*Goura cristata*	WESTERN CROWNED-PIGEON / BLUE CROWNED-PIGEON
000002	*Oena capensis*	NAMAQUA DOVE
000004	*Spatula smithii*	CAPE SHOVELER
000054	*Phoenicopterus chilensis*	CHILEAN FLAMINGO
000001	*Musophaga violacea*	VIOLET TURACO
000003	*Antigone canadensis*	SANDHILL CRANE
000006	*Threskiornis aethiopicus*	AFRICAN SACRED IBIS
000008	*Spatula rhynchotis*	AUSTRALASIAN SHOVELER
000022	*Spatula versicolor*	SILVER TEAL
000012	*Sibirionetta formosa*	BAIKAL TEAL

United States Department of Agriculture
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Species Inspected

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6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

000006	*Cariama cristata*	RED-LEGGED SERIEMA
000002	*Haliaeetus vocifer*	AFRICAN FISH-EAGLE
000019	*Spatula puna*	PUNA TEAL
000002	*Streptopelia hypopyrrha*	ADAMAWA TURTLE-DOVE
000001	*Antigone antigone*	SARUS CRANE
000002	*Tockus erythrorhynchus*	NORTHERN RED-BILLED HORNBILL
000004	*Dacelo novaeguineae*	LAUGHING KOOKABURRA
000064	*Lophodytes cucullatus*	HOODED MERGANSER
000003	*Haematopus palliatus*	AMERICAN OYSTERCATCHER
000036	*Recurvirostra avosetta*	PIED AVOCET
000002	*Charadrius vociferus*	KILLDEER
000003	*Columba oenas*	STOCK DOVE
000019	*Gallicolumba luzonica*	LUZON BLEEDING-HEART
000002	*Grus americana*	WHOOPING CRANE
000001	*Gallicolumba tristigmata*	SULAWESI GROUND DOVE
000001	*Musophaga rossae*	ROSS'S TURACO
000003	*Geotrygon versicolor*	CRESTED QUAIL-DOVE
000002	*Anthropoides virgo*	DEMOISELLE CRANE
000002	*Buceros rhinoceros*	RHINOCEROS HORNBILL
000387	*Melopsittacus undulatus*	BUDGERIGAR / BUDGIE / COMMON PARAKEET / SHELL PARAKEET
000037	*Taeniopygia guttata*	ZEBRA FINCH / TIMOR ZEBRA FINCH
000007	*Goura victoria*	VICTORIA CROWNED-PIGEON
000002	*Coracias cyanogaster*	BLUE-BELLIED ROLLER
000001	*Ara glaucogularis*	BLUE-THROATED MACAW
000003	*Ocyphaps lophotes*	CRESTED PIGEON
000001	*Coragyps atratus*	BLACK VULTURE / MEXICAN VULTURE
000166	*Psittacula cyanocephala*	PLUM-HEADED PARAKEET
000004	*Aratinga solstitialis*	SUN PARAKEET
000001	*Turtur brehmeri*	BLUE-HEADED WOOD-DOVE
000004	*Nesoenas picturatus*	MALAGASY TURTLE-DOVE / MADAGASCAR TURTLE-DOVE
000005	*Gallinula chloropus*	EURASIAN MOORHEN / COMMON MOORHEN
000004	*Vanellus chilensis*	SOUTHERN LAPWING
000003	*Tauraco persa*	GUINEA TURACO
000001	*Actophilornis africanus*	AFRICAN JACANA
000001	*Eurypyga helias*	SUNBITTERN
000001	*Cyanopica cyanus*	AZURE-WINGED MAGPIE
000004	*Psophia crepitans*	GRAY-WINGED TRUMPETER
000002	*Ephippiorhynchus senegalensis*	SADDLE-BILLED STORK
000005	*Platalea ajaja*	ROSEATE SPOONBILL
000012	*Vanellus spinosus*	SPUR-WINGED LAPWING
000002	*Burhinus senegalensis*	SENEGAL THICK-KNEE
000004	*Lamprotornis superbus*	SUPERB STARLING
000004	*Vanellus senegallus*	WATTLED LAPWING
000001	*Psephotus haematonotus*	RED-RUMPED PARROT
000002	*Cyanocorax yncas*	GREEN JAY
000017	*Ploceus castaneiceps*	TAVETA GOLDEN-WEAVER
000003	*Tringa semipalmata*	WILLET
000001	*Sarcoramphus papa*	KING VULTURE
000002	*Paradisaea raggiana*	RAGGIANA BIRD-OF-PARADISE
000002	*Parabuteo unicinctus*	HARRIS'S HAWK

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Species Inspected

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6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

000005	*Estrilda astrild*	COMMON WAXBILL
000002	*Bucorvus abyssinicus*	ABYSSINIAN GROUND-HORNBILL
000003	*Ramphastos toco*	TOCO TOUCAN
000004	*Molothrus ater*	BROWN-HEADED COWBIRD
000003	*Trichoglossus moluccanus*	RAINBOW LORIKEET
000005	*Psephotus dissimilis*	HOODED PARROT
000003	*Platycercus eximius*	EASTERN ROSELLA
000001	*Psittacula derbiana*	DERBYAN PARAKEET
000005	*Neophema splendida*	SCARLET-CHESTED PARROT
000002	*Cyanocorax chrysops*	PLUSH-CRESTED JAY
000002	*Ara macao*	SCARLET MACAW
000002	*Cacatua alba*	WHITE COCKATOO / UMBRELLA COCKATOO
000001	*Euplectes orix*	SOUTHERN RED BISHOP
000003	*Turdus merula*	EURASIAN BLACKBIRD
000001	*Ara militaris*	MILITARY MACAW
000002	*Urocissa erythroryncha*	RED-BILLED BLUE-MAGPIE
000010	*Psephotus varius*	MULGA PARROT
000002	*Lonchura striata*	WHITE-RUMPED MUNIA
000001	*Cacatua galerita*	SULPHUR-CRESTED COCKATOO / GREATER SULPHUR-CRESTED COCKATOO
000004	*Artamus leucorynchus*	WHITE-BREASTED WOODSWALLOW
000002	*Lophochroa leadbeateri*	PINK COCKATOO / LEADBEATER'S COCKATOO / MAJOR MITCHELL'S COCKATOO
000001	*Chlamydera cerviniventris*	FAWN-BREASTED BOWERBIRD
000001	*Calocitta formosa*	WHITE-THROATED MAGPIE-JAY
000001	*Paroaria coronata*	RED-CRESTED CARDINAL
000003	*Lamprotornis iris*	EMERALD STARLING
000002	*Patagioenas fasciata*	BAND-TAILED PIGEON
000001	*Cyrtonyx montezumae*	MONTEZUMA QUAIL
000015	*Radjah radjah*	RADJAH SHELDUCK
000003	*Larosterna inca*	INCA TERN
000002	*Bubo bubo*	EURASIAN EAGLE-OWL
000004	*Guttera pucherani*	EASTERN CRESTED GUINEAFOWL
000009	*Numida meleagris*	DOMESTIC GUINEAFOWL / HELMETED GUINEAFOWL / PEARL HEN
000002	*Acryllium vulturinum*	VULTURINE GUINEAFOWL
000045	*Gallus gallus domesticus*	DOMESTIC CHICKEN (INCLUDING ALL DOMESTIC BREEDS / TURKIN / COCK / HEN / ROOSTER)
000001	*Pavo cristatus*	INDIAN PEAFOWL / COMMON PEAFOWL / PEAHEN / PEACOCK
000011	*Dendrocygna guttata*	SPOTTED WHISTLING-DUCK
000010	*Anser albifrons*	GREATER WHITE-FRONTED GOOSE
000004	*Anser erythropus*	LESSER WHITE-FRONTED GOOSE
000006	*Anser cygnoides*	SWAN GOOSE
000004	*Coscoroba coscoroba*	COSCOROBA SWAN
000002	*Anser brachyrhynchus*	PINK-FOOTED GOOSE
000003	*Anser anser domesticus*	DOMESTIC GOOSE
000011	*Branta hutchinsii*	CACKLING GOOSE
000013	*Chloephaga picta*	UPLAND GOOSE
000002	*Speculanas specularis*	SPECTACLED DUCK
000008	*Cygnus cygnus*	WHOOPER SWAN

United States Department of Agriculture
Animal and Plant Health Inspection Service

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168		001	Sylvan Heights Waterfowl Park and Eco Center	20-JUN-2024

000006	*Anas wyvilliana*	HAWAIIAN DUCK
000006	*Anas superciliosa*	PACIFIC BLACK DUCK
000002	*Anas gibberifrons*	SUNDA TEAL
000006	*Anas sparsa*	AFRICAN BLACK DUCK
000002	*Anas erythrorhyncha*	RED-BILLED DUCK
000006	*Aythya baeri*	BAER'S POCHARD
000010	*Aythya collaris*	RING-NECKED DUCK
000012	*Mareca falcata*	FALCATED DUCK
000005	*Bucephala islandica*	BARROW'S GOLDENEYE
000002	*Alopochen aegyptiaca*	EGYPTIAN GOOSE
000005	*Chloephaga poliocephala*	ASHY-HEADED GOOSE
000009	*Oxyura leucocephala*	WHITE-HEADED DUCK
000004	*Sarkidiornis sylvicola*	COMB DUCK / AMERICAN COMB DUCK
000013	*Tadorna tadornoides*	AUSTRALIAN SHELDUCK
000015	*Tadorna cana*	SOUTH AFRICAN SHELDUCK
000015	*Tadorna ferruginea*	RUDDY SHELDUCK
000015	*Mergellus albellus*	SMEW
000003	*Mergus squamatus*	SCALY-SIDED MERGANSER

003377 **Total**

PROTOCOL FOR THE MAINTENANCE AND MANAGEMENT OF THE BRAZILIAN MERGANSER (*Mergus octosetaceus*) UNDER HUMAN CARE

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Responsable Veterinairian of Zooparque Itatiba and for the reproduction program

July de 2022

Chapter I - Introduction

Introduction

Taxonomic classification

Phylum: Chordata
Class: Aves
Order: Anseriformes
Family: Anatidae
Genus and Species: *Mergus octosetaceus* Vieillot, 1817
Conservation Status: Critically Endangered (MMA, 2014);
Critially Endangered C2a(i) (IUCN, 2019).

General Information

There are seven species of mergansers found in the world, belonging to the family Anatidae. The Brazilian Merganser, *Mergus octosetaceus,* is among the rarest species of waterfowl in the world (Todd 1996). The species was even considered extinct after not been seen for almost 20 years and was rediscovered in 1948 (del Hoyo *et al*. 1992). It was native to Brazil, Paraguay and Argentina, but now it's believed that they are extinct in these last two countries, considering that the last report of individuals in Argentina was in 2002 and in Paraguay was in 1984 (Birdlife International 2018). Today there are records of its occurrence in regions nearby the State of Goias, at the Chapada dos Veadeiros National Park, at Minas Gerais inside the Serra da Canastra National Park, at Rio Novo, at Tocantins State in Jalapão State Park (Silveira *et al*. 2018).

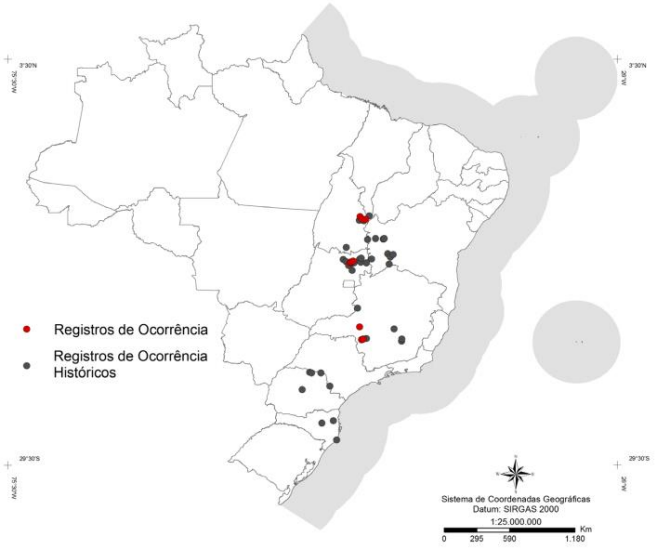

Image: Brazil Red Book of Threatened Species of Fauna – ICMBio.

The total estimated population in 1992 was thought to be 250 individuals, and current data support that the number of mature birds are still around the same, but further confirmation is necessary (Birdlife International 2018).

The Brazilian Merganser (*Mergus octosetaceus*) is the only surviving species of Mergini (Order Anseriformes) in the Southern Hemisphere. It is a locally and globally endangered species (Birdlife International 2018) and one of the most endangered waterfowl and it inhabits fast flowing and clean water rivers and streams, crossing subtropical and closed forest, surrounded by cerrado (tropical savanna) (del Hoyo *et al*. 1992; Birdlife International 2018). To feed, it usually scans the underwater surroundings from the surface and then it dives in to catch fish and aquatic macro invertebrates (Todd 1996). It is an extremely territorial bird and it's most believed that it remains on the same stretch of river once it's paired (Silveira *et al*. 2018). The size of the territory can be influenced by the amount of fish available, the number of rapids found along the river and by riparian vegetation (Birdlife International 2018).

The reproduction period starts before the raining season, and nests are made during June to October, in tree holes and in holes of riverbanks. The offspring may vary up from 6 to 8 ducklings, unlike other mergansers; the male provides extensive parental care. The young, on the first days of life, are fed by the parents. It is unknown where the ducklings go after leaving the parents (Todd 1996).

The species is very selective with its habitat, and that's because they need fast-flowing rivers with extremely clean water, with forests surrounding them. Gathering these factors with deforestation, mining, pollution, silting and ecotourism, such as the rafting and buoy-cross, leads to the decline of Brazilian merganser population (Silveira *et al*. 2018).

Ex situ history of the species

The Brazilian Merganser project began in 2006 on the initiative of Dr. Luís Fábio Silveira, who initiated negotiations with IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources). In 2011, after the creation of ICMBio (Chico Mendes Institute for Biodiversity Conservation), the project began to gain greater structure. After restructuring its objectives and actions, the Brazilian Merganser PAN (National Action Plan) was created, in partnership with the NGOs Terra Brasilis, Naturatins and CerVivo, and the Museum of Zoology of the University of São Paulo. The Poços de Caldas Scientific and Conservation Breeding Center also joined the project and, later, so did the Piracema Conservation Reserve. The main objective of the project is to permanently ensure the maintenance of *ex situ* Brazilian Merganser populations in the medium and long term, stimulate population growth.

The *ex situ* maintenance of the Brazilian Merganser is essential for the conservation of the species. Maintenance under human care allows the compilation of new data and information, enabling the creation of management models aimed at the *ex sit*u conservation of the species and helping in the recovery of its conservation status. The maintenance of *ex situ* populations serves as genetic backup and these populations are of fundamental importance to work as re-stocking for future releases and reintroductions.

The maintenance of *Mergus octosetaceus* in captivity began in 2011 with the first collection of eggs in the Serra da Canastra National Park, in the State of Minas Gerais. The eggs were sent to the Scientific and Cultural Breeding Center of Poços de Caldas-MG, where they hatched and the first ducklings were kept. New collections in nature were

carried out to continue the project, all of them following the Egg Collection Protocol developed by PAN. The eggs from these collections were sent to Zooparque Itatiba and, in 2016, the zoo became the headquarters of the *ex situ* program.

The first reproduction of *Mergus octosetaceus* in captivity took place at Zooparque Itatiba in 2017, with the birth of 4 ducklings through artificial breeding, being the first Brazilian Mergansers born in captivity in history. In 2018, 4 more ducklings were born in Zooparque. However, this time the eggs were incubated by the mother and the ducklings were raised by the parents themselves. This reproduction was extremely important for the project, as it shows that birds, even born in captivity, maintain the innate ability to care for their young, indicating a promising future for the reintroduction project.

The *ex situ* Brazilian Merganser conservation program is extremely important for maintaining a population that will serve as genetic backup and re-stocking for future releases and reintroductions. In this way, it was necessary to develop this document, the Protocol for Management and Maintenance of the Brazilian Merganser (*Mergus octosetaceus*) Under Human Care, so that all institutions that participate in the project have access to information on the proper way to care for the species.

Objectives

This Protocol was prepared with the following objectives:

• Guide the institutions that will receive this species about the appropriate conditions for its maintenance and handling under human care;

• Standardize all care techniques for these animals;

• Establish techniques that will provide an adequate and safe environment for the birds, contributing to the well-being of the species;

• Enable appropriate techniques for reproductive management;

• Enable the maintenance of an *ex situ* Brazilian Merganser population as part of the *ex situ* Program enabling future reintroductions.

Training and evaluation

Institutions that show interest in participating in the *ex situ* project for the conservation of the Brazilian Merganser and in the *Studbook* must adapt to the structural conditions and follow the staff training mentioned in the Protocol, complying with the items in this document.

The *Studbook* is part of a technical cooperation agreement established between the Association of Zoos and Aquariums of Brazil (AZAB), Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Ministry of the Environment (MMA) aimed at the conservation of 25 Brazilian native species. The *studbook keeper* and person

responsible for the *Studbook* is Robert Frank Kooij, partner-director of Zooparque Itatiba, assisted by Camila Piovani, biologist responsible for the *ex situ* program at Zooparque Itatiba.

Before a new institution receives this species under its care, it is important that it has an employee available especially for the care of Brazilian Mergansers. It is essential and of extreme importance that this professional already has experience with the management of waterfowl and, mainly, in the maintenance and reproduction of Anatidae.

This professional must go through a special training in Zooparque Itatiba for a period of one month. During this month it will be possible to learn the routine of handling the animals and also about the behavior of the species. Therefore, it is preferable that training takes place during the reproductive period of mergansers.

To ensure that all institutions are following all the items mentioned in this document and are capable of handling the species, it will be necessary that each one receives a visit from a representative of Zooparque Itatiba, the only institution in the world that keeps the Brazilian Merganser under its care and who developed the *ex situ* management strategies. Such training is essential to ensure that the new institution is fully capable of handling the species.

If, during the training, it is assessed that the institution does not yet have the physical structure or adequate trained staff to receive the animals, the transfer cannot be carried out. Only after complying with the appropriate measures of adequacy and proving them, the institution will be able to receive the animals.

Animal exhibition

As the *Ex situ* Reproduction Program is part of the Merganser PAN, all birds of this species must be housed in aviaries outside the public exhibition area. In accordance with the PAN, some individuals were authorized to be in exhibition at Zooparque Itatiba with the goal of working with the institution's environmental education department. However, it is only possible to work with the exposure of individuals that are not breeding pairs and are not part of the group capable of reproduction (according to the guidelines of the *studbook*). Therefore, to date, Zooparque Itatiba does not have any individuals on display. If a new institution starts working with the species, it must meet the same parameters as above, and it is not possible to have animals on display at the first moment.

Chapter II - Maintenance of adult birds

Reproduction aviaries

The Brazilian merganser is a monogamous bird and for that reason they are extremly territorial once they have paired up. The breeding pair doesn´t accept any other Brazilian mergansers or even other species of waterfowl in the same aviary. If so, it will get aggressive, attack the other bird and will fight until death. Because of this type of territorial behaviour it´s fundamental to keep only one pair of mergansers in each aviary.

The birds need be kept fully winged so for that reason it needs to be kept in an aviary, an aviary strong enough designed against any kind of extrem weather forcast and predators (Images 1,2,3 and 4).

Image 1 – Overview of the *ex situ* Reproduction Sector at Zooparque Itatiba

Image 2 – Side view of the *ex situ* Reproduction Sector at Zooparque Itatiba

Image 3 – Side view of the aviaries

Image 4 – Detail on the electric fence to protect the ducks in the aviary

The ideal design for a reproduction aviary is a long shaped one with at least 90m2, for example: 15 m long x 6 m wide x 4 m high, with all sides built on a 0.8 m high masonry wall, 50 above ground level and 30cm below, with galvanized welded mesh to complete it. To achieve a higher safety level against pest animals, it needs to be a closed aviary with the use of galvanized welded mesh all around and on top of the aviary with a 10 mm x 10 mm mesh (Image 5). It´s important that there is a complete visual berrier between the aviaries, avoiding that one breeding pair would see the other. At Zooparque Itatiba, a thick canvas is attached to the screen that divides the enclosures, as can be seen in Images 6 and 7. For security measures, the aviaries must have a security aisle, which will give access to the enclosure through a side door. Through this aisle, the staff will have access both to the aviary and to the holding area, which will allow them to monitor the animals and preventing the animals from escaping when opening the door. Removable visual barriers made of a natural brazilian product called 'Piaçava' are also used between the enclosures and the security aisle. It´s used to make sure that the birds will feel secure and won´t feel disturbt by whoever passes by the aisle. Other materials can be used, such as camouflage nets (Image 8).

Image 5 – Detail of the screen with a 10mm x 10mm mesh.

Image 6 – Division between enclosures with complete visual barrier.

Image 7 – Division between enclosures with complete visual barrier.

Image 8 – Security corridor with visual barrier.

Nests

Most *in situ* nests are in tree trunks and high riverbanks. Two wooden nests should be used in each enclosure, one lower and the other higher of the ground. Always close to the water (Images 9 to 14). Remembering that all nests must have an inspection door, always on the opposite side to the bird's entrance, so that we can monitor and collect eggs. The nests are standardized and follow the model found in Image 15. Even if waterfowl present the behavior of plucking down to line the nest, substrate should be placed inside it. It is best to use woodchips as a substrate.

Image 9 – Arrangement of the artificial nests in the aviary, one placed on lower ground and close to the water and the other higher up.

Image 10 – Higher nest, with access perch to the entrance.

Image 11 – Higher nest

Image 12 – Lower nest, on the edge of the pond.

Image 12 – Lower nest, on the edge of the pond.

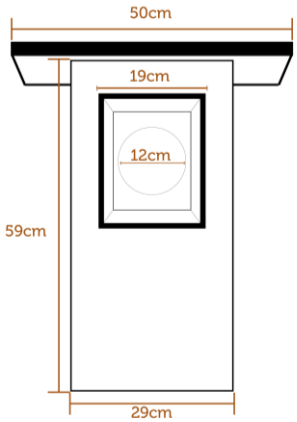

Image 14 – Nest box model with measurements – front view.

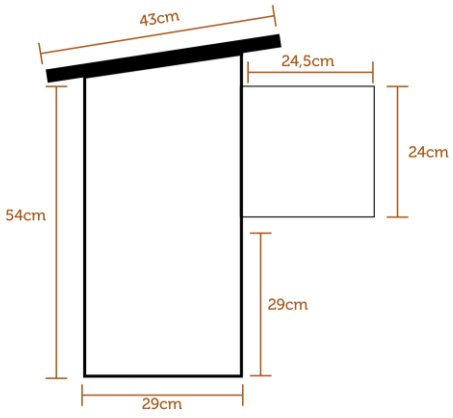

Image 15 – Nest box model with measurements – side view.

Ponds, vegetation and natural decoration

It is suggested that the enclosure includes a 10 m² pond with rocks and logs on the edges and a source of running water. The pond is important for the ducks to be able to maintain the natural behavior of aquatic species and fishing behavior. The water needs to come from a clean, pollutant-free source, such as an artesian well.

Considering that in nature mergansers spend a lot of time resting on riverbanks during the day, it is important to place rocks on the banks of the ponds and logs of various diameters, positioned close to the water, to mimic the natural habitat. The arrangement of thick trunks as high perches is interesting and can be used, however they should not be positioned close to the side screens of the enclosures (Images 16 to 19).

The vegetation in the aviary should preferably be low, considering that the bird needs an open area for flying. Therefore, the ideal is to use bushes, low plants and small trees. This vegetation is very important as it will also serve as a vanishing point and natural shading for the animals (Images 20 to 23).

Image 16 – Example of a trunk

Image 17 – Example of vegetation in the enclosure.

Image 18 – Example of the decoration and possitions of the nests

Image 19 – Example of the position of the trunk in the enclosure.

Image 20 – Example of vegetation in the enclosure.

Image 21 – Example of vegetation in the enclosure.

Image 22 – Example of vegetation in the enclosure.

Image 23 – Example of vegetation in the enclosure.

It is necessary to check the direction and intensity of the wind in order to protect the aviary, if necessary. The luminosity needs to be similar to that of the natural environment of the species, for this natural shading is used with natural trees and artificial shading with double strips of shadow net, offering points of shadows. To adapt to the local climate, the use of artificial irrigation is suggested, if necessary. In places with a cold climate, it is recommended to cover the side screens with thermal protection (transparent plastic) during winter. The floor must be grass, with good drainage so that water does not accumulate with mud (Image 24).

Imagem 24 – Example of vegetation in the enclosure

Control and monitoring

All enclosures must be monitored by security cameras 24 hours a day. This remote monitoring is essential so that the team that cares for the animals can observe the birds without their presence interfering with the natural behavior of the species. The cameras are essential to monitor the behavior of the birds and ensure the safety of the bird (Images 24 and 25).

It is recommended the use of identification plates in the enclosures with the number of the aviary, the number of the bands of the individuals and the sex. Thus, whenever someone is in the security aisle, they will know which birds are in the enclosure, without having to access them. In addition, if the animals are transferred to another enclosure, the identification plates can be taken with the birds, for better population control.

It is important to highlight that it is always necessary to have an empty enclosure for immediate use to separate the bird. It is common for birds to fight, often even between individuals that have been paired for a long time. In these cases, the animals need to be separated immediately and housed in another enclosure until they can be brought together again. Therefore, if the institution houses more than one pair, it will be necessary to have more enclosures available to house the birds in an emergency situation.

Image 24 – Security camera

Image 25 – Remote monitoring of the mergansers.

Handling and transport

Mergus sp., when handled improperly, can present several problems such as reduced egg laying, increased rate of infertile eggs, injuries and even death. Therefore, it needs to be handled correctly.

The transfer of the animals (change of enclosure) should always be done in the coolest period of the day. In this way, it is recommended that the transfer be made in the morning, as in addition to the favorable climate, there will be more time to observe the animals throughout the day, avoiding the eve of holidays and weekends in places that receive visitation from the public. After transfering, perform intensive observation for the first few days to ensure that the animals have adapted well to the new enclosure.

Birds, must be transported in individual in closed boxes. It is recommended that the boxes have the following dimensions: 50 cm long x 30 cm high x 30 cm wide (Figure 26). It is important that the box has ventilation, but that it blocks the bird's view of the surroundings.

On long trips and in cases of air transport, boxes with a satisfactory size must be used to allow the movement of the bird. The ceiling must be lined internally with a foam, well fixed, to avoid injuries to the bird's head. The bottom can be lined with grass or woodchips, remembering never to use boxes with a smooth floor. It is preferable that the birds be transported at night or during hours with mild temperatures, always protected from the sun and wind (closed/air-conditioned vehicle), avoiding exposing the box to the sun, which can cause death due to excessive heat.

The travel schedule must be well planned, observing the recommendations of this protocol and the transport must be done in the shortest possible time. Before transportation, it is necessary to request specific licenses from IBAMA or the state environmental agency in advance.

Figure 26 – Transport box model.

Catching and handling

When physical restraining of the animal, it is recommended to catch the merganser with a catcher net of a size compatible with the size of the bird, made with resistant material (canvas, cloth, parachute nylon, rip-stop nylon) so that it does not get damaged during the operation and the animal is doesn´t get harmed.

Once in the net, the bird must be restrained, with two hands (image 27), keep it as short as possible and excessive force should not be applied when restraining the bird to avoid fractures, especially in the legs and wings. During restraint, the thoracic-abdominal region must be left free, as birds do not have a diaphragm, having a single coelomic cavity, they need to expand the thoracic-abdominal region to breathe and, if there is excessive compression, it may have a respiratory arrest (Image 27). In addition, birds that share the same enclosure must be released into the enclosure at the same time, avoiding fights between individuals due to hierarchy in the enclosure.

The entire procedure should be as brief as possible, reducing stress and avoiding respiratory and circulatory collapse. For this, it is recommended that handling the merganser should be carried out by an experienced person.

Image 27 – Holding the merganser

Food

Even without any previous experience with *ex situ* feeding of the species, all brazilian mergansers ducklings raised under human care were born well and it was possible to keep them in good conditions with a diet based on Brazilian Merganser pellets, from the brand Reino das Aves. After becaming adults, these individuals continued to receive the same feed and showed excellent development.

Due to the fact that this species has never been kept in an *ex situ* environment before, there is still no literature on its feeding in captivity. However, with this history of maintaining the first 10 individuals, it appears that it is possible to raise, maintain, reproduce the species with extruded pellets for Brazilian Mergansers. The protein in this pellets comes from fish, a factor that meets the nutritional requirements of the species.

The diet is offered in a stainless steel feeder, coated internally with cement, preventing the birds from turning over the bowls, preventing accidents and food waste. This material is easy to clean and does not add pathogenic agents to its material (Image 28). The bowl needs to be placed near the pond.

Lambari (*Astyanax* sp.) fingerlings up to 5 cm long are offered daily as supplement and environmental enrichment to stimulate fishing behavior, but it does not replace extruded feed.

Image 28 – Feeder

Pairs already separated in breeding aiviaries will receive a different diet during the breeding season. This variation, or nutritional shock, is a technique used to mimic the variation in food supply in nature, which directly impacts animal reproduction.

Through nutritional shock, it´s possible to cause variations in the basic elements of the diet, which will form, for example, fatty acids that are the basis of reproduction hormones, which triggers the hormonal cascade that induces the behavior and physiology of reproduction (Chart 1).

Every diet change must go through a transition period of at least one week. The bird is offered half of the portion of new food mixed with the old portion. As the days go by, the amount of the old food is gradually reduced, until 100% of the new feed is used.

UMIDADE (MÁX)	130,00 g/kg	VITAMINA B2 (MÍN)	11,25 mg/kg
PROTEÍNA BRUTA (MÍN)	320,00 g/kg	VITAMINA B6 (MÍN)	7,50 mg/kg
LISINA (MÍN)	21,00 g/kg	VITAMINA B12 (MÍN)	36,00 mcg/kg
METIONINA (MÍN)	8.000,00 mg/kg	NIACINA (MÍN)	50,00 mg/kg
EXTRATO ETÉREO (MÍN)	70,00 g/kg	ÁCIDO PANTOTÊNICO (MÍN)	13,50 mg/kg
FIBRA BRUTA (MÁX)	25,00 g/kg	ÁCIDO FÓLICO (MÍN)	1,00 mg/kg
MATÉRIA MINERAL (MÁX)	90,00 g/kg	BIOTINA (MÍN)	0,50 mg/kg
CÁLCIO (MÍN)	15,00 g/kg	COLINA (MÍN)	500,00 mg/kg
CALCIO (MÁX)	20,00 g/kg	VITAMINA C (MÍN)	50,00 mg/kg
FÓSFORO (MÍN)	10,00 g/kg	FERRO (MÍN)	50,00 mg/kg
VITAMINA A (MÍN)	30.000,00 UI/kg	COBRE (MÍN)	20,00 mg/kg
VITAMINA D (MÍN)	3.000,00 UI/kg	ZINCO (MÍN)	70,00 mg/kg
VITAMINA E (MÍN)	150,00 UI/kg	MANGANÊS (MÍN)	100,00 mg/kg
VITAMINA K (MÍN)	3,75 mg/kg	IODO (MÍN)	2,00 mg/kg
VITAMINA B1 (MÍN)	3,75 mg/kg	SELÊNIO (MÍN)	0,20 mg/kg

Table 1 – Table with nutritional values of the pellets for breeding Brazilian Mergansers from the brand Reino das Aves.

Individual marking

Animals that newly arrived from the wild will receive open rings with 11 mm diameter. On the other hand, birds born under human care will receive a 11 mm diameter closed rings between 25-30 days of life, following the dimensions already known and tested at the Zooparque. Below is a demonstrative drawing of the procedure for placing the closed ring (Image 29).

If the use of microchips is necessary, they must be implanted intramuscularly, respecting the manufacturer's standards, and will always be implanted in the pectoral muscles.

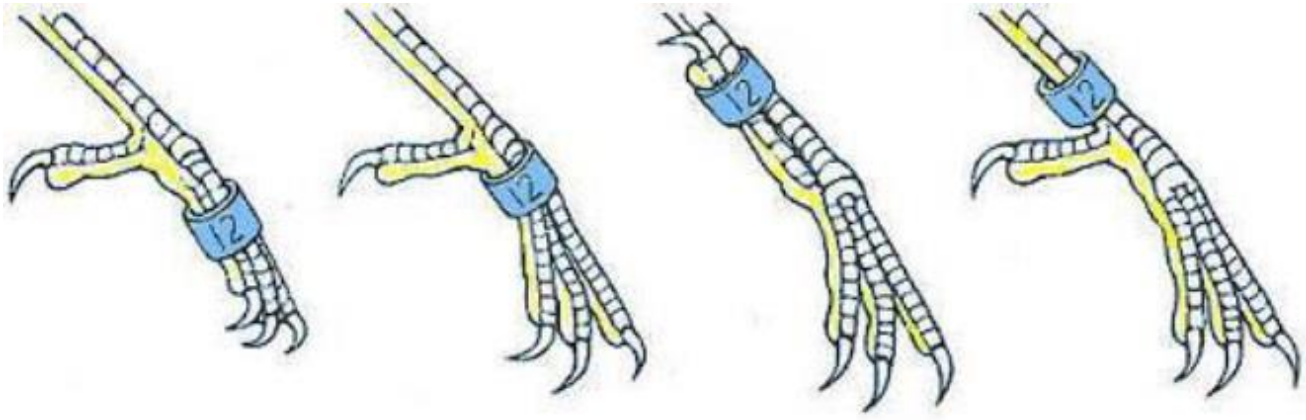

Image 29 – Demonstration of how the banding is done

Chapter III - Reproduction

Reproductive period

The *ex situ* Brazilian Merganser breeding season occurs annually from May to August.

The breeding group should already be formed about 60 to 90 days before the start of the breeding season. During this period observation must be carried out daily to assess the formation of the pairs and to separate them due to possible fights.

Parent rearing

Parental rearing is the most recommended technique for *ex situ* Brazilian Merganser reproduction. In this scenario, the female will be responsible for incubating of the eggs and, after hatching, the pair will be responsible for parente rearing.

The experience with the *ex situ* creation of Brazilian Merganser at Zooparque Itatiba has already shown that parental rearing is effective and highly advisable, even for pairs formed by adults who were created through artificial incubation (Images 30 to 32).

The ducklings of this species have great difficulties in eating by themselves in the first days of life, which is why parental care is so important. In this way, it is essential to pay attention if the parents are teaching the ducklings to feed properly and if they are well nourished. In this phase, lambari (*Astyanax* sp.) fingerlings of 2-4 cm in length must be offered every day so that the young can learn to fish and have a complete nutrition.

Figure 30 – Ducklings born in the nest with the parent.

Figure 31 – Ducklings in the pond.

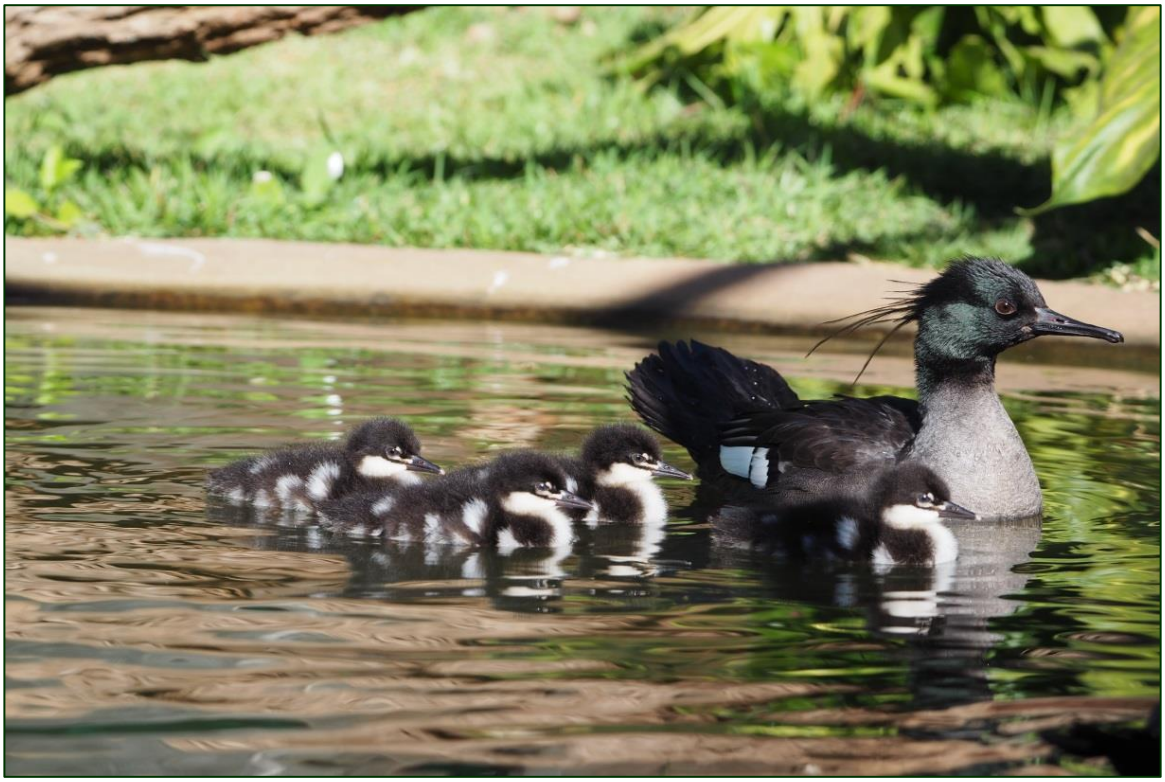

Figure 32 – Ducklings swimming in the water with their mother.

Hand rearing

The natural incubation of the eggs by the female is always recommended. Artificial incubation requires the presence of a trained team to carry out the work and should only be used when the adult female Merganser is not in a position to carry out the incubation, being highly discouraged for hatchlings born from pairs already kept in captivity. In situations where the female has laid eggs in different parts of the enclosure or is not incubating the eggs properly, artificial incubation may be necessary as a way to avoid the loss of possible fertile eggs.

In the case of eggs collected *in situ* and transferred to captivity, artificial incubation is necessary. This technique consists of incubating the eggs in an artificial incubator until hatching. The ideal incubation temperature used for the merganser Family is around 37.2°C, with a maximum humidity of 50%. Automatic rotation is maintained. The incubator used for the artificial incubation of the eggs is a HEKA, and must remain in a dark environment with the equipment´s light off (Image 33).

Ovoscopy should be performed almost every day during the incubation period to inspect all eggs (Image 34). This regularity in performing the procedure allows monitoring of embryonic development at all stages. Eggs that are not fertile and eggs that have suffered embryonic death must be removed from the incubator, avoiding contamination of other healthy eggs.

Image 33 – HEKA artificial incubator model

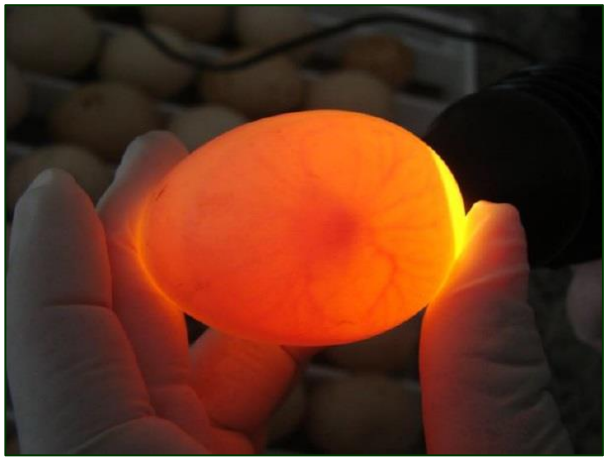

Image 34 – Embryonic development observed during ovoscopy.

Rearing box

After the hatching of the eggs in the incubator, the ducklings are transferred to an ICU to dry (Image 35), where they remain for 24 hours without feeding and water, a standard procedure for the bird to fully collect the yolk sac, avoiding infections. The ICU must be in a dark and silent environment, simulating the environment inside the nest, and preventing the ducklings to become agitated. It is also important to remember that, even if ducklings are raised by hand, the ideal is that they suffer as little as possible from imprinting. Therefore, the dark and silent place prevents them from being stimulated by people and sounds in the environment.

The next day they will be transferred to the “Rearing Box”, where they will remain for at least another 10 days. During this period, they are weighed daily for clinical control and daily weight gain control.

Image 35 – ICU

The great difficulty of hand rearing waterfowl ducklings is hypothermia. Ducklings have a natural behavior of looking for water sources to swim in the first days of life; however, at this age, the internal temperature regulatory system of birds is not yet able to ideally control the body temperature of these animals at 42ºC. Thus, in a closed

environment, the ducklings are not able to dry completely after getting wet and could get into a hypothermia, which leads the duckling to death quickly. On the first day in the rearing box, an artificial grass mat can be used below the heating, where the ducklings will settle, which will also avoid heat loss. It is important that the artificial grass is tall and soft. At this time, it is also important to provide the duckling with a shallow water reservoir, with constant water dripping, to encourage the animals to look for water for consumption. After the second day in the box, it is no longer necessary to use the mat.

The “Rearing Box” was developed precisely so that waterfowl ducklings could swim and dry themselves quickly (Images 36 to 38). When the duckling comes out of the water, it will look for warmth under the artificial mother (heating lamp), where there is a metal grid that dosen´t have contact with the water, allowing a quick drying.

The Rearing Box has the following measurements: Height: 52 cm, Width: 80 cm, Height: 60 cm, Length: 130 cm, Weight: 13 kg, Weight of the metal grid: 10 kg.

The Box for Artificial Breeding of Waterfowl consists of:

• 01 fiberglass box with two drains; (1).

• 01 support grid made of welded galvanized mesh; (2).

• 01 artificial brooder, which is a large hood with ceramic mouthpiece (3)

• 01 Ceramic resistance lamp 100 W, 22 v (4).

The brooder must be placed at a certain height that doesen´t allow the ducklings to have any physical contact with the lamp, which can cause burns due to the high temperature generated by the lamp. It is necessary to check that the ducklings are comfortable with the temperature, if the birds are cold, it is necessary to lower the height of the hood, and if they are hot, increase the height of the hood (Image 39).

The side of the box chosen to be used as a pool must receive constant water so that it can be changed, avoiding the accumulation of dirt such as food and feces. When the pool is completely filled, excess water will pass under the support grid, going to the drain. With this, the birds that are on the support grid do not have contact with the water (Images 40 and 41).

From 24 to 30 hours after the hatch, the ducklings will be allowed access to the pool area. However, although the ducklings have the choice between the dry and wet area, you will have to observe if the ducklings are drying themselves correctly. If they are continually getting wet or not drying off enough, it is necessary to cut the access to the water for some hours untill they are completely dry. Otherwise, they may suffer from a drop in body temperature, therefore, it is extremely important that the professional responsible for the care of the ducklings already has experience in raising Anatidae.

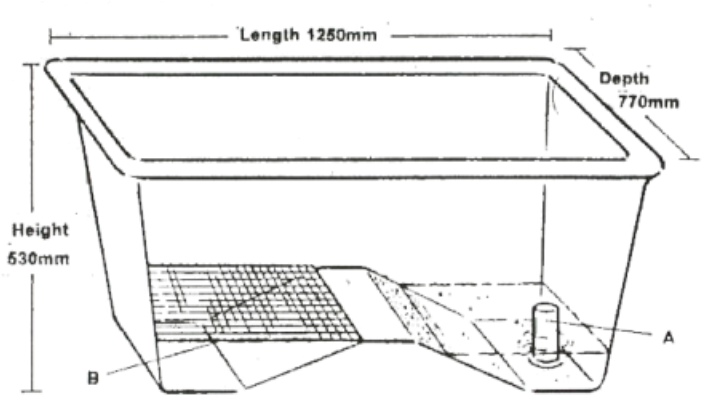

Image 36 – Illustrative drawing of the "Rearing Box" with measurements.

Image 37 – "Rearing Box".

Image 38 – "Rearing Box". 1 – Fiberglass Rearing Box; 2 – Wire mess support; 3 – Artificial brooder; 4 - Heating lamp.

Image 39 – Merganser duckling under the artificial mother in the rearing box.

Image 40 – Merganser ducklings swimming and feeding in the "Rearing Box".

Image 41 – Merganser ducklings

The ducklings are being fed after the first 24 hours of hatching. Feeding can be done either with the use of breeding pellets for Brazilian Merganser, or with the use of live fish fingerlings, up to 3 cm in length. Although rearing with both food sources is possible, fish-based feeding is highly recommended. In addition to faster development, the young fish dry easily due to the absence of fat present in the pellets, in addition to stimulating the natural behavior of the species, which tends to fish with its parents from the first day of life.

Ideally, the rearing box should be monitored by a 24-hour security camera. Remote monitoring is essential for controlling ducklings with as little human interference as possible. It is possible to control the behavior and feeding of the ducklings through the equipment.

Aviary for ducklings - “Nursery”

Ducklings around 10 days old should be transferred from the “Rearing Box” to larger outside enclosures. This change of environment is extremely important, as ducklings need sunlight for healthy development. Mergansers are territorial since they were young, so ducklings of similar ages should be placed together as soon as possible, and always with close observation to avoid fights. The “Nursery” should offer shelter with a heat source throughout the day. During the first 20 days in this environment, the ducklings must remain in the environment between 9:00 am and 3:00 pm, only on sunny days; and need to return to the “Rearing Box” for the overnight stay. After the first 20 days, all the ducklings can sleep closed in the aviary´s holding area (Image 42), always with adequate heating and covering on the floor for temperature control. It is necessary that the aviaries are connected by a security aisle, and through it is possible to access the holding area, using an observation window (Images 43 and 44).

The “Nursery” must have a security aisle, like any enclosure, and the following dimensions: 7 m long x 4 m wide x 2.5 m high. Masonry wall along the entire side, 0.5 m high and holding área of 2 m long x 1.5 m wide x 1.6 m high. It must have a pond, of around 2x2m and around 0.40m deep (Image 45). Enclosures with similar measures can be used, but only if they meet the needs of the animals and are accepted after inspection.

Image 42 – Nursery enclosure.

Image 43 – pond and setting of the “Nursery” enclosure.

Image 44 - Security aisle access window into the holding area

Image 45 – Security aisle

During the first 10 days that the ducklings are in the “nursery”, it is necessary to limit their access to the entire enclosure. As the area is large, you will need to force them to stay close to the water, preventing them from staying in places far from the pond and, consequently, not eating properly and not enough swimming, which is extremely importanty for their development. For this, a temporary barrier must be built and placed in the enclosure, with four walls of approximately 4 m wide X 0.4 m high, forming a square that will be maintained around the lake (Images 46 and 47). After 30 days, the barrier can be removed, allowing the ducklings to have access to the entire enclosure area.

Picture 46 – Barriers inside the nursery grounds.

Picture 47 – Merganser ducklings inside the enclosure.

The ducklings will remain in this enclosure until they are fully grown, becoming young adults, between 4 to 5 months old. Some visual characteristics that help to determine this moment are the total loss of the down feathers, the total growth of the crest and the darkening of the feathers in the pectoral region. After this period, the birds must be transferred to the pairing enclosure.

Enclosure for adolescent birds

When the young birds already have good feathering, which usually occurs between 4 and 5 months, they should be transferred to a larger enclosure for natural pairing. However, to be able to add several Brazilian Mergansers in the same aviary, it is necessary to have a large enclosure with two or more ponds of water, so that there will be formation of hierarchical groups according to the selection made by the birds themselves and, consequently, the formation of pairs.

The size of this aviary will depend on the number of birds that will be placed together; however, we indicate that the larger the space, the better the result. In Zooparque, an aviary measuring 20 m long x 12 m wide x 3 m high is used, but enclosures with an approximate size of this can be used after approval during the inspection. The pond needs to be 25 m² in size and 0.6 m deep (Image 48). The size can vary, but the essential thing is that they have a large area for the animals. The enclosure is completely closed on the sides with galvanized mesh and sombrite on top and natural logs and rocks should be placed along the edge of the pond.

It is necessary to follow the guidelines in the *studbook* to pair the birds, in this way it is possible to be sure that the pairs will be formed by individuals from different regions.

Image 48 – Adolescent aviary for pairing the birds.

Chapter IV - Sanitary measures

Preventive medicine

As preventive measures, the following procedures must be adopted:

- Knowledge about the biology and management of the species;
- Daily observations, usually performed while cleaning and feeding;
- Perform clinical examinations on birds annually;
- Quarantine for receiving new birds;
- Performing coproparasitological exams every six months;
- Conducting periodic health examinations (every six months or annually);
- Avoid rearing birds of different species in the same enclosure;
- Carry out periodic cleaning and disinfection of the enclosures;
- Adequate cleaning and disinfection of equipment and fomites used in the breeding site;
- Adequate nutrition for each stage of life and potable water available;
- Training of people involved in maintenence of the birds;
- Constant veterinary medical assistance;
- Pest and vector control.

Quarantine

The institution must have a quarantine, which consists of a physical structure for the isolation of animals that have recently arrived at the site. Therefore, any animal that enters the establishment, whether young or adult, must be immediately isolated in this structure, both to prevent the spread of potential pathogens and to allow closer/accurate examination and treatment of individuals, as necessary.

During admission to quarantine, animals undergo a complete physical examination. At this time, the collection of suitable biological samples is carried out to run specific tests of sanitary importance, as shown below.

The suggested quarantine period is 30 days, unless symptoms are observed, which may require an extension of this period.

After checking the results, the appropriate measures will be taken and, after possible treatments, the tests are repeated. After verifying that there are no infectious agents or parasites present, the animals are ready to be released in their proper aviaries.

Isolation

The institution must have a physical structure that allows the isolation of mergansers, when they need to be removed for treatments. Usually the area used is an isolation room found in the institution's veterinary sector.

Methodology adopted for carrying out tests on birds as part of the preventive medicine program

All animals must undergo a complete anamnesis and physical examination, performed by a competent professional and all will have biological samples collected for standard examinations established below; if there is any specific suspicion, the veterinarian will request additional tests.

1- Exam: Bacteriological culture
Biological material to be collected: excreta.
Methodology: bacterial culture for bacteria isolation in selective broth medium.
If there is growth of pathogenic bacteria, an antibiogram will be performed to choose the most appropriate antibiotic.
Time interval: Every 6 months, or whenever there is suspicion.

2- Coproparasitological evaluation
Methodology: direct fresh microscopy examination and examination of fluctuation in saturated sodium chloride solution in optical microscopy at 100x and 400x.
Time interval: Every 6 months, or whenever endoparasitosis is suspected.

3- PCR test for: Mycoplasmosis (*Mycoplasma* spp. and *Mycoplasma gallisepticum*)
Methodology: molecular biology technique described by the OIE (2021).
Material: Oropharyngeal swab.
Methodology: molecular biology technique described by Meulemans et al. (2001).
Time interval: Every 6 months, or whenever there is suspicion.

4- PCR test for Avian Adenovirus (Adenoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Time interval: Every 6 months, or whenever there is suspicion.

5- PCR test or bacterial culture for Salmonellosis (*Salmonella* spp.)
Material: Serum, organs, excreta, cloacal swabs
Methodology: molecular biology technique, or bacterial culture for isolation of bacteria in selective broth described by OIE (2022).
Time interval: Every 6 months, or whenever there is suspicion.

6- PCR test or bacterial culture for Pasteurellosis or Avian Cholera (*Pasteurella multocida*)
Material: Blood, organs, excreta, cloacal swabs.

Methodology: molecular biology technique, or bacterial cultivation for bacterial isolation in selective broth described by OIE (2021).
Time interval: Every 6 months, or whenever there is suspicion.

Protocol of exams to be carried out during quarantine

The exams will be the same as those listed in item 10.4 plus the exams listed below:

PCR test for: Newcastle Disease (Paramyxoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Methodology: molecular biology technique described by the OIE (2021).

PCR test for: Avian Influenza (Orthomyxoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Methodology: molecular biology technique described by the OIE (2021).

Percentages of birds to be examined in the Prophylactic Sanitary Protocol for the Maintenance of *Mergus octosetaceus*

In order to validate the protocol with a minimum number of reliable samples, which really represent the health condition of the flock, the following will be evaluated:

• Flock with 1 to 5 specimens: all specimens will be tested;

• Flock with 6 to 20 specimens: exams must be carried out in at least 50% of the population;

• Flock with 21 to 100 specimens: exams must be carried out in at least 30% of the population;

• Flock with more than 101 animals: tests must be carried out in at least 20% of the population.

Chapter V - Allocation of genetic material

Necropsy and disposal of carcasses

Necropsy consists of a careful post-mortem examination that assists in the clinical diagnosis and consists of the external and internal analysis of the body cavities and organs of a cadaver, in order to elucidate the cause of death or verify the extent and nature of the injuries caused by illnesses. It must be performed as soon as possible or within 24 hours with the carcass kept under refrigeration (4°C to 8°C), to ensure the feasibility of complementary exams. During the examination samples may be collected for cytology, microbiology, serology, toxicology, parasitology and molecular biology.

Organs and tissues with lesions should be collected in 10% buffered formalin, and after three days of fixation in formalin, this should be replaced with 70º GL alcohol for feasibility of histology and immunohistochemistry exams. Necropsy and sample collection must be performed following the protocol described by Teixeira (2011), cosmetically as described by Goncalves and Salgado (2011) in order not to damage the carcasses.

Chapter V - Expense control

Maintenance costs

Like all species kept under human care, the Brazilian Merganser generates expenses for its maintenance and handling. However, this species has different life habits that need to be considered by the institution that will keep it under its care.

The feeding of the Brazilian Merganser in a captive environment is based on feed and live fish fingerlings. Because of this, in addition to the cost of purchasing these two dietary sources, a special structure is needed to keep the fish alive until the moment of consumption. Therefore, the institution needs to have a maintenance structure for these fingelings, forming a system with tanks, water pumps, water oxygenation and feeding of the fish. To keep this system operating, it is necessary to use additional water and energy, which will vary from institution to institution, according to the population of mergansers housed there.

The species also needs a running flow of clean water, so it is important that the institution has a plan for expenses with water consumption and filtering, if it is reused.

In addition, there is the cost of specialized labor. Hiring a person with experience in the care of anatids is essential for the care of Brazilian Mergansers, as the professional's experience will make all the difference to the success in handling the species.

Case study: Zooparque Itatiba

Zooparque Itatiba can serve as an example for new institutions that are interested in knowing the expenses with the maintenance of the species. For this, a survey was carried out considering the expenses that Zooparque had with the care of the Brazilian Merganser in the year 2021.

For this, we considered the number of 50 individuals, among ducklings, juveniles and adults. It is noteworthy that consumption in this institution is very high due to the large number of animals and that food consumption throughout the different stages of growth will vary from one individual to the other, therefore, average values will be presented to facilitate understanding.

As the main source of the diet, Brazilian Merganser pallets is used, produced by the company Reino das Aves. Each adult merganser consumes an average of 75g of feed per day. The bag contains 25kg of feed and costs approximately R$ 270.00 for breeding feed and R$ 180.00 for maintenance feed (the costs are subject to company readjustments). Considering the variation of the diet throughout the year, it is possible to consider that the approximate consumption of pellets for reproduction is used during six months of the year and maintenance is used in the other six months. In 2021, Zooparque Itatiba had a cost of approximately R$ 10.500,00 with food for the Brazilian Merganser.

The consumption of live fish varies throughout the year, being higher during the reproductive period. This is due to the fact that the pairs consume more fish to help with reproduction and also because the young consume a very high number of fingerlings, wich is their main food source in the first months, until the diet is adjusted for feed consumption. Each adult individual consumes an average of 20 fish per day, while the young have varied consumption, and in the growth phase they reach consumption of approximately 130 fish per day. This value will decrease as the animal stabilizes its weight and the feed is added to the diet. In 2021, Zooparque Itatiba had a cost of approximately R$ 100.000,00 in fingerlings, including costs to feed the hatchlings, juveniles and adults.

In addition to costs on electricity to maintain the water pumping system and raise fish, in 2021 Zooparque purchased a water filtration system to avoid wasting this resource. The filtering system cost R$ 60.000,00 and can filter the water of the 17 aviaries in the institution's *ex situ* Reproduction Sector.

Other costs such as labor, energy, water and enclosure construction were not accounted for in this summary and will vary according to the plantel present in each institution.

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Museu de Zoologia
Universidade de São Paulo

São Paulo, July 30, 2024

United States Fish and Wildlife Service
Department of the Interior
Division of Management Authority, Branch of Permits
MS: IA 5275 Leesburg Pike
Falls Church, VA 22041-3803

The application is for the Import of Live Animals that are listed in the United States Endangered Species Act.

To whom it may concern

I have known Michael Lubbock for twenty years since we were involved with the initial Brazilian Merganser (*Mergus octosetaceus*) Recovery Program founded by Wolf Bartmann. At the time, Mike was the avicultural adviser for the captive breeding of the Mergansers once all other possible sources to save the species were exhausted. He has visited Itatiba Zoo along with Dr. Dustin Foote the Director of Aviculture at Sylvan Heights, and they have replicated the breeding aviaries for the birds at their facility in North Carolina. I would highly recommend these 5 pairs of birds go to Sylvan Heights Bird Park to secure the future of the birds, as there is no better waterfowl facility in the United States.

Below is when we first met approximately 20 years ago
Original member of the Brazilian Merganser Recovery Team
A special group developed under the Wildfowl Wetlands Trust UK Threatened Waterfowl Specialist Group to preserve the critically endangered Brazilian Merganser
Brazilian Merganser Conservation Project

Mike Lubbock was invited to a workshop in Brazil to address the dire situation of the Brazilian Merganser, one of the rarest waterbirds. The workshop was organized by Wolf Bartmann of the Dortmund Zoo in Germany and included experts from around the world in the field of wild and captive waterfowl management. Mike continued to work as a project advisor to Brazilian naturalist groups, having overseen the collection of Brazilian Merganser eggs to be hatched and reared in captivity.

Sincerely yours

Prof. Dr. Luís Fábio Silveira

Vice-director

Curator of Birds

Museu de Zoologia da Universidade de São Paulo

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Dear Animal Population Management Committee Members,

I am writing to request the renewal of Sylvan Heights Bird Park as a Sustainability Partner for the Saddle-billed Stork SSP. Sylvan Heights Bird Park has participated in the Saddle-billed Stork SSP since March 2018 and has been a Sustainability Partner for saddle-billed storks since October 2019.

The North American Regional population of saddle-billed storks is currently declining, with only 51 individuals at 22 institutions. The SSP faces a number of challenges including low reproductive success and finding and retaining institutions that can hold and care for these large storks. With one exception, flight restricted males have not been able to produce fertile eggs in this population. The males appear to need the balance flight lends them to successfully copulate with females at the nest. This in itself lends to the breeding difficulties in this species as many institutions cannot provide large enclosed spaces. In fact, less than 50% of the North American Regional population's saddle-billed storks are held in enclosed spaces allowing for flighted birds.

Sylvan Heights Bird Park is one of those few institutions that have dedicated enclosed space for their stork pair. The bird park specifically built a large aviary and enclosed nesting platform for breeding storks in 2017/2018. The SSP recommended that they receive a genetically valuable established pair in their prime breeding years. This pair had been previously held in an open-topped exhibit, thus the birds had to be flight restricted. With the enclosed space at Sylvan Heights the male is kept full-winged which will hopefully aid in the breeding success of this pair. Breeding at Sylvan Heights Bird Park would increase genetic diversity and help the population to approach the potential GD of over 90%. "Much greater long-term gene diversity can be maintained if a larger proportion of the population contributes to reproduction." (Saddle-billed Stork Breeding and Transfer Plan 2016) The Saddle-billed Stork Population Viability Analysis (PVA) "results indicate that the saddle-billed stork population is likely to decline in size and have a high extinction risk under its average breeding rate from the past ten years. However, increasing potential space and breeding could allow the population to become demographically stable near its target size of 90 individuals." (April 2017) "Increased reproduction and recruitment of additional holding institutions would greatly improve the demographic and genetic health of this SSP." (Saddle-billed Stork Breeding and Transfer Plan 2022) If Sylvan Heights Bird Park cannot participate in the SSP, the population would lose a genetically valuable breeding pair and much needed enclosed holding space.

Sylvan Heights Bird Park has worked with saddle-billed storks since March 2018. Mike Lubbock, the Executive Director of the park, has worked with saddle-billed storks during his long career in aviculture as has Dustin Foote, the Director of Aviculture. Staff at Sylvan Heights regularly communicate in a timely manner with the SSP and have completed a survey in support of the SSP. Sylvan Heights Bird Park remains committed to transferring birds as needed per SSP recommendations. The park currently works with 26 SSP programs, proving their dedication to animal care and welfare.

I have received confirmation from the Sylvan Heights Bird Park's Executive Director Mike Lubbock that he has read and understood the AZA's Code of Professional Ethics, the Full Participation in the SSP Policy, the Policy on Responsible Population Management, and the AZA Accreditation Standards related to animal care and welfare.

Harrison Edell, the Ciconiiformes, Phoenicopteriformes and Pelecaniformes TAG Chairman, has reviewed Sylvan Heights Bird Park's Sustainability Partner application and fully supports their inclusion in the SSP.

Thank you for your time and consideration of this request to renew Sylvan Heights Bird Park Saddle-billed Stork SSP Sustainability Partner status.

Sincerely,

Marcie Herry
Assistant Zoological Manager – Dallas Zoo
650 South R.L. Thornton Frwy
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(469) 554-7244
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Saddle-billed Stork Program Coordinator

SYLVAN HEIGHTS BIRD PARK

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info@shwpark.com

[redacted]

January 7th, 2023

Chico Mendes Institute for Biodiversity Conservation

Dear President,

We, Mike Lubbock, Director and Dustin Foote, Director of Aviculture of Sylvan Heights Bird Park, would like to officially certify and confirm that our institution is interested in integrating into the captive conservation program for the Brazilian Merganser (*Mergus octosetaceus*) and studbook.

We understand the importance of combining in situ and ex situ conservation and are passionately committed to wildlife conservation programs for endangered species. For this reason, we support different wildlife conservation programs around the world. We have supported the Brazilian Merganser ex situ Reproduction Program developed by Zooparque Itatiba from the beginning and considering the history and partnership between our institutions, we would like to formally integrate into the program.

Our institution has the funds necessary to build the aviaries, keep and breed the birds following the Protocol for the Maintenance and Management of the Brazilian Merganser (*Mergus octosetaceus*) Under Human Care, developed by Zooparque Itatiba. Our resources will also cover the expenses to send out staff to Zooparque Itatiba for the training program developed by them and required in the protocol. Additionally, our facility has a tremendous amount of experience with breeding endangered waterfowl.

We also certify by this document that all the birds, including the offspring, will be provided when requested by the captive conservation program for the Brazilian Merganser and we will fully participate in the species studbook.

[redacted]

Sincerely,

Mike Lubbock
Director, SHBP

Dustin Foote, M.S.
Director of Aviculture, SHBP
PhD Candidate, ECU

Scope	Associação De Zoológicos e Aquários do Brasil (AZAB) / AZAB
Studbook Name	Mergus octosetaceus
Date of Export	06 January 2025
Filters	Status = Alive and As of Jan 06, 2025

Studbook Animals

Studbook ID	GAN	Current Location	Current Local ID	Sex Type	Hatch Date	Current Status	Sire	Dam	Age	Birth Type
4		ITATIBA	7989	Male	Aug 03, 2014	Alive	WILD5	WILD6	10Y,5M,3D	Captive Birth/Hatch
5		ITATIBA	8183	Male	Jul 01, 2015	Alive	WILD7	WILD8	9Y,6M,5D	Captive Birth/Hatch
8		ITATIBA	8186	Male	Jul 01, 2015	Alive	WILD7	WILD8	9Y,6M,5D	Captive Birth/Hatch
14		ITATIBA	8448	Male	Jul 15, 2017	Alive	WILD9	WILD10	7Y,5M,22D	Captive Birth/Hatch
15		ITATIBA	8449	Male	Jul 15, 2017	Alive	WILD9	WILD10	7Y,5M,22D	Captive Birth/Hatch
16		ITATIBA	8450	Male	Jul 20, 2017	Alive	WILD11	WILD12	7Y,5M,17D	Captive Birth/Hatch
18		ITATIBA	8452	Female	Jul 20, 2017	Alive	WILD11	WILD12	7Y,5M,17D	Captive Birth/Hatch
23		ITATIBA	8457	Female	Aug 16, 2017	Alive	4	1	7Y,4M,21D	Captive Birth/Hatch
24		ITATIBA	8458	Female	Aug 16, 2017	Alive	4	1	7Y,4M,21D	Captive Birth/Hatch
27		ITATIBA	8580	Male	Jul 09, 2018	Alive	5	9	6Y,5M,28D	Captive Birth/Hatch
28		ITATIBA	8581	Male	Jul 09, 2018	Alive	5	9	6Y,5M,28D	Captive Birth/Hatch
29		ITATIBA	8732	Female	Jul 08, 2019	Alive	14	17	5Y,5M,29D	Captive Birth/Hatch
34		ITATIBA	8746	Female	Sep 01, 2019	Alive	4	1	5Y,4M,5D	Captive Birth/Hatch
35		ITATIBA	8747	Female	Sep 01, 2019	Alive	4	1	5Y,4M,5D	Captive Birth/Hatch
37		PRAHA	Indeterminate	Female	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
38		ITATIBA	8915	Female	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
39		ITATIBA	8916	Male	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
40		ITATIBA	8917	Male	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
41		PRAHA	Indeterminate	Female	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
43		ITATIBA	8920	Female	Aug 01, 2020	Alive	28	19	4Y,5M,5D	Captive Birth/Hatch
45		ITATIBA	8923	Male	Aug 04, 2020	Alive	27	25	4Y,5M,2D	Captive Birth/Hatch
46		ITATIBA	8924	Female	Aug 04, 2020	Alive	27	25	4Y,5M,2D	Captive Birth/Hatch
48		ITATIBA	8926	Female	Aug 04, 2020	Alive	27	25	4Y,5M,2D	Captive Birth/Hatch
49		ITATIBA	8929	Female	Aug 08, 2020	Alive	WILD15	WILD16	4Y,4M,29D	Captive Birth/Hatch
50		ITATIBA	8930	Female	Aug 08, 2020	Alive	WILD15	WILD16	4Y,4M,29D	Captive Birth/Hatch
55		ITATIBA	9136	Male	Jul 03, 2021	Alive	WILD13	WILD14	3Y,6M,3D	Captive Birth/Hatch
56		ITATIBA	9137	Male	Jul 09, 2021	Alive	WILD17	WILD18	3Y,5M,28D	Captive Birth/Hatch

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Studbook ID	GAN	Current Location	Current Local ID	Sex Type	Hatch Date	Current Status	Sire	Dam	Age	Birth Type
57		ITATIBA	9138	Male	Jul 09, 2021	Alive	WILD17	WILD18	3Y,5M,28D	Captive Birth/Hatch
58		ITATIBA	9154	Female	Aug 09, 2021	Alive	27	25	3Y,4M,28D	Captive Birth/Hatch
59		ITATIBA	9155	Male	Aug 09, 2021	Alive	27	25	3Y,4M,28D	Captive Birth/Hatch
60		ITATIBA	9156	Male	Aug 09, 2021	Alive	27	25	3Y,4M,28D	Captive Birth/Hatch
63		PRAHA	Indeterminate	Male	Jun 24, 2022	Alive	WILD13	WILD14	2Y,6M,13D	Captive Birth/Hatch
64		PRAHA	Indeterminate	Male	Jun 24, 2022	Alive	WILD13	WILD14	2Y,6M,13D	Captive Birth/Hatch
65		PRAHA	Indeterminate	Female	Jun 24, 2022	Alive	WILD13	WILD14	2Y,6M,13D	Captive Birth/Hatch
66		ITATIBA	9318	Male	Jun 24, 2022	Alive	WILD13	WILD14	2Y,6M,13D	Captive Birth/Hatch
67		ITATIBA	9319	Male	Jul 14, 2022	Alive	40	50	2Y,5M,23D	Captive Birth/Hatch
69		PRAHA	Indeterminate	Female	Jul 14, 2022	Alive	40	50	2Y,5M,23D	Captive Birth/Hatch
71		ITATIBA	9326	Male	Jul 25, 2022	Alive	28	24	2Y,5M,12D	Captive Birth/Hatch
73		PRAHA	Indeterminate	Female	Aug 03, 2022	Alive	39	49	2Y,5M,3D	Captive Birth/Hatch
74		ITATIBA	9339	Male	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
76		PRAHA	Indeterminate	Male	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
77		ITATIBA	9342	Female	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
78		PRAHA	Indeterminate	Male	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
80		ITATIBA	9315	Female	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
81		ITATIBA	9346	Male	Aug 13, 2022	Alive	27	25	2Y,4M,24D	Captive Birth/Hatch
82		PRAHA	Indeterminate	Male	Aug 22, 2022	Alive	45	35	2Y,4M,15D	Captive Birth/Hatch
83		ITATIBA	9352	Male	Aug 22, 2022	Alive	45	35	2Y,4M,15D	Captive Birth/Hatch
85		ITATIBA	9480	Male	Jul 05, 2023	Alive	55	29	1Y,6M,1D	Captive Birth/Hatch
87		ITATIBA	9493	Female	Jul 20, 2023	Alive	16	23	1Y,5M,17D	Captive Birth/Hatch
88		ITATIBA	9509	Male	Aug 26, 2023	Alive	57	25	1Y,4M,11D	Captive Birth/Hatch
90		ITATIBA	9511	Female	Aug 26, 2023	Alive	57	25	1Y,4M,11D	Captive Birth/Hatch
91		ITATIBA	9515	Male	Sep 03, 2023	Alive	14	44	1Y,4M,3D	Captive Birth/Hatch
92		ITATIBA	9516	Female	Sep 03, 2023	Alive	14	44	1Y,4M,3D	Captive Birth/Hatch
93		ITATIBA	9517	Female	Sep 03, 2023	Alive	14	44	1Y,4M,3D	Captive Birth/Hatch
94		ITATIBA	9518	Male	Sep 03, 2023	Alive	14	44	1Y,4M,3D	Captive Birth/Hatch
95		ITATIBA	9519	Male	Sep 03, 2023	Alive	14	44	1Y,4M,3D	Captive Birth/Hatch
96		ITATIBA	Indeterminate	Indeterminate	Sep 15, 2024	Alive	59	50	0Y,3M,22D	Captive Birth/Hatch
97		ITATIBA	Indeterminate	Indeterminate	Sep 15, 2024	Alive	59	50	0Y,3M,22D	Captive Birth/Hatch
98		ITATIBA	Indeterminate	Indeterminate	Sep 15, 2024	Alive	59	50	0Y,3M,22D	Captive Birth/Hatch

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ZOOPARQUE ITATIBA

Dustin Foote
Sylvan Heights Bird Park

Itatiba, January 06th, 2025.

Dear Mr. Foote,

I'm writing to you regarding the letter of intent that Sylvan Heights sent to the Brazilian Merganser National Action Plan in 2022.

Because of your formal interest in participating in the conservation program of the species, the *studbook* would like to send 10 specimens of Brazilian merganser (*Mergus octosetaceus*) to you as part of the breeding program for the species.

Currently in Brazilian the *ex situ* population is kept only at Zooparque Itatiba and there are no other institutions in the country that have structure and availability to manage the birds at the moment. For safety reasons, it´s important to manage the captive population in more than one location. In addition, the program aims to reproduce the birds in captivity and later on start the reintroduction program but first it´s necessary to breed more birds, which is very difficult to do now considering the number of institutions participating. With more active members, we will have better reproduction numbers to expand the program and avoid a genetic bottleneck in the captive population.

It´s important to highlight that the animals and their future offspring are part of the species *studbook* and therefore property of the Brazilian government. To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Medes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation.

All the Brazilian Mergansers that your institution would receive, will participate in the *studbook* for analysis and recommendations and were born at Zooparque Itatiba – located at Zooparque de Itatiba Avenue, Itatiba/SP, Brazil, 13254-762 – through *ex situ* reproduction program. The identification of these birds are as follows:

RF

Studbook Number	ID (leg band)	Sex	Date of Birth (dd/mm/yyyy)
67	SP 11.0 AAA 002016	Male	14/07/2022
74	SP 11.0 AAA 002962	Male	13/08/2022
91	SP 11.0 AAA 002977	Male	03/09/2023
94	SP 11.0 AAA 002980	Male	03/09/2023
95	SP 11.0 AAA 002981	Male	03/09/2023
46	SP 11.0 AAA 001732	Female	04/08/2020
58	SP 11.0 AAA 002021	Female	09/08/2021
77	SP 11.0 AAA 002965	Female	13/08/2022
80	SP 11.0 AAA 002968	Female	13/08/2022
90	SP 11.0 AAA 002976	Female	26/08/2023

It´s important to begin the documentation process as soon as possible because the bureaucratic work involved of importing and exporting birds in Brazil usually takes a long time to be concluded.

I look foward to your reply and hope we can work closer together in the future.

Best regards,

ZOO ZOOPARQUE ITATIBA

Robert Frank Kooij
231.810.138-89
Sócio Gerente

Robert Frank Kooij
Director of Zooparque Itatiba
Brazilian merganser *studbook keeper*

Dr. Dustin J. Foote

Phone: [redacted] E-Mail: dustin@shwpark.com

Work Experience

Sylvan Heights Bird Park Director of Aviculture **January 2023-Present**

- Responsible for the direction and care of the living collection. Coordinates with curator and lead aviculturists to ensure birds, exhibits, and grounds are properly cared for. Supervises health, incubation, and hand rearing of collection animals.
- Responsible for the overseeing the design, construction, and maintenance of exhibits.

Sylvan Heights Bird Park General Curator **November 2017-2022**

- Responsible for the overseeing the design, construction, and maintenance of exhibits.

Sylvan Heights Bird Park Research Coordinator **January 2015-2017**

- Development and oversight of research projects including the White-winged Wood Ducks with Akron Zoo, Minnesota Zoo Baer's Pochard Genetic study, Houston Zoo Curassow Study, Fish and Wildlife Specimens Lab, Mazuri Feed Trials and B10k.
- Work with 8 local universities and colleges to include collection in undergraduate research and class work.

Sylvan Heights Bird Park Assistant Curator **January 2012-2017**

- Manage large collection of waterfowl and exotic birds. Overseeing a staff while providing instruction for husbandry skills, basic veterinary care, and breeding recommendations. Practiced in grant writing, federal and state permitting, budget planning, project planning/construction, record management, and diet development. Collaborating with education director on youth to college level education programs.
- Developed Sylvan Heights High Path Avian Influenza Response Plan through the Zoo and Aquarium all Hazard Preparedness Center, APHIS, USDA, and State departments.
- Oversee Avian Husbandry Internship Program.
- Institutional Representative for 16 Species Survival Programs.

Cornell Lab of Ornithology Research Developer **January 2011-January 2012**

- Developed an online curriculum through BirdSleuth, connecting kids with birds. Real life science concepts were explained through basic bird biology, allowing K-12 children to learn science by observing birds. After development, teacher workshops were led to instruct on how to best implement the curriculum in their lesson plans.

Maui Bird Conservation Center, San Diego Zoo **August-December 2010**

- Extended internship based on the husbandry of critically endangered Hawaiian avifauna. Daily routine consisted of diet preparation, husbandry, staff meetings, facility maintenance, and bird enrichment. Became acquainted with the intellectual demand of corvids, nesting behavior of Passeriformes, and the difficulties of pairing territorial species within a dwindling gene pool. Became familiar with conservational breeding objectives and hand raising releasable chicks.

Sylvan Heights Waterfowl Park Aviculture Internship **July-June 2010**

- Internship that dealt primarily with breeding of waterfowl. Participated in an Avian Husbandry Program that taught breeding behavior, husbandry, incubation, and nutrition of ducks, geese, and swans.

Emerald Forest Bird Gardens **March-August 2009**

- Husbandry internship learning about the breeding, incubation, and hand rearing of threatened Ramphastids, Psittacines, and Bucerotiformes. Internship was primarily focused on hand feeding of chicks from hatch day to fledging in addition to breeding management.

Cornell University Raptor Program Student Supervisor **January-August 2008**

- Responsible for management and breeding of numerous species of raptor. Managed student volunteers in educational presentations in public and educational venues. Worked with the Cornell Wildlife clinic to rehabilitate injured raptors.

Avian Hobbyist **1995-Present**

- Raise multiple species of poultry, exotic ducks, pheasants, pigeons, and passerines. Familiar with taking blood samples of birds for disease testing. Posses NC State Falconers license and experienced with raptors and telemetry.

Education

East Carolina University, Ph.D. **Graduated Spring 2023**

East Carolina University, M.S **Graduated Spring 2016**

Cornell University, B.S **Graduated Winter 2012**

- Animal Science major with numerous classes in animal behavior and nutrition, ornithology, ecology, biology, and botany. Worked 30 hours a week in addition to playing club soccer and course load.
- Became certified as a NY State Emergency Medical Technician basic, completing a yearlong rotation in ambulatory and emergency room settings.

Shoals Marine Lab **Summer 2011**

- Field Ornithology class providing mist net experience and ecological surveying. Collected data on Great Black-backed Gulls and Common Eiders.

New Visions Environmental Studies **Fall 2006-Summer 2007**

- Spent senior year of high school at Cornell University. Weekly schedule consisted of daily lectures, university classes, and Cornell Veterinary College rotations. Rotated through each department allowing familiarity with veterinary procedures and practices. Became familiar with Exotic Avian Care with an extended rotation in the Wildlife and Exotics Department. Senior research thesis was conducted on 12 fresh water streams. Monthly water quality samples and invertebrate population surveys were conducted to determine the affect of water quality on invertebrates.

Awards

Hancock Memorial Award **October 2016**

- International Wild Waterfowl Association for “Outstanding contributions to the collective knowledge of waterfowl through field and captive research”.

Professional Organizations

International Wild Waterfowl Association **2012-Present**

Cornell Lab of Ornithology **2010-Present**

Zoological Association of America **2015-Present**

Avicultural Society of America **2014-Present**

Association of Zoos and Aquariums Professional Member **2014-Present**

Presentations/Articles

ParkTalks **January 2015-Present**

- Developed monthly educational/informal talks on various science and bird topics for the general public.

Avian Pirates, Greenville Bird Club **2015**

RaptorsRule, Greenville Bird Club **2016**

Falconry: An Ancient Art in Modern Times, Chapel Hill Bird Club **2017**

African Finches, Raleigh Caged Bird Society **2016**

RaptorsRule, Raleigh Caged Bird Society **2017**

Breeding Flamingos, AAZK Conference **2013**

Waterfowl Nutrition, AAZK Conference **2014**

The Current Status of Anseriformes in the USA, AAZK Conference **2014**

Raising Shorebirds: Experiences at Sylvan Heights, AZA Conference **2017**

Hand-rearing Waterfowl: The Science is in the Setup, AZA Conference **2017**

RaptorsRule, Raleigh Caged Bird Society **2017**

Articles/Segments

Breeding Lesser Flamingos, AviaryLife **2015**

The Red, Red-breasted Goose Status, AviaryLife **2016**

Vultures, Eastern Living **2016**

Science and Sylvan, Words on Waterfowl **2016**

The Miraculous Egg, Words on Waterfowl **2014**

Avian Pirates, Words on Waterfowl **2015**

Raptors: Pirates of the Sky, Words on Waterfowl **2014**

Birds of a Feather, Virginia Morning Show **2015, 2016**

Local Highlights, WRAL-TV **2014, 2015**

Conferences/Presentations

Future of Waterfowl Conservation Workshop **February 2016**

- Developed, organized and moderated first FWCW for over 85 attendees from 7 countries at Scotland Neck, NC. Next workshop for 2019.

North American Ornithological Conference (Presented) **2016**

Association of Zoos and Aquariums Midyear Conference **2015, 2017**

American Federation of Aviculture Conference **2013, 2016**

American Association of Zookeepers **2013**

Publications/Contributing Publications*

Melding Research and Education in a Zoological Setting, MS Thesis **2016**

Conservation and Immunogenomics of the Endangered White-winged Duck, Dissertation **2023**

Visitor Perceptions and Reliance on Active and Passive Communication Techniques in Zoos, peerJ **2017**

***Karyotype Analysis and Sex Determination in Australian Brush-turkeys (*Alectura lathami),* Plos one** **2017**

***Comparative Transcriptome Analysis of Indian Domestic Duck Reveals Candidate Genes Associated with Egg Production, Scientific Reports** **2022**

***Dense Sampling of Bird Diversity Increases Power of Comparative Genomics, Nature** **2020**

Scientific Collection Trips

North American Hummingbirds, Arizona USA **April 2015**

- In collaboration with Toledo Zoo, worked in Arizona collecting three hummingbird species to establish husbandry protocols in captivity. Hal trap was used for adult, non-breeding individuals, quarantined in Toledo before transferred to Sylvan.

Andean Flamingos, La Paz, Bolivia **December 2016**

- In collaboration with La Paz Zoo, BIOTA, and local organizations, helped collect Andean and James flamingo eggs. Instructed zoo on construction/design of incubator, rearing pens, and aviary, and protocols for hatching eggs and rearing chicks.

Tammy Stanton

[redacted]

Scotland Neck, NC 27874

[redacted]

Professional Experience:

Sylvan Heights Bird Park, Scotland Neck NC Feb 2024-present
Lead Aviculturist

- Works closely with veterinarian, directors, and curators to care for the waterfowl species at the park.
- Responsible for daily care and or oversight of the daily husbandry of a large portion of the collection in mixed species aviaries.
- Develops and maintains husbandry protocols and helps lead the team in management of daily record keeping and the use of ZIMS. Works closely with the registrar to maintain effective records of parks animal collection.

Busch Gardens Tampa Bay, Tampa FL
Senior 1 Animal Care Specialist- Animal Care Center Sept 2016- Jan 2024

- Responsible for all collection animals being treated at the zoos hospital, all Quarantine animals, and all rehabilitating animals at Busch Gardens.
- Responsible for setting up appropriate habitats and getting diets started with the nutrition center for incoming Quarantine animals and rehab birds.
- Work closely with all veterinarians and veterinary technicians on hospitalized animal cases. Used strong communication skills to provide veterinary staff with key information about animals under my care
- Fluent in TRACKS record keeping system. Used for daily record keeping and tracking of medications, daily nutritional goals, and animal measurements.
- Learned new skill sets and became a strong asset in capture and restraint for wild rehab birds and small mammals.
- Developed and maintained several protocols and SOPs for hospital husbandry.
- Started and maintained Busch Gardens own live insect propagation center. Started with superworms to maintain our supply for collection animals during COVID shortages. Now propagate mealworms, superworms, and waxworms for collection animals.

Senior 1 Animal Care Specialist-Nutrition Center Jan 2015-Sept 2016

- Responsible for daily diet preparation working with the team for the entire zoo collection. Trained on all tables and preparation of all diets.
- Assist Nutritionist with the regular diet changes and maintenance of the Animal Diet Database.
- Assisted with set up and regular maintenance of the saltwater fish tank that has become the Rising Tide Conservation Display. Wrote Standard Operating Procedures for various tasks including complicated water changes. Completed a Coral and Fish Identification and Inventory Guide.

Senior Animal Care Specialist-Bird Reptile Department Jan 2009-Jan 2015

- Provide daily husbandry, training, and enrichment for many species of birds, reptiles, and mammals under the care of the Bird and Reptile Department.

- Assist with the veterinary procedures of all animals in our care.
- Maintain the keeper aspect of record keeping in our animal record system EARS, as well as keep an accurate inventory of our ever changing holding areas.
- Assist management with the training and supervision of new part-time and seasonal keepers in our area.
- Promote the planning, hatching, and hand rearing of various bird species in the collection.

Palm Beach Zoo at Dreher Park, West Palm Beach FL
Assistant Curator- Birds Mar 2004-Oct 2008

- Direct supervision of daily care of the Zoo's avian collection, including over 70 species of waterfowl.
- Manage and provide scheduling for staff, interns, and volunteers.
- Oversight of training, enrichment, nutrition, and veterinary programs as they relate to the avian collection
- Developed and maintain avian incubation program and nursery
- Perform department wide Animal Duty Officer responsibilities on a rotational weekly basis.
- Assisted in development and data input for West Indian whistling duck and spotted whistling duck studbooks.
- Oversight of veterinary clinic and staff in lieu of an on-site veterinarian.

Veterinary Technician/ZooKeeper Jan 2003-Mar 2004

- Assisted in veterinary care of zoological collection, including daily medication, treatment, diagnosis, and surgical procedures
- Provided care for animals under veterinary treatment
- Maintained veterinary records through MedARKS computer program.
- Involved in the rehabilitation and release of numerous animals under the care of the Zoo’s animal rehabilitation program.
- Primary technician in charge of hand-rearing, including native rehab animals, a red kangaroo, and N.A. river otters.
- Assisted in medically necessary assisted parent rearing of giant anteater and jaguar cubs.
- Provided daily husband for birds, carnivores, primates, and reptiles. Provided training, enrichment, and veterinary programs as they related to the animals in my care.
- Assisted in management of the collection

North Hampton Animal Hospital, North Hampton, NH Sept 2000-Jan 2003
Veterinary Technician

- Assisted in basic veterinary care provided to small domestic animals brought in to small animal and exotics practice.
- Assisted and performed in all types of surgical procedures, venipuncture, radiography, and ultrasonography.
- Maintained medical records in both computerized and written form

York’s Wild Kingdom, York, ME May 1998- Sept 2000
Senior Animal Keeper

- Provided daily husbandry for small collection of carnivores, primates, birds, and reptiles.
- Performed live animal presentations for zoo guests.
- Assisted in management of the collection animals.
- Upkeep and design of various exhibits
- Medicating animals with worming medications.
- Daily record keeping.
- Involved in the daily operations and care of African Elephants

Education

1999-2000 University of Southern Maine, Portland, ME

- Two semesters of Biology related classes

Service and Membership

- Steering Commitee member for Anseriformes TAG from 2016-2022
- Raft Champion for the Anseriformes TAG DERP program
- Active Member of Florida Avian group and Avian Interest Group
- Institutional Representative for various AZA avian conservation programs
- Currently serving on the Anseriformes TAG Steering Committee
- Serving as an assistant to the Guam Kingfisher SSP Committee

Additional Training

- Completed a seminar on artificial avian incubation with Susan Kasielke at Miami MetroZoo in December 2004
- Completed the Avian Husbandry Program with Mike Lubbock at Sylvan Heights in April 2007

August 12, 2024

CURRICULUM VITAE

Dorcas Patricia O'Rourke
(Formerly Dorcas O'Rourke Schaeffer)

PERSONAL DATA:

Birth Place: [redacted]
E-Mail: orourked@ecu.edu
Work Phone: (252)414-3757
Work Address: 101 Forest Drive
Washington, NC
27889

EDUCATION:

High School:	Grace King High School, Metairie, LA., 1972.
Undergraduate:	Louisiana State University, Baton Rouge, LA: B.S., Zoology, 1977.
Professional:	Louisiana State University School of Veterinary Medicine, Baton Rouge, LA.; DVM, 1986.
Graduate:	Louisiana State University School of Veterinary Medicine, Baton Rouge, LA.; M.S., Neuroanatomy, 1989.
Postgraduate:	Louisiana State University School of Veterinary Medicine, Baton Rouge, LA; Residency Certificate,
Laboratory Animal	Medicine, 1989.

HONORS, RECOGNITION, AND AWARDS:

Phi Zeta
Phi Kappa Phi
Profiled in **Lab Animal**, "Careers in Laboratory Animal Science: Taking the Roads Less Traveled", Vol 32, No 6, June, 2003

SOCIETY MEMBERSHIPS:

American Veterinary Medical Association (AVMA)
American College of Laboratory Animal Medicine (ACLAM)

Association of Primate Veterinarians (APV)
Association of Avian Veterinarians (AAV)
Association of Reptile and Amphibian Veterinarians (ARAV)

PREVIOUS UNIVERSITY APPOINTMENTS:

Louisiana State University School of Veterinary Medicine, Baton Rouge, Louisiana. Assistant Professor of Laboratory Animal Medicine, Department of Veterinary Clinical Sciences, 1989-1993.

Served as clinical veterinarian for the veterinary school and main campus laboratory animal facilities (both AAALAC-accredited), and for the LSU Deer Research Unit. Collaborated with investigators at all facilities. Participated in patient care and emergency on-call rotation for the LSU exotic animal and wildlife clinic. Served as clinician for the LSU Raptor and Wildlife Rehabilitation Unit, and treated a variety of wild bird species, including eagles, hawks, owls, cranes, and waterfowl. Veterinary member of USFWS research team capturing and implanting radiotransmitters into canvasback ducks for five seasons. Facilitated clinical and surgical specialist support from the LSU SVM for the Audubon Zoo. Served as clinical veterinarian for Louisiana alligator farmers. Instructed veterinary students in Year I (anatomy), Year III (Laboratory, Zoo, Exotic, and Marine Animal Medicine -- course coordinator and lecturer), and Year IV (exotic and lab animal clinical rotations).

University of Tennessee, Knoxville. Assistant Professor, Department of Comparative Medicine; Director, College of Veterinary Medicine Laboratory Animal Facilities, 1993-1998.

Director of the College of Veterinary Medicine Laboratory Animal Facilities. Responsible for management and compliance of AAALAC-accredited units at the College of Veterinary Medicine and Cherokee Laboratory Animal Facilities. Supervised seven full-time employees and four student workers. Responsible for budget, daily operations, investigator interactions, facility maintenance, personnel management, recordkeeping, preventive medicine, clinical care, and occupational health and safety issues. Directed operation and maintenance of the College of Veterinary Medicine incinerator.

Associate Director, Office of Laboratory Animal Care. Participated in continued maintenance of an AAALAC-accredited laboratory animal program. Provided (with one other veterinarian) clinical care, preventive medicine, and health surveillance for all laboratory animals housed within main campus, the College of Veterinary Medicine, and the Medical Research Center. Conducted weekly rounds of facilities in up to 10 separate locations. Consulted with facility directors on animal facility operations. Provided (along with two other veterinarians) veterinary review on all protocols submitted to the Institutional Animal Care and Use Committee (IACUC). Participated in developing IACUC policies and guidelines. Assisted in IACUC semi-annual program review and inspection. Consulted and collaborated with investigators conducting research, including project design, selection of appropriate animal species, drugs and dosages, and

performance of experimental and surgical procedures. Participated in training of animal care and research technical staff, graduate and professional students, and investigators. Assisted in oversight of the occupational health program, and in preparation of compliance documents for AAALAC, International, USDA, and OLAW.
Provided consultation on cases in the exotic animal clinic, the Knoxville Zoological Gardens, and the necropsy pathology service. Participated in didactic and clinical instruction of veterinary, graduate, and undergraduate students.

University of Tennessee, Knoxville. Associate Professor, Department of Comparative Medicine, Attending Veterinarian and Director, Office of Laboratory Animal Care, 1998-2006.

Responsible for campus-wide, AAALAC-accredited, laboratory animal care program, which included approximately 327,158 square feet of animal space. Supervised two veterinarians, two research technicians, one administrative assistant, four managers, ten full-time lab animal technicians and five student workers. Responsible for direct management of animal facilities at the College of Veterinary Medicine, including daily operations, physical plant maintenance, animal care, investigator support, and personnel management. Responsible for compliance oversight of facilities in the College of Education, Health, and Human Sciences, College of Arts and Sciences, College of Veterinary Medicine Large and Small Animal Clinical Sciences Departments, the College of Agricultural Sciences and Natural Resources, the Agricultural Experiment Stations, and the Medical Center.

Supervised and participated in providing clinical veterinary care, surgical support, preventive medicine and health surveillance to animal facilities. Served as voting veterinary member of the IACUC. Participated in monthly IACUC meetings, semi-annual inspections, veterinary review of protocols (approximately 250 active protocols), and development of guidelines and policies. Consulted and collaborated with investigators conducting research, including project design, selection of appropriate animal species, drugs and dosages, and performance of experimental and surgical procedures. Participated in training animal care and research technical staff, undergraduate, graduate, and professional students, and investigators. Involved with revision of the Occupational Health Program, and responsible for compliance with USDA, OLAW, and AAALAC, International.

Provided consultation on cases in the exotic animal clinic, Knoxville Zoological Gardens, and the necropsy pathology service. Participated in didactic and clinical instruction of undergraduate, graduate, professional students, and residents.

East Carolina University. Professor and Chair, Department of Comparative Medicine, Brody School of Medicine. Attending Veterinarian, East Carolina University.

Chaired an academic department of 2 faculty and 25 staff. Member of ECU graduate faculty. Responsible for instruction of undergraduate, graduate, and professional students, and training of animal care and research staff. Research support duties included management and veterinary care oversight of a rodent barrier, BSL3 (including select agent) rodent housing area, specialized rodent quarantine and containment housing areas, primate housing and procedure areas, housing areas for swine, fish, and birds, a diagnostic laboratory, and research surgery suite. Facilities (approximately 75,000SF) located in four sites on the medical campus, three sites on the east campus (biology and psychology), and one site on the west research campus (biology). As attending veterinarian, served on the campus-wide IACUC. Responsible for ensuring compliance with AAALAC, OLAW, and USDA.

OTHER APPOINTMENTS:

Interim Attending Veterinarian, Oak Ridge National Laboratories, March 1996-June 1997, and January 2002- October 2003.Responsible for veterinary care and compliance of the Life Sciences Division facility which housed up to 120,000 mice. Provided consultation and guidance in maintaining full AAALAC accreditation.

IACUC member, Oak Ridge National Laboratories, 1998-2006.

Consulting veterinarian, Environmental Sciences Division, Oak Ridge National Laboratories, 1998-2006. Responsible for veterinary care and compliance of aquatic animal facilities.

Interim Chair, Department of Anatomy and Cell Biology, East Carolina University, January, 2020.

CURRENT POSITIONS:

Private Consultant

Attending Veterinarian, Sylvan Heights Bird Park, Scotland Neck, NC
Provide veterinary care and consultation. On site approximately one day a week, and available by phone, text, and email at other times.

Professor Emeritus, Department of Comparative Medicine
East Carolina University

PRACTICE (PROFESSIONAL) EXPERIENCE:

Licenses: North Carolina, 2006-present (6077)

Specialty Board Certification: American College of Laboratory Animal Medicine, 1991

Accreditation: USDA National Veterinary Accreditation Program, Category II Accredited Veterinarian (046364)

TEACHING/TRAINING:

1994-1995
VM846 Multispecies Medicine, lecture 5 hrs, lab 6 hrs
VM822 Neuroanatomy, lecture 1 hr
VM887 Behavior, lecture 1 hr
VM835 Medical Interaction, lecture 1 hr
VM505 Laboratory Animal Care and Use, lecture 2 hrs
Clinical Clerkship, 2 weeks (4 students)
Year I student orientation

1995-1996
VM846 Multispecies Medicine, lecture 6hrs
VM897 Small Animal Reproduction Elective, lecture 3 hrs
VM867 Infectious Disease Elective, lecture 1 hr
VM835 Medical Interaction, lecture 30 min
CEM610 Experimental and Surgical Techniques in Reptiles (8 grad students); 30 hrs
WFS530 Wildlife Diseases, lecture 3 hrs, lab 4 hrs
WFS440 Wildlife Techniques, lecture 1 hr
VM850 Intro to Clinical Medicine, 2 weeks (1 student)
Clinical Clerkship, 2 weeks (3 students)
Year I student orientation
Comparative Medicine Journal Club, organizer; also presented 2 hrs lectures
Pathology Journal Club, presented 2 hrs lecturesLincoln Memorial University Veterinary Technology Student Rotation, lecture 1 hr lab 3 hrs

1996-1997
BIOL202 Inside the Biological Sciences, lecture 1 hr (UT undergraduate course)
VM506 Laboratory Animal Care and Use, lecture 1 hr, lab 3 hrs
VM846 Multispecies Medicine, lecture 7 hrs., lab 6 hrs
VM897 Small Animal Reproduction Elective, lecture 4 hrs
VM850 Introduction to Clinics, lecture 1 hr
Lincoln Memorial University Veterinary Technology Student Rotations, lab 6 hrs
Clinical Clerkship, 2 weeks (1 student)

Year I student orientation
Comparative Medicine Journal Club Organizer, July 1996 - January 1997;
also presented 2 hrs lecture

1997-1998
VM846 Multispecies Medicine, lecture 4 hrs, lab 6 hrs
VM867 Infectious Diseases Elective, lecture 1 hr
AGR317 College Honors Seminar, lecture 1 hr
VM897 Small Animal Reproduction Elective, lecture 2 hrs
WFS530 Wildlife Diseases, lecture 3 hrs., lab 4 hrs
WFS440 Wildlife Techniques, lecture 1 hr
Lincoln Memorial University Veterinary Technology Student Rotations, 8 hrs instruction
AALAS Technician Training Course, lecture 4 hrs
Faculty Rounds, case report
Comparative Medicine Journal Club, 2 hrs lecture

1998-1999
BIOL 202 Inside the Biological Sciences, lecture 1 hr
CEM 610 Special Topics in Laboratory Animal Medicine (4 grad students), 45 hrs
CEM 609 Mechanisms of Disease, lecture 2 hrs
Year I student orientation
VM 846 Multispecies Medicine, lecture 3 hrs, lab 6 hrs
VM 850 Introduction to Clinics, lecture 1 hr
VM 850 Introduction to Clinics, 5 students, 2 week rotation each
Lincoln Memorial University Veterinary Technology Student Rotations, lab 12 hrs
Comparative Medicine Journal Club, lecture 1 hr

1999-2000
BIOL 202 Inside the Biological Sciences, lecture 1 hr
CEM 505 Laboratory Animal Care and Use, 30 hrs
CEM 506 Experimental Animal Surgery, 45 hrs
Year I student orientation
VM 846 Multispecies Medicine, lecture 3 hrs, lab 6 hrs
VM850 Introduction to Clinics, lecture 1 hr
VM850 Introduction to Clinics, 1 student, 2 week rotation
VM887 Pain Management Elective, lecture 2 hrs
WFS530 Wildlife Diseases, lecture 1.5 hrs, lab 4 hrs
WFS440 Wildlife Techniques, lecture 1 hr
Clinical Clerkship, 2 weeks (1 student)

2000-2001
Biology 202 Inside the Biological Sciences, Lec 1 hour
CEM 506 Experimental Animal Surgery, 45 hrs
Year I student orientation
VM 887 Pain Management Elective, lecture 1 hr
VM 846 Multispecies Medicine, Lec 3 hours, lab 6 hours
VM 850 Introduction to Clinics, 1 student, 2 week rotation
WFS 440 Wildlife Techniques, lecture 1 hr
Clinical Clerkship, 2 weeks (3 students)

2001-2002
VM847 Multispecies Medicine, lec 6 hrs, lab 6 hrs
Year 1 student orientation
VM806 3rd year Clinical Exposure
VM850 Introduction to Clinics, 2 week rotations
WFS530 Wildlife Diseases, lecture 1.5 hr, lab 4 hrs
VM887 Pain Management Elective, lecture 1 hr
Reptile and Amphibian Biology and Care, distance learning lecture for
UT Memphis laboratory animal medicine residents, lecture 1 hr
Clinical Clerkship, 2 weeks (4 students)

2002-2003
VM 846, Multispecies Medicine, lec 6 hrs, lab 6 hrs
Year 1 student orientation
CEM 505, Experimental Animal Care and Use, 30 hrs
CEM 506, Experimental Animal Surgery, 45 hrs
VM 887 Pain Management Elective, lecture 1 hr

2003-2004
VM 846, Multispecies Medicine, lec 6 hrs, lab 6 hrs
Year 1 student orientation
Botany 309, 1.25 hrs
WFS530 Wildlife Diseases, lecture 2hrs
VM850 Introduction to Clinics, 2 week rotations

2004-2005
VM 846, Mulitspecies Medicine, lec 3 hrs, lab 6 hrs
Year 1 student orientation
VM 850, Clinical Exposure, 1 week rotations

2006-2007
M2 Pathology, lab 3 hrs
M3 Surgery, lab 18 hrs
Biol 6880, lec 1 hr

2007-2008
CMED 8100, 30 hrs
AALAS techician training, 3 hrs
Redesigned mandatory training for all animal users to be placed on Blackboard, 24 hrs
ECU new faculty orientation, 4 hrs

2008-2009
ECU new faculty orientation, 4 hrs
ECU new chairs orientation, 4 hrs
AALAS techician training, 2 hrs

2009-2010
CMED 8100, 2 hrs

2010-2011

AALAS technician training, 1 hr

2011-2012
ECU new faculty orientation, 4 hrs
Research Triangle Laboratory Animal Medicine Training Program (RTLATP) resident training, 4.5 hrs
ECU IACUC training on 2011 *Guide* topics, 2hrs
ECU IACUC new member orientation, 2 hrs

2012-2013
ECU new faculty orientation, 3 hrs
BIOL 7350, 1 hr
Agricultural Medicine Course, 1.25 hrs
Logging Safety Course, 1.5 hrs
Redesigned and updated animal user mandatory online training module, 16 hrs

2013-2014
Faculty member, Medical Toxicology Fellowship (submitted)
ECU new faculty orientation, 3 hrs
Research Triangle Laboratory Animal Medicine Training Program (RTLATP) resident training, 2hrs
Agricultural Medicine Course, 1.25 hrs

2014-2015
ECU new faculty orientation, 3 hrs
Agricultural Medicine Course, 2.5 hrs

2015-2016
Research Triangle Laboratory Animal Medicine Training Program (RTLATP) resident training, 2hrs
ECU new faculty orientation, 2.5 hrs
CMED 8100, 2 hrs
HUMS 7004, 4.5 hrs (1.5 hrs spring and fall semesters and 1 hr online spring)

2016-2017
Research Triangle Laboratory Animal Medicine Training Program (RTLATP) resident training, 2hrs
ECU new faculty orientation, 2.5 hrs
HUMS 7004, 4.5 hrs (1.5 hrs spring and fall semesters and 1 hr online spring)
Agricultural Medicine Course, 2.0 hrs

2017-2018
Research Triangle Laboratory Animal Medicine Training Program (RTLATP) resident training, 2hrs
ECU new faculty orientation, 2.5 hrs
CMED 8100, 30 hrs; course coordinator
MCBI 7490, 2 hrs
HUMS 7004, 1 hr (web based)
Agricultural Medicine Course, 2 hrs

MPH 6036, 2 hrs (web based)

2018-2019
CMED 8100, 30 hrs; course coordinator
MCBI 7490, 2 hrs
HUMS 7004, 2 hr (1 hr web based, 1 hr student interview)

2019-2020
Responsible Conduct of Research Postdoc training, 1 hr
Research Resource 101 – IACUC, 1 hr
MCBI 7490, 2 hrs

2020-2021
Responsible Conduct of Research Postdoc training, 1 hr
MCBI 7490, 2 hrs

2021-2022
CMED 8100, 30 hrs; course coordinator and primary instructor
MCBI 7490, 2 hrs
Responsible Conduct of Research Postdoc training, 1 hr
Grant Writing Series: Campus Approval and Tracking Process, 1.5 hr

2022-2023
MCBI 7490, 2 hrs
Responsible Conduct of Research Postdoc training, 1 hr

UNIVERSITY COMMITTEES AND OFFICES HELD:

University of Tennessee

Ad Hoc Advisory Committee on Organization and Structure of CVM, 2001
CVM Executive Committee, 1999-2006
Institute of Agriculture Safety Committee, 1997-2002
Hospital Advisory Board, 1994-2002
Nosocomial Infection Committee, 1994-1996
Institutional Animal Care and Use Committee, 1993-2006
Knoxville Zoological Gardens Medical Advisory Board, 1993-2002
City of Knoxville Animal Control Board, 1994-1997; President, 1995-1997
ORNL Animal Care and Use Committee, 1996-1997, 1998-2006
Research and Graduate Training Advisory Committee, 1996-1998
Animal Sales Committee, 1997-2006
University of Tennessee Institutional Biosafety Committee, 1998-2003
College of Veterinary Medicine Space Committee, 1998-2006
Interview committee for CVM applicants, 2003
Search Committees:
Laboratory Animal Clinical Veterinarian (1997)
Comparative Medicine Research Faculty (1997)

Pathology Faculty (1998)
Large Animal Ambulatory Faculty (1997)
Laboratory Animal Assistant Director (1998);
Search Committee Chair Pathology Faculty (1999)
Laboratory Animal Assistant Director (2000); Search Committee Chair
Laboratory Animal Assistant Director (2003); Search Committee Chair

East Carolina University

University-Wide
Institutional Animal Care and Use Committee, 2006-2023
Compliance Council, 2007
Pandemic Flu Committee, 2006-2007
Disaster Planning Committee, 2006-2007

Unit
Brody Council, 2006-2023
Brody Women Faculty Committee, 2006-2023
Risk Management Committee, 2006-2021
Research Committee, 2006-2022
Compliance Committee, 2006-2011
Research Infrastructure Assessment Team, 2007
Committee to Evaluate EHS/Prospective Health Structure and Function, 2009
DCM Assistant Professor search committee, 2009 (2)
Department of Oncology Chair search committee, 2010
Director of Prospective Health search committee, 2011
DCM Assistant Professor search committee (chair), 2013
Sustainability Committee, 2014-2016
BSOM Basic Science Chair of Chairs, 2015, 2019, 2022
BSOM Dean Search Committee, 2016-2017
DCM Associate Professor search committee (chair), 2017
DCM Facility Manager search committee, 2016
DCM Facility Supervisor search committees (2), 2016
DCM Laboratory Technician search committee, 2018
DCM Budget Officer search committee, 2018
DCM Surgery Supervisor search committee, 2018
DCM Administrative Assistant search committees, 2018, 2019
DCM Facility Supervisor, 2019
DCM Surgery Technician, 2019
IACUC Director search committee, 2019
Internal Medicine Chair Five Year Administrative Review Committee, 2019
Pharmacology and Toxicology Chair Five Year Administrative Review Committee, 2020 (Chair)
Department of Pharmacology and Toxicology Chair search committee Chair, 2020-2021
OFALD Advisory board, 2022-2023

JOURNAL/BOOK REVIEWER ASSIGNMENTS:

Contemporary Topics, 7 manuscripts reviewed, 1992-2023

Laboratory Animal Anesthesia and Analgesia, 1 chapter reviewed, 1994

ILAR Journal, 2 manuscripts reviewed, 1995

A Practitioner's Guide to Domestic Rodents, entire text reviewed, 1997

Infection and Immunity, 1 manuscript reviewed, 1997

ILAR Journal, 1 manuscript reviewed, 2003

Education Resource Committee Proposal for Aquatic Animal Information in Training Materials, Xenopus, ALAT Training Materials, AALAS, manuscript reviewed, 2006

Education Resource Committee Proposal for Aquatic Animal Information in

Training Materials, Zebrafish, ALAT Training Materials, AALAS, manuscript reviewed, 2006

Journal of the American Association for Laboratory Animal Science, 2 manuscripts reviewed, 2007; 1 manuscript reviewed, 2009; 1 manuscript reviewed, 2010; 2 manuscripts reviewed, 2013

Applied Animal Behavior Society Special Issue on Laboratory Animal Welfare, manuscript reviewed, 2012

Laboratory Animal Medicine, 3rd Ed, Zebra Finches in Biomedical Research chapter reviewer, 2014

Journal of Avian Medicine and Surgery, manuscript reviewed, 2020

STUDY SECTIONS/PANELS

NIEHS Special Emphasis Panel NIHES2010084, Analytical Chemistry Services for the National Toxicology Program, Review Panel, June, 2010

East Carolina University East/West Collaboration Program, Grant Proposal Review Panel, November, 2012

Trinity College, Dublin BioResources Unit External Evaluator Panel, September, 2013

BSOM Starter/Bridge Grant Proposal Review Panel, March, 2014

NIH G20 Grant Review Panel, October, 2015

OFFICES HELD/INVOLVEMENT IN PROFESSIONAL ORGANIZATIONS:

American Association for Laboratory Animal Science, Appalachian Branch, Board of Directors, 1995-1997; Chairman, District IV 2000 meeting, 1999-2000

Advisory Board to ACLAM Forum Local Arrangements Committee, 1994-1995

American Association of Zoo Veterinarians, Education Committee, 1991-1997

American Association of Zoo Veterinarians, Public Relations Committee, 1990-1997

American Association of Zoo Veterinarians, Legislative/Animal Welfare committee, 1998-2001; Protocol Review Subcommittee, 1999-2001; Co-Chair, 1999-2000; Chair, 2000-2001

AAALAC, International Council on Accreditation member, 1999-2011, AAALAC Council Officer, 2006-2007, 2007-2008 (Assistant Section Leader); Vice President 2008-2009, Vice President/President Pro Temp 2009-2010; President 2010-2011, Council Emeritus, 2011-2023

AAALAC Nomination Committee for new Council members, 2001, 2003, 2008(Chair), 2009 (Chair)

AAALAC Nomination Committee for new ad hoc consultants, 2004, 2005 (Chair)

AAALAC Committee to Review Reptile and Amphibian Guidelines, 2005 (Chair)

AAALAC Committee to Review Guidelines of the American Society of Mammalogists for the Use of Wild Mammals in Research, 2006 (Chair)

AAALAC Committee to Review Euthanasia in Animal Rooms, 2006-2007 (Chair)

AAALAC Committee to Review FELASA Ethical Document and Evaluate Reference Resources Application, 2007-2008

AAALAC Committee to Establish Criteria for Reviewing Labs, 2009-2010

AAALAC Emeritus Committee, 2011

AAALAC Committee to Review *Guidelines of the American Society of Mammalogists for the Use of Wild Mammals in Research* as a Reference Resource, 2016

AAALAC Committee to Develop Methods for Evaluation of Ad Hocs, Council Members, and Council Emeriti, 2015-2017

AAALAC Committee to Review the Guide for the Care and Use of Agricultural Animals in Research and Teaching, 2020-2021

ACLAM Training Program Recognition Committee, 1994-1998

ACLAM Government and Regulatory Affairs Committee, 2012-2016

Scientists Center for Animal Welfare Board of Trustees, 2001-2011; meeting Chair, May, 2002; meeting Co-Chair, December, 2002, Treasurer, 2006-2008

North Carolina Association for Biomedical Research, Board of Directors, 2006-2017

North Carolina Association for Biomedical Research, Executive Committee, 2017-present; Vice Chair, 2020-2022; Chair, 2022-2024

Faculty Affiliate, North Carolina Agromedicine Institute, 2012-2015

NC Agromedicine Institute Member, 2015-2023

Morris Animal Foundation, Animal Welfare Advisory Board, 2013-2016

Morris Animal Foundation, Senior Scientific Advisory Board, 2020-2021

Co-Coordinator, North Carolina Mock ACLAM Board Exam Coalition, 2015-2017

Sylvan Heights Bird Park, Board of Directors, 2020-present

FACULTY/FELLOWS/RESIDENTS/STUDENTS/STAFF TRAINED/MENTORED

Postdoctoral Fellows:
Jonathan Sleeman, BVSc, 1993-1995, exotic animal/wildlife medicine
Mike Jones, DVM, 1993-1996, exotic animal/wildlife medicine
Karen Kearns, DVM, 1994-1996, exotic animal/wildlife medicine
Christine Kolmstetter, DVM, 1995-1997, exotic animal/wildlife medicine
Christal Pollock, DVM, 1996-1999, exotic animal/wildlife medicine
Carol Canney, DVM, 1996-1999, exotic animal/wildlife medicine
Jennifer Erdtmann, DVM 1997-1999, exotic animal/wildlife medicine
George Langan, DVM 1997-1999, laboratory animal medicine (advisor)
Monica Kelley Fann, DVM 1999-2000, laboratory animal medicine (advisor)
Leah Greer, DVM, 1999-2001, exotic animal/wildlife medicine
Isabelle Langlois, DVM, 2001-2003, exotic animal/wildlife medicine

Others:

Shawn Lewis, PhD Candidate, Comparative & Experimental Medicine, 2000-2005, (graduate committee member)

Heather Kittrell, ECU undergraduate, pre-vet 2007-2010; accepted to veterinary school to enter 2010
Matthew Rosenbaum, Assistant Professor DCM; provided support and mentoring during ACLAM board preparation2009-2010; boards obtained 2010
Matthew Rosenbaum and Karen Oppelt, Assistant Professors DCM; provided support/collaboration during contract/grant applications; one contract funded 2010 and one contract and one grant funded 2011
Joyce Chandler, St. George's University senior veterinary student, 6 week clinical rotation in laboratory animal medicine, February-March, 2011
Karen Mikkelsen, budget specialist from Faculty of Health Sciences, University of Copenhagen, Denmark; 6 week rotation in DCM to learn administration and budget management for laboratory animal programs in US; February-March, 2011
Madison Rushing, ECU undergraduate biology major, special topics undergraduate rotation in laboratory animal medicine spring semester, 2012
Bryce Burton, NC State senior veterinary student, 2 week clinical rotation in laboratory animal medicine, summer, 2012
Meagan Szarek, Amanda Grandy, ECU undergraduates, special topics undergraduate rotation, 2012-2013
Christina Webster, Melissa Schneider, ECU undergraduate students shadowing experience, 2012-2013
Carly Dexter, Ross University senior veterinary student, 3 week clinical rotation in laboratory animal medicine, April-May, 2013
Sara Linstadt, resident, SODM, 2 day research animal rotation, 2014
Truman Vereen, MPH candidate, BSOM, assisted with survey preparation and facilitated data collection for MPH project, 2014-2015
Amanda Szucsik, NC State veterinary student summer rotation, 2015
Brittany Lawson, SODM resident, research animal rotation, spring 2016
Zac Carnevale, SODM resident, research animal rotation, April, 2018
Nash Community College vet tech student tour, 2018
Dustin Foote, PhD candidate, Biology, committee member, 2018-2023
Shayan Nik Akhtar, PhD candidate, Anatomy, committee member, 2021-2021
Sarah Mariani, MPH 6905 student, internship rotation, 2022

PUBLICATIONS (REFEREED):

"Coagulase-negative *Staphylococcus* sp. septicemia in a love bird." Bounous D, Schaeffer D, Roy A. **JAVMA**, 195, 1120-1122, 1989.

"Vitamin C deficiency in captive nonhuman primates fed commercial primate diet." Ratterree M, Didier P, Blanchard J, Clarke M, Schaeffer D **Laboratory Animal Science**, 40, 165-168, 1990.

"Encephalitis in a mongolian gerbil due to naturally occurring infection with Bacillus piliformis (Tyzzer's Disease)." Veazey RS, Paulsen DB, Schaeffer DO **Laboratory Animal Science**, 42, 516-518, 1992.

"Effect of hyperbaric oxygen on cerebrospinal fluid gentamicin concentrations." Schaeffer D, Caprile K, Strain G, Bivin W, Cohn G. **Journal of Veterinary Pharmacology and Therapeutics**, 15, 104-106, 1992.

"Transmission of tomato spotted wilt virus from pepper and three weed hosts by *Frankliniella fusca*." Hobbs, H, Black L, Story R., Valverde R, Bond W, Gatti J, Jr, Schaeffer D, Johnson R. **Plant Disease**, 77, 797-799, 1993.

"Survival of female canvasbacks wintering in coastal Louisiana." Hohman B, Pritchert R, Moore J, Schaeffer D **Journal of Wildlife Management**, 57, 758-762, 1993.

"An alternative technique for partial hepatectomy in mice." Schaeffer DO, Hosgood G., Oakes M, St. Amant LG, Koon C. **Laboratory Animal Science**, 44, 189-190, 1994.

"Isoflurane anesthesia in a rhinoceros." Cornick-Seahorn JL, Mikota SK, Schaeffer DO, Ranglack GS, and Boatright SB. **JAVMA**, 206, 508-511, 1995.

"Mouse lung tumors exhibit specific Ki-*ras* mutations following transplacental exposure to 3-methylcholanthrene." Wessner LL, Fan M, Schaeffer DO, McEntee MF, Miller MS. **Carcinogenesis**, 17(7):1519-1526, 1996.

"Pharmacokinetic properties of itraconazole in blue-fronted Amazon parrots (*Amazona aestiva aestiva*)." Orosz SE, Frazier DL, Schroeder EC, Cox SK, Schaeffer DO, Doss S, Morris PJ. **Journal of Avian Medicine and Surgery**, 10, 168-173, 1996.

"The role of platelet derived growth factor in intraluminal stented graft healing." Ombrellaro MP, Stevens SL, Schaeffer DO, Freeman MB, Sciarrotta J, Carroll RC, and Goldman MH. **Journal American College of Surgeons**, 184(1):49-57, 1997.

"Healing characteristics of intra-arterial stent-grants in an injured artery model." Weatherford DA, Ombrellaro MP, Schaeffer DO, Stevens SL, Sackman JE, Freeman MB, Goldman MH. **Annals of Vascular Surgery**, 11(1):54-61, 1997.

"Effect of intra-arterial environment on endothelialization and basement membrane organization in polytetrafluoroethylene grafts." Ombrellaro MP, Stevens SL, Sciarrotta J, Schaeffer D, Freeman MB, Goldman MH. **American Journal of Surgery**, 174(1):29-32, 1997.

"Effect of balloon-expandable and self-expanding stent fixation on endoluminal polytetrafluoroethylene graft healing." Ombrellaro MP, Stevens SL, Sicarrotta J, Schaeffer DO, Freeman MB, Goldamn MH. **American Journal of Surgery**, 173(6):461-466, 1997.

"Alterations in growth, hematopoiesis, and serum chemistry profiles in *fitness-1* 4226SB mutant mice." Schultze AE, Schaeffer DO, Potter MD and Johnson DK, **Comparative Hematology International**, 7: 143-151, 1997.

"Molecular pathogenesis of transplacentally-induced mouse lung tumors." Miller MS, Leone-Kalder S, Rollins LA, Wessner LL, Fan M, Schaeffer DO, McEntee MF, O'Sullivan MG. **Experimental Lung Research** 24 (4): 557-577, 1998.

"Cardiopulmonary effects of sevoflurane in Garnett's greater bush baby (Otolemur garnettii)." Langan GP, Harvey RC, O'Rourke D, Fontenot MB, Schumacher J. **Comparative Medicine** 50 (6): 639-643, 2000.
"The evaluation of subatmospheric pressure and hyperbaric oxygen in ischemic full-thickness wound healing." Fabian TS, Kaufman HJ, Lett ED, Thomas JB, Rawl DK, Lewis PL, Summitt JB, Merryman JI, Schaeffer D, Sargent LA, Burns RP. **The American Surgeon** 66 (12): 1136-1143.

"A new hantavirus synthetic-peptide based ELISA and its application to testing samples for antibodies to Newfound Gap virus – a newly identified hantavirus." Lewis S, Kania SA, O'Rourke DP, New J, Chu Y-K, Jonsson C, Thomas K, McDonald M. Submitted to **J Clin Microbiol.**

"Field use of isoflurane for safe squirrel and woodrat anesthesia". Parker WT, Muller LI, Gerhardt RR, O'Rourke DP, Ramsay EC. J**ournal of Wildlife Management,** 72(5), 1262-1266, 2008.

"The *Bacteroides fragilis* transcriptome response to oxygen and H2O2: the role of OxyR and its effect on survival and virulence." Sund CJ, Rocha ER, Tzinabos AO, Wells WG, Gee JM, Reott MA, O'Rourke DP, Smith CJ. **Mol Microbiol.** 68(5):1340, 2008.

"Dietary n-3 polyunsaturated fatty acids enhance hormone ablation therapy in androgen-dependent prostate cancer." McEntee MF, Ziegler C, Reel D, Tomer K, Shoieb A, Ray M, Li X, Neilsen N, Lih F, O'Rourke D, Whelan J. **Am J Path**,173(1), 229-241, 2008.

"Pilot studies of pressure-immobilization bandages for rattlesnake envenomations." Meggs WJ, Courtney C, O'Rourke D, Brewer KL. **Clin Toxicol** 48(1):61-3, 2010.

"A localizing circumferential compression device delayed death after artificial eastern diamondback rattlesnake envenomation to the torso of an animal model in a pilot study." Hack JB, Orogobemi B, DeGuzman JM, Brewer KL, Meggs WJ, O'Rourke D. **J Med Tox** 6:207-211, 2010.

"High doses of ketamine-xylazine anesthesia reduce cardiac ischemia-reperfusion injury in guinea pigs." Sloan R, Rosenbaum M, O'Rourke D, Oppelt K, Frasier C, Watson C, Allan A, Brown D. **JAALAS** 50(3): 1-6, 2011.

"A localizing circumferential compression device increases survival after coral snake envenomation to the torso of an animal model." Hack JB, Deguzman JM, Brewer KL, Meggs WJ, O'Rourke D. **Journal of Emergency Medicine** 41(1):102-107, 2011.

"Abdominal mass in a New Zealand White rabbit (*Oryctolagus cuniculus*). Rosenbaum M, Gardiner D, O'Rourke D. **Lab Animal** 42(1): 19-22, 2013.

"Trypsin and rosemarinic acid reduce the toxicity of *Micrurus fulvius* venom in mice." Parker-Cote JL, O'Rourke DP, Miller SN, Brewer KL, Rosenbaum MD, Meggs WJ. **Clin Tox** 52 (2):118-120, 2014.

"A randomized controlled trial of trypsin to treat brown recluse spider bites in guinea pigs." Cabaniss WW, Bush SP, O'Rourke DP, Fletcher PF, Brewer KL, Lertpiriyapong K, Punja M, Miller SN, Meggs WJ. **J Med Tox**, 10 (3): 266-268, 2014.

"Long-term efficacy of pressure immobilization bandages in a porcine model of coral snake envenomation." Smyrnioudis ME, O'Rourke DP, Rosenbaum MD, Brewer KL, Meggs WJ. **American Journal of Emergency Medicine** 32: 1024-1026, 2014.

"Rabies surveillance among bats in Tennessee, USA,1996-2010." Gilbert A, McCracken G, Sheeler L, Muller L, O'Rourke D, Kelch W, New J, Jr. **Journal of Wildlife Diseases** 51 (4): 821-832, 2015.

"Efficacy of trypsin in treating coral snake envenomation in the porcine model." Parker-Cote JL, O'Rourke DP, Brewer KL, Lertpiriyapong K, Punja M, Bush SP, Miller SN, Meggs WJ. **J Med Tox** 11: 430-432, 2015.

"GPR4 deficiency alleviates intestinal inflammation in a mouse model of acute experimental colitis." Sanderlin EJ, Leffler NR, Lertpiriyapong K, Cai Q, Hong H, Bakthavatchalu V, Fox JG, Oswald JZ, Justus CR, Krewson EA, O'Rourke DP, Yang LV. **Biochimica et Biophysica Acta** 1863: 569-584, 2017.

"Suppression of murine osteoarthritis by 4-methylumbelliferone." Tsuchiya S, Ohashi Y, Ishizuka s, Ishiguro N, O'Rourke DP, Knudson CB, Knudson W. **Journal of Orthopaedic Research**, DOI 10.1002/jor.24541, 2019.

"Efficacy of methylene blue in a murine model of amlodipine overdose." De Castro Bras L, Baccanale C, Eccleston L, Sloan T, St Antoine J, Verzwyvelt S, Pittman P, O'Rourke D, Meggs W. **American Journal of Emergency Medicine** DOI 10.1016/j.ajem.2020.08.077, 2020.

"Pilot study of bronchial hyper-reactivity in two strains of mice exposed to an over-the-counter air freshener." Meggs WJ, Brewer KL, O'Rourke D, Baccanale C, Fuller A, Eells J, Parker-Cote J, Walters D. **Current Topics in Toxicology**, 18:23-27, 2022.

"Preclinical efficacy and safety of novel SNAT against SARS-CoV-2 using a hamster model." Pokhrel LR, Williams F, Cook PP, O'Rourke D, Murray G, Akula S. **Drug Delivery and Translational Research**, 12:3007-3016, 2022.

"COVID-19 infection enhances susceptibility to oxidative-stress induced parkinsonism." Smeyne RJ, Eells JB, Chatterjee D, Byrne M, Akula SM, Sriramula S, O'Rourke DP, Schmidt P. **Movement Disorders**, 37 (7): 1394-1404, 2022.

"Long COVID in K18-hACE mice causes persistent brain inflammation and neurocognitive impairment." Sriramula S, Parekh R, Theobald D, Akula SM, O'Rourke DP, Eells JB. Submitted, 2022

PUBLICATIONS (BOOK CHAPTERS & BOOKS):

The Care and Use of Amphibians, Reptiles and Fish in Research. Schaeffer DO, Kleinow K, and Krulisch L, eds. 1992.

"Zoo and Exotic Animal Medicine." In Pratt PW, **Review Questions and Answers for Veterinary Boards, Ancillary Topics**. American Veterinary Publications, Goleta, CA, 1993.

Well-Being of Animals in Zoo and Aquarium Sponsored Research. Bielitzki JT, Boyce JR, Burghardt GM and Schaeffer DO, eds. **SCAW**, 1996.

"Anesthesia and Analgesia of Nontraditional Laboratory Animal Species." Schaeffer DO. In Kohn, et al, **Anesthesia and Analgesia in Laboratory Animals**. Academic Press, 1997.

"Disease Problems of Guinea Pigs and Chinchillas." Schaeffer DO, Donnelley T. In Hillyer E and Quesenberry K., **Ferrets, Rabbits and Rodents: Clincial Medicine and Surgery**. W.B. Saunders Co., Philadelphia, 1997.

"Zoo and Exotic Animal Medicine." In Pratt PW, **Review Questions and Answers for Veterinary Boards, Ancillary Topics**. Second edition. American Veterinary Publications, Goleta, CA.

"Rabbit Microbiology." Langan GP and Schaeffer DO. In Fudge, **Laboratory Medicine: Avian and Exotic Pets**, WB Saunders Company, Philadelphia, 2000.

"Biology and Diseases of Amphibians." O'Rourke DP and Schultz TW. In Fox et al, **Laboratory Animal Medicine.** 2nd edition, Academic Press, 2002.

"Biology and Diseases of Reptiles." O'Rourke DP and Schumacher J. In Fox et al, **Laboratory Animal Medicine.** 2nd edition, Academic Press, 2002.

"Disease Problems of Guinea Pigs." O'Rourke DP. In Carpenter J and Quesenberry K., **Ferrets, Rabbits and Rodents: Clinical Medicine and Surgery**. 2nd edition. W.B. Saunders Co., Philadelphia, 2003.

"Companion Reptiles and Amphibians." O'Rourke, DP. In Campbell et al, **Companion Animals: Their Biology, Care, Health, and Management**. Pearson Prentice Hall, 2005.

"Anesthesia and Analgesia in Reptiles". O'Rourke DP and Jenkins AL. In Fish et al, **Anesthesia and Analgesia of Laboratory Animals**, 2nd edition, Elsevier, 2008.

"Anesthesia and Analgesia in Amphibians". O'Rourke DP and Jenkins AL. In Fish et al, **Anesthesia and Analgesia of Laboratory Animals**, 2nd edition, Elsevier, 2008.

"Companion Reptiles and Amphibians." Mitchell MA and O'Rourke DP. In Campbell et al, **Companion Animals: Their Biology, Care, Health, and Management,** 2nd edition. Pearson Prentice Hall, 2009.

"Reptiles and Amphibians in Laboratory Animal Medicine." O'Rourke, DP. In Mader et al, **Reptile Medicine and Surgery: Current Therapy**, Elsevier, 2014.

"Biology and Diseases of Amphibians". O'Rourke DP and Rosenbaum MD. In Fox et al, **Laboratory Animal Medicine**, 3rd ed, Elsevier, 2015.

"Biology and Diseases of Reptiles". O'Rourke DP and Lertpiriyapong K. In Fox et al, **Laboratory Animal Medicine**, 3rd ed, Elsevier, 2015.

"Nontraditional Species". O'Rourke DP, Cox J, Baumann D. In Weichbrod et al, **Management of Animal Care and Use Programs in Research, Education, and Testing, 2nd ed,** CRC Press, 2018. **This text was one of 5 finalists for the prestigious PROSE award in 2019.*

"Laboratory Management and Medicine". O'Rourke D, Nowlan P, Retnam L. In Divers and Stahl, **Mader's Reptile and Amphibian Medicine and Surgery, 3rd ed**, Elsevier, 2019.

"Managing the Mental Well-Being of Personnel." Juzwin K, O'Rourke DP. In Colby et al, **Disaster Management and Business Continuity for Animal Research Programs**, CRC Press, in review, 2023.

"Biology and Diseases of Reptiles". O'Rourke DP and Russell-Lodrigue K. In Fox et al, **Laboratory Animal Medicine**, **4th ed**, Elsevier, in preparation, 2023.

PUBLICATIONS (ABSTRACTS, POSTERS, PROCEEDINGS, REFEREED PRESENTATIONS, REVIEW PAPERS):

"Rabbit pasteurellosis." Schaeffer DO. **Seminars in Avian and Exotic Pet Medicine**, 2(4): 175-178, 1993.

"Miscellaneous species: anesthesia and analgesia." Schaeffer DO. In **Research Animal Anesthesia, Analgesia, and Surgery**, Smith A, Swindle M, eds. **SCAW**, 1994.

"Characterization of hematologic and serum chemistry abnormalities in *fitness-1* mutant mice." Schultze AE, Patton MD, Johnson DK, Schaeffer DO. **Vet Path** 32(5): 551, 1995.

"Designing a research protocol form for zoos and aquariums." Schaeffer, DO. In **The Well-Being of Animals in Zoo and Aquarium Sponsored Research**. Bielitzki JT, Boyce JR, Burghardt GM and Schaeffer DO, eds. **SCAW**, 1996.

Book Review: **Health and Welfare of Captive Reptiles**. Schaeffer, DO. **Herpetological Review**, 27(1): 48, 1996.

"Neuroanatomy and neurologic diseases of reptiles." Schaeffer DO, Waters RM. **Seminars in Avian and Exotic Pet Medicine**, 5(3): 165-171, 1996.

"Frequent mutations in Ki-*ras* in mouse lung tumors following transplacental exposure to 3-methylcholanthrene." Miller MS, Wessner LL, Fan M, McEntee MF and Schaeffer DO. **Fund. Appl. Toxicology, Supplement (Toxicologist)** 30:218, 1996.

"Role of oncogenes in transplacental carcinogenesis." Wessner LL, Fan M, Schaeffer DO, McEntee MF, Miller MS. **Proc. Am. Assoc. Cancer Res**. 37:887, 1996.

"Genetic polymorphism in intron 4 of the DBA/2 mouse p53 gene." Rollins LA, Fan M, Gressani KM, Schaeffer DO, Miller MS. Sequence submitted to GenBank, U70769, 1996.

"Avian Euthanasia." Schaeffer DO. **Proceedings of the AAV Annual Conference**, Tampa, 1996.

"Analysis of transplacentally-induced murine lung tumors for p53 mutations--identification of a genetic polymorphism." Rollins LA, Fan M, Gressani KM, Schaeffer DO, Miller MS. SOT Annual Meeting, 1997.

"The evaluation of subatmospheric pressure and hyperbaric oxygen in full thickness wound healing." Fabian TS, Kaufman HJ, Thomas JB, Raul DK, Lewis PL, Summitt JB, Merryman JI, Schaeffer DO, Lett ED, Kennedy JW, Brzezienski MA, Sargent LA, Burns RP. Southeastern Surgical Congress Annual Meeting, 1999.

"Care of Laboratory Reptiles and Amphibians." Schaeffer DO. **Animal Research and Welfare: A Partnership**. Tur-Mari JA and Orellana-Muriana JM, eds. SECAL, Madrid, 2000.

"Normal Bacterial Flora in the Rabbit Gastrointestinal Tract: A Clinical Approach." Fann M, O'Rourke D. **Seminars in Avian and Exotic Pet Medicine** 10 (1) 45-47, 2001.

"Caring for Snakes" and "Caring for Turtles". O'Rourke, DP. Guidelines to accompany AALAS position statement on use of animals in the pre-college educational classroom, 2004.

"Reptiles and amphibians as laboratory animals." O'Rourke DP. **Lab Animal**, 31(6), 43-47, 2002.

"Amphibians used in research and teaching." O'Rourke DP. **ILAR Journal**, 48(3), 183-187, 2007.

"Humane Care and Use of Agricultural Animals in Research." Garber J, O'Rourke D, eds. Proceedings of SCAW Conference, St. Louis, MO, 2007.

"Venom Lysis Syndrome: A Cause of Lethality in Rattlesnake Envenomations." Meggs WJ, Courtney C, O'Rourke D, Jenkins A, Brewer K. **Clin Tox** 45: 620, 2007.

"A Novel Localizing Circumferential Compression Device Delays Onset of Systemic Toxicity After Eastern Coral Snake Torso Envenomations in Anesthetized Swine." Hack

JB, DeGuzman JM, Meggs WJ, Brewer K, O'Rourke D. Poster, Southeastern Regional Society for Academic Emergency Medicine, Louisville, KY, March, 2008.

"A Novel Localizing Circumferential Compression Device Delays Onset of Systemic Toxicity After Eastern Coral Snake Envenomation to the Torso of an Animal Model." Hack JB, DeGuzman JM, Meggs WJ, Brewer K, O'Rourke D. Poster, SAEM Annual Meeting Washington, DC, May, 2008.

"Pressure Immobilization Bandages Increase Survival in a Porcine Model of Rattlesnake Envenomations." Meggs WJ, Courtney C, O'Rourke D, Jenkins A, Brewer K. Platform presentation, EAPCCT XXVIII International Congress, Seville, Spain, May, 2008. *Nominated for best scientific presentation (3 nominees out of 340 papers).* **Clin Tox** 46(71), 2008.

"Pressure Immobilization Bandages for Rattlesnake Bites Prevent Lethal Hyperkalemia from Necrosis in a Porcine Model." Meggs WJ, Courtney C, O'Rourke D, Brewer K. **Ann Emerg Med** 52(S140-S141), 2008.

"Cardiovascular Effects of Intravenous Rattlesnake Envenomation." Fish LR, O'Rourke D, Lust R, Brewer KL, Meggs WJ. **Ann Emerg Med** 52(S140), 2008.

"A Novel Circumferential Device Delays Onset of Systemic Toxicity After Eastern Diamondback Rattlesnake Envenomation to the Torso of an Animal Model." Hack JB, Orogbemi, B, DeGuzman J, Brewer K, Meggs W, O'Rourke D. **Academic Emergency Medicine**, 16(S224), 2009.

"Diphenhydramine increases lethality in a porcine model of intravenous rattlesnake envenomation." Sekhon N, Fish L, Brewer KL, O'Rourke D, Meggs WJ. **Ann Emerg Medicine** 54(S2115-116), 2009.

Authors' response to letter "Hyperkalemia and death from crotalid envenomation" by Zuckerman, Heeley-Ray, Morrissey, and Hoffman. Meggs W, Courtney C, Brewer K, O'Rourke D. **Clin Tox** 48(5): 473, 2010.

Sexing or gender identification in small mammals." O'Rourke D. Lafeber Corporation Veterinary Medicine website, June, 2010.

"Mouse malignant mesothelioma results found to be murine polyoma virus PCR positive – virus integration without expression?" Rosenbaum M, Oppelt K, Henderson K, O'Rourke D. Poster, ACLAM Forum, San Antonio, TX, May, 2011.

"Mouse malignant mesothelioma results found to be murine polyoma virus PCR positive – virus integration without expression?" Rosenbaum M, Oppelt K, Henderson K, O'Rourke D. Poster, AALAS national meeting, San Diego, CA, October, 2011.

"Long term efficacy of pressure immobilization bandages in a porcine model of coral snake envenomation." Smyrnioudis M, Brewer K, O'Rourke D, Rosenbaum M, Meggs W. **Academic Emergency Medicine** 19 Suppl 1, S276-277, 2012.

"Long term efficacy of pressure immobilization bandages in a porcine model of coral snake envenomation." Smyrnioudis M, O'Rourke D, Rosenbaum M, Brewer K, Meggs W. Oral presentation and poster, ECU/Vidant GME Research Day, Greenville, NC, May, 2012.

"Comparison of lorazepam and morphine in treating cocaine intoxication in rats." Bream J, O'Rourke D, Rosenbaum M, Miller S, Brewer K, Meggs W. **Annals Emerg Med** 60: S124, 2012.

"Efficacy of glass bead sterilization in serial rodent surgeries." Oppelt K, O'Rourke D, Roop R, Alligood R, Wu Q, Rosenbaum M. Poster, AALAS national meeting, Minneapolis, MN, November, 2012.

"Neutralization with proteolytic enzyme and a phospholipase A2 inhibitor reduces the toxicity of *Micrurus fulvius* venom." Parker Cote JL, Brewer K, O'Rourke D, Rosenbaum M, Miller S, Meggs W. **Clin Tox** 51:278, 2013.

"*In vitro* neutralization with trypsin or rosemarinic acid reduces the toxicity of *Micrurus fulvius* venom." Parker-Cote JL, Brewer KL, O'Rourke DP, Rosenbaum MD, Meggs WJ. **Annals Emerg Med** 61:S122-S123, 2013.

"Working with Reptiles in a Research Setting." O'Rourke DP, Lertpiriyapong K. On-line Training Module, **Collaborative Institutional Training Initiative**, University of Miami, 2015.

"Efficacy of trypsin in treating coral snake envenomation in the porcine model." Parker-Cote JL, O'Rourke DP, Brewer KL, Lertpiriyapong K, Girard J, Bush SP, Miller SN, Punja M, Meggs WJ. **J Med Tox**, online pub, 2015.

"GPR4 Deficiency Ameliorates Intestinal Inflammation in a Mouse Model of Inflammatory Bowel Disease." Yang L, Leffler N, Lertpiriyapong K, Sanderlin E, Justus C, Krewson E, Dong L, O'Rourke D. Poster presentation, **Innovation Symposium**, Ranin Foundation, San Francisco, CA, June, 2015.

Proton-sensor GPR4 potentiates intestinal inflammation in the DSS-induced colitis mouse model (abstract). Sanderlin E, Leffler N, Lertpiriyapong K, Cai, Q, Hong H, Bakthavatchalu V, Fox J, Oswald J, Justus C, Krewson E, O'Rourke D, Yang L. In: **Proceedings of the American Association for Cancer Research Annual Meeting** (AACR), Cancer Res 77 (13 suppl), 2017.

Naltrexone as an antidote to prevent delayed neuropsychological disabilities from acute poisoning with the sarin analogue diisopropyl-flurophosphate. Nussbaum C, Meggs W, Brewer K, Fletcher P, Tran T, O'Rourke D, DeWitt J. **Annals Emerg Med** 70:S138, 2017.

Nontraditional laboratory animal species. O'Rourke D, Baccanale C, Stoskopf M. **ILAR Journal**, 2018, doi: 10.1093/ilar/ily003.

"Efficacy of Methylene Blue in a Murine Model of Amlodipine Toxicity." de Castro Bras L, Baccanale C, Eccleston L, Sloan T, St Antoine J, Verzwyvelt S, Pittman P, O'Rourke

D, Meggs W. Abstract, **American College of Emergency Medicine Research Forum,** October, 2020.

"Pilot Study of Methylene Blue as an Antidote for Amlodipine Poisoning in Mice." de Castro Bras L, Baccanale C, Eccleston L, Sloan T, St Antoine J, Verzwyvelt S, Pittman P, O'Rourke D, Meggs W. Poster presentation, **American College of Medical Toxicology** Virtual Annual Scientific Meeting, April, 2021.

UNREFEREED POPULAR ARTICLES/TALKS:

1993

"Alligators as Laboratory Animals." Appalachian Branch AALAS Meeting, July, 1993.

1994

"Psittacines as Laboratory Animals," Southeastern AALAS Regional Meeting, Athens, GA, January, 1994.

"Alligators as Laboratory Animals," Southeastern AALAS Regional Meeting, Athens, GA, January, 1994.

"Guinea Pig Medicine and Diseases." UT Annual Conference for Veterinarians, February, 1994.

"Rabbit Medicine and Diseases." UT Annual Conference for Veterinarians, February, 1994.

"Effect of Water Temperature on Hematologic Values in the American Alligator." Animal Disease Research Workers in Southern States Annual Conference, Baton Rouge, LA, March, 1994.

"Miscellaneous Species: Anesthesia and Analgesia." SCAW Conference, Atlanta, GA, May, 1994.

"Reptile Veterinary Care." In seminar, "Reptiles in the Laboratory," AALAS Annual Meeting, Pittsburgh, October, 1994.

"Husbandry of Terrestrial Reptiles." In seminar, "Reptiles in the Laboratory," AALAS Annual Meeting, Pittsburgh, October, 1994.

"What the Lab Animal Program Can Do For You." Office of Laboratory Animal Care Seminar Series, October, 1994.

1995

"Waterfowl." Avian Seminar and Wetlab, University of Tennessee, Knoxville, March, 1995.

"Designing a Research Protocol Form for Zoos and Aquariums." The Well-Being of Animals in Zoo and Aquarium Sponsored Research, SCAW Conference, New Orleans, LA, May, 1995.

"Medicine and Disease Prevention for Reptiles." Care and Use of Fish, Amphibians and Reptiles in Research, SCAW Conference, Toronto, September, 1995.

1996

"Anesthesia and Analgesia of Ectotherms." District IV Annual AALAS Meeting, Knoxville, TN, April, 1996.

"Care of Laboratory Reptiles." District IV Annual AALAS Meeting, Knoxville, TN, April, 1996.

"Reptile Anatomy." Reptile Seminar and Wetlab, (also faculty advisor and presented 3 hr lab), University of Tennessee, Knoxville, TN, May, 1996.

"Anesthesia, Analgesia and Euthanasia." ORNL Training Seminar, Biology Division, July, 1996.

"Avian Euthanasia." AAV Annual Meeting, Tampa, FL, August, 1996.

"Anesthesia and Analgesia in Selected Small Mammals." AAV Annual Meeting, Tampa, FL, August, 1996.

"Antibiotic Considerations and Gut Flora of Sensitive Species." AAV Annual Meeting, Tampa, FL, August, 1996.

"Care and Husbandry of Reptiles." UT Last Chance Continuing Education Seminar, Knoxville, TN, December, 1996.

1997

"Field Studies in Alaska, Louisiana and Cades Cove." Appalachian Branch AALAS Winter Meeting, January, 1997.

"Diseases of Guinea Pigs, Hamsters and Rats." Small Mammal Seminar and Wetlab (also faculty advisor and presented 3 hr lab), University of Tennessee, Knoxville, TN, March, 1997.

"Nontraditional Animal Models." Redlands Community College AALAS Summer Preceptorship, El Reno, OK., June, 1997.

"Field Research." District IV Annual AALAS Meeting, Decatur, GA., June, 1997.

"Overview of Amphibian Animal Care Programs Focusing on *Xenopus* Management." AALAS Annual Meeting, Anaheim, CA, November 1997.

"Special Considerations for Inspection of Other Animal Facilities -- Cold-Blooded and Exotic Species." AAALAS Annual Meeting, Anaheim, CA, November 1997.

1998

"Rabbits: An Overview of Husbandry, Diagnostics, and Diseases." University of Tennessee Annual Conference for Veterinarians, Knoxville, TN, January, 1998.

"Hamsters, Rats, and Other Pet Rodents." University of Tennessee Annual Conference for Veterinarians, Knoxville, TN, January, 1998.

"Care and Use of Xenopus." Appalachain Branch AALAS meeting, Knoxville, TN, January, 1998.

"Nontraditional Animal Models." Redlands Community College AALAS Summer Preceptorship, El Reno, OK, June, 1998.

"Nonmammalian Laboratory Animals – Models and Medicine." Current Laboratory Animal Science Seminar, Armed Forces Institute of Pathology, Washington, D.C., August, 1998.

1999

"The Animal Care and Use Program at the University of Tennessee." UT Medical Center Research Seminar Series, Knoxville, TN, February, 1999.

"Reptiles and Amphibians in the Laboratory Animal Facility." District IV AALAS Annual Meeting, Raliegh, NC, March, 1999.

"Fish and Wildlife Research – Animal Care and Use Issues." Environmental Sciences Division Seminar, Oak Ridge National Laboratories, Oak Ridge, TN, March, 1999.

"Care of Laboratory Reptiles and Amphibians." Joint Meeting of International Council for Laboratory Animal Science, Federation of European Laboratory Animal Science Associations and Sociedad Española para las Ciencias del Animal de Laboratorio, Mallorca, Spain, May, 1999.

"Nontraditional Laboratory Animals." Charles River Laboratories Thirteenth Annual Short Course, Andover, MA, June, 1999.

"Biology and Care of Laboratory Amphibians and Reptiles." Charles River Laboratories Thirteenth Annual Short Course, Andover, MA, June, 1999.

"Nontraditional Animal Models." Redlands Community College AALAS Summer Preceptorship, El Reno, OK, July, 1999.

"Animal Use in Teaching and Research." Small Animal Care Workshop for VoAg Teachers, University of Tennessee, Knoxville, TN, July, 1999.

"Nonmammalian Laboratory Animals – Models and Medicine." Current Laboratory Animal Science Seminar, Armed Forces Institute of Pathology, Washington, D.C., August, 1999.

"How to Site Visit Fish, Frog, and Reptile Facilities." AAALAC Council on Accreditation, Fall Meeting, September, 1999.

2000

"The Laboratory Animal Care Program at the University of Tennessee with Emphasis on Occupational Health and AAALAC Accreditation." UT Medical Center Research Seminar Series, Knoxville, TN, January, 2000.

"Waterfowl Rehabilitation." East Tennessee Wildlife Rehabilitation Council, Knoxville, TN, January, 2000.

"Waterfowl Biology and Research." District IV AALAS Annual Meeting, Knoxville, TN April, 2000.

"Nontraditional Laboratory Animals." Charles River Laboratories Annual Short Course, Andover, MA, June, 2000.

"Biology and Care of Laboratory Amphibians and Reptiles." Charles River Laboratories Annual Short Course, Andover, MA, June, 2000.

"Nontraditional Animal Models." Redlands Community College AALAS Summer Preceptorship, El Reno, OK, July, 2000.

"Anesthesia, Analgesia, and Euthanasia of Small Animals." IACUC Issues in Field Biology, NIH Conference, Charleston, September, 2000.

2001

"Nontraditional Laboratory Animals." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2001.

"Biology and Care of Laboratory Amphibians and Reptiles." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2001.

"The Laboratory Animal Care Program at the University of Tennessee." UT Medical Center Research Seminar Series, Knoxville, TN, February, 2001.

"IACUC." University of Tennessee Compliance Seminar Series, Fall, 2001.

"The Lab Animal Technician's Role in AAALAC Accreditation." Workshop, AALAS Annual Meeting, Baltimore, MD, October, 2001.

"Council Member/Council Partner Interactions." AALAS Annual Meeting, Baltimore, MD, October, 2001.

"Coping With Research Animal Death in the Laboratory." Advancing IACUC Education and Research Animal Well-Being, SCAW/OLAW/UTHSCSA Meeting, San Antonio, TX, December, 2001.

2002

"Animal Research at the University of Tennessee Medical Center," UT Medical Center Research Seminar Series, Knoxville, TN, February, 2002.

"When Professional Judgments Differ – IACUC and Veterinary Issues." PRIM&R Annual Meeting, Boston, MA, March, 2002.

"Maximizing the Use of Non-scientist, Non-affiliated Members." PRIM&R Annual Meeting, Boston, MA, March, 2002.

"Rodents Need TLC, too – Aseptic Technique, Enrichment, Wire Bottom Caging, and Carbon Dioxide Euthanasia." PRIM&R Annual Meeting, Boston, MA, March, 2002.

"Collaborations and Contracts". PRIM&R Annual Meeting, Boston, MA, March, 2002.

"Enrichment Strategies for Reptiles, Amphibians, and Fish". SCAW Conference, Baltimore, May, 2002.

"Nontraditional Laboratory Animals." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2002.

"Biology and Care of Laboratory Amphibians and Reptiles." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2002.

"The Lab Animal Technician's Role in AAALAC, International Accreditation." Workshop, AALAS Annual Meeting, San Antonio, TX, October, 2002.

"Anatomy of a Land Grant Institution." AAALAC Seminar, AALAS Annual Meeting, San Antonio, TX, October, 2002.

2003

"Research Using Animals at the University of Tennessee." UT Medical Center Research Seminar Series, Knoxville, TN, February, 2003.

"IACUC Protocol Review - Refinement." IACUC-Advanced Meeting, Clearwater, FL, March, 2003.

"Nontraditional Research Animal Protocol Considerations." IACUC-Advanced Meeting, Clearwater, FL, March, 2003.

"Capture and Release of Wildlife." IACUC-Advanced Meeting, Clearwater, FL, March, 2003.

"Laboratory Animal Management Findings." AAALAC, International Trends and Expectations Conference, Reston, VA, May, 2003.

"Laboratory Animal Management Panel." AAALAC, International Trends and Expectations Conference, Reston, VA, May, 2003.

"Aquatic Species Behavior and Enrichment." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2003

"Nontraditional Laboratory Animals." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2003.

"Biology and Care of Laboratory Amphibians and Reptiles." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2003.

"Rabbit Diseases." Extension presentation to Cumberland Rabbit Breeders Association, Crossville, TN, August, 2003.

"The Lab Animal Technician's Role in AAALAC, International Accreditation." Workshop, AALAS Annual Meeting, Seattle, WA, October, 2003.

"ACLAM Training Session: Pigs, Amphibians, and Zebrafish." AALAS Annual Meeting, Seattle, WA, October, 2003.

2004

"Research Using Animals at the University of Tennessee." UT Medical Center Research Seminar Series, Knoxville, TN, February, 2004.

"Aquatic Species Behavior and Enrichment." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2004.

"Biology and Care of Laboratory Amphibians and Reptiles/Nontraditional Species." Charles River Laboratories Annual Short Course, Danvers, MA, June, 2004.

"Regulations and Guidelines for International Standards of Animal Care." AAALAC, International representative at IBRO-sponsored meetings in Santiago, Chile and Montevideo, Uruguay, June, 2004.

"Guidelines for Care of Laboratory Reptiles, Amphibians, and Fish." AAALAC, International representative at IBRO-sponsored meeting in Montevideo, Uruguay, June, 2004.

"Laboratory Animal Medicine Careers." UTCVM Avian, Wildlife, and Exotics Club meeting, Knoxville, TN, September, 2004.

"The Lab Animal Technician's Role in AAALAC, International Accreditation." Workshop, AALAS Annual Meeting, Tampa, FL, October, 2004.

"Ensuring Quality Animal Care Through Training." AALAS Annual Meeting, Tampa, FL, October, 2004.

2005

"Out of the Lab: IACUCs and Field Studies, Including Collaborations with State and Federal Agencies." PRIM&R Annual Meeting, San Diego, CA, March, 2005.

"Integrating Agricultural Animals into an Institutional Care and Use Program." PRIM&R Annual Meeting, San Diego, CA, March, 2005.

"Out of the Swamp: IACUCs and Fish, Reptiles, and Amphibians (Including Introducing the IACUC Members to Novel Models and Working with Zebrafish)." PRIM&R Annual Meeting, San Diego, CA, March, 2005.

"Environmental Enrichment for Reptiles, Amphibians, and Fish." SCAW IACUC-Advanced, New Orleans, LA, March, 2005.

"Compliance: Nontraditional Research Animal Protocol Considerations." SCAW IACUC-Advanced, New Orleans, LA, March, 2005.

"Regulations, Guidelines, Accreditation: Ask What You Want to Know." SCAW IACUC-Advanced, New Orleans, LA, March, 2005.

"IACUC Review of Protocols with Nontraditional Species." SCAW IACUC-Advanced, New Orleans, LA, March, 2005.

"How Laboratory Animal Veterinarians Can Facilitate Integration of Agricultural Programs into an Accredited Unit (Lessons Learned)." ACLAM Forum, Asheville, NC, May, 2005

"Using Performance Standards in the Guide for the Care and Use of Laboratory Animals to Create Quality Animal Care Programs." IBRO International Workshop on Animals in Scientific Research, Buenos Aires, Argentina, June, 2005.

"Animal Care Protocol Review by IACUCs (Institutional Animal Care and Use Committees)." IBRO International Workshop on Animals in Scientific Research, Buenos Aires, Argentina, June, 2005.

"Round Table: On the Need and Creation of Ethics Committees for the Use of Laboratory Animals." IBRO International Workshop on Animals in Scientific Research, Buenos Aires, Argentina, June, 2005.

"Husbandry and Diseases of Fish, Amphibians, and Reptiles." 8'th Current Laboratory Animal Science Seminar (CLASS), AFIP, Rockville, MD, July, 2005.

"Agricultural Animals Used in Research Laboratories and Other Facilities." SCAW IACUC-Advanced, Research Triangle Park, NC, September, 2005.

"Principal Investigators: Write the Perfect Protocol!" SCAW IACUC-Advanced, Research Triangle Park, NC, September, 2005.

"Protocol Review for Non-Traditional Species." SCAW IACUC-Advanced, Research Triangle Park, NC, September, 2005.

"Elements of an Effective Animal Care and Use Program." 2'nd IACUC Basic Training Course, Singapore, October, 2005.

"Value and Process of AAALAC Accreditation." 1'st Singapore Association for Laboratory Animal Science (SALAS) Conference, Singapore, October, 2005.

"Occupational Health and Safety Programs and Disaster Planning." 1'st Singapore Association for Laboratory Animal Science (SALAS) Conference, Singapore, October, 2005.

2006

"Maintaining a Healthy IACUC". AAALAC Education and Outreach Seminar, Durham, NC, June, 2006 .

"Semiannual Program Review". AAALAC Education and Outreach Seminar, Durham, NC, June, 2006.

"Review of Animal Protocols and Post-Approval Monitoring". AAALAC Education and Outreach Seminar, Durham, NC, June, 2006.

"IACUC Oversight of Agricultural Animals". AAALAC Education and Outreach Seminar, Durham, NC, June, 2006.

"Care and Use of Animals in Biomedical Research". Presentation and Tour, Rx for Science Literacy, NCABR, ECU, Greenville, NC, October, 2006.

"Guidelines for Care of Laboratory Amphibians, Reptiles, and Fish". 2'nd Singapore Association for Laboratory Animal Science (SALAS) Conference, Singapore, November, 2006.

"Husbandry and Diseases of Laboratory Fish". 2'nd Singapore Association for Laboratory Animal Science (SALAS) Conference, Singapore, November, 2006.

"Husbandry and Diseases of Laboratory Amphibians". 2nd Singapore Association for Laboratory Animal Science (SALAS) Conference, Singapore, November, 2006.

"How IACUCs Address New Technologies". Addressing Current Animal Research and IACUC Issues, SCAW Conference, San Antonio, TX, December, 2006.

2007

"Care and Use of Animals in Biomedical Research". Presentation and Tour, Rx for Science Literacy, NCABR, ECU, Greenville, NC, March, 2007.

"Non-Traditional Species: Research with Fish, Birds, Reptiles, and Amphibians". PRIM&R Annual Meeting, San Diego, CA, March, 2007.

"Setting Up an Institutional Program That is 'Most Likely to Succeed'". PRIM&R Annual Meeting, San Diego, CA, March, 2007.

"Setting Up an Institutional Program That is 'Most Likely to Succeed' – Follow Up Track". PRIM&R Annual Meeting, San Diego, CA, March, 2007.

"Preparing for an AAALAC, International Site Visit." Workshop, AALAS National Meeting, Charlotte, NC, October, 2007.

"Field Research: Monitoring and Collection." SCAW IACUC-Advanced, Anchorage, AK, September, 2007.

2008

"AAALAC International: Who We Are and What We Do." IACUC Basic Training, Singapore, April, 2008.

"Elements of an Effective Animal Care and Use Program." IACUC Basic Training, Singapore, April, 2008.

"Endpoints." IACUC Advanced Training, Singapore, April, 2008.

"Ferrets." CL Davis - Topics in Laboratory Animal Medicine Symposium, Raleigh, NC, May, 2008.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2008.

"Personnel Qualifications and Training." IACUC 101, San Francisco, CA, September, 2008.

"Protocol Review." IACUC 201 Plus, San Francisco, CA, September, 2008.

"Training." IACUC 201 Plus, San Francisco, CA, September, 2008.

"Before the Site Visit". AAALAC International Ad Hoc Consultant Training Seminar, AALAS National Meeting, Indianapolis, IN, November, 2008.

"Preparing for an AAALAC, International Site Visit." Workshop, AALAS National Meeting, Indianapolis, IN, November, 2008.

"Not Your Typical Species: IACUC Coping Mechanisms." Animal Behavior, Welfare, and Science: IACUC Roles, SCAW Conference, San Antonio, TX, December, 2008.

2009

"Hot or Not? Venomous Snakes of Eastern North Carolina." Beaufort County Grange Meeting, Washington, NC, March, 2009.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2009.

"AAALAC International in Europe: Approaches to Ethical Review". AAALAC International Conference, Rome, Italy, May, 2009.

"Preparing for an AAALAC, International Site Visit." Workshop, AALAS National Meeting, Denver, CO, November, 2009.

"AAALAC Program Evaluation Writing." Workshop, AALAS National Meeting, Denver, CO, November, 2009.

"Nuts and Bolts of Semi Annual Inspections." SCAW Conference, San Antonio, TX, December, 2009.

2010

"Amphibians." CL Davis ACLAM Board Preparation Seminar, Raleigh, NC, May 2010.

"Do's and Don't's When Preparing for AAALAC." Invited seminar, University of Maryland, College Park, MD, May, 2010.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2010.

"AAALAC's Approach to Implementing the 2010 Guide." AAALAC *ad hoc* and Emeritus Training Seminar, AALAS National meeting, Atlanta, GA, October, 2010.

"The 2010 Guide for the Care and Use of Laboratory Animals: An AAALAC International Perspective." Seminar, AALAS National Meeting, Atlanta, GA, October, 2010.

"AAALAC Virtual facility Tour." In "Preparing for an AAALAC International Site Visit." Workshop presentation, AALAS National meeting, Atlanta, GA, October, 2010.

2011

"Careers in Veterinary Medicine." ECU pre-vet/pre-med club meeting, East Carolina University, January, 2011.

"Chapter 3: Environment, Housing, and Management." In "Update to the Guide for the Care and Use of Laboratory Animals." NCABR Conference, Raleigh, March, 2011.

"A Living Room Conversation: Harmonizing Your Programs with the Guides." Panel, PRIM&R National Conference, Chicago, IL, March, 2011.

"Wildlife Protocol Oversight, Including Special Challenges When Conducting Field Studies." Workshop, PRIM&R National Conference, Chicago, IL, March, 2011.

"Preparing for AAALAC Site Visits: Getting Your PIs and Labs Ready." Workshop, PRIM&R National Conference, Chicago, IL, March, 2011.

"The 2011 ILAR Guide: Chapter 3 – Environment, Housing, and Management." FASEB National Meeting, Washington, DC, April, 2011.

"Advice I Wished I'd Gotten 15 Years Ago: Lessons I Learned the Hard Way." Panel, Brody Women in Science and Medicine Conference, East Carolina University, April, 2011.

"Role of the Veterinarian: AAALAC International Perspective." Access AAALAC International Meeting, Beijing, China, May, 2011.

"Preparing for a COA Meeting." New Council on Accreditation Member Training, Pacific Rim AAALAC Council Meeting, Beijing, China, May, 2011.

"AAALAC Position Statements and Interpretations." Charles River Short Course, Boston, MA, June, 2011.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2011.

"AAALAC Virtual Facility Tour." In "Preparing for an AAALAC International Site Visit." Workshop presentation, AALAS National meeting, San Diego, CA, October, 2011.

"The New Guide and What You Need to Know from AAALAC, International." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"Maintaining an Effective and Well-Balanced IACUC – AAALAC, International Perspective." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"How to Set Up and Maintain Best Practices for Agricultural Animal Research Facilities." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"Agricultural Animal Housing, Husbandry, and Handling." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"Are Our Agricultural Animals Healthy? A Review of Procurement, Veterinary Care, Standard Agricultural Practices, and Genetically Engineered Animals." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"Are Our Aquatic Animals Healthy? Adequate Veterinary Care Provision." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"IACUC Scenarios." Thai Association for Laboratory Animal Science Annual Meeting, Bangkok, Thailand, October, 2011.

"Research With Wildlife and Zoo Animals: Personal Experiences." Khao Kheow Open Zoo IACUC Training, Chonburi, Thailand, October, 2011.

"Field Euthanasia." Wildlife Research Conference, Albuquerque, NM, November, 2011.

"Scenario #2: Euthanasia in the Field due to Injury or Other Circumstances." Panel, Wildlife Research Conference, Albuquerque, NM, November, 2011.

"Medical Breakthroughs and Research Animal Care." Greenville Evening Rotary Club, Greenville, NC, November, 2011.

2012

"East Carolina University Animal Care and Use Program." University Affairs Committee of the ECU Board of Trustees, Greenville, NC, February, 2012.

"Housing and Welfare of Amphibians Used in Biomedical Research." Bioconference Live, International Webcast, February, 2012.

"Aquatics." Institute of Laboratory Animal Management Annual Conference, Memphis, TN, May, 2012."Amphibian and Reptile Colony Management." Institute of Laboratory Animal Management Annual Conference, Memphis, TN, May, 2012.

"Assessing *Guide* Provisions for Terrestrial Animals." North Carolina Association for Biomedical Research Meeting on the *Guide* and the PHS Checklist, Research Triangle Park, NC, May, 2012.

"Significant IACUC Considerations about Field Research." North Carolina Association for Biomedical Research Meeting on the Guide and the PHS Checklist, Research Triangle Park, NC, May, 2012.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2012.

Veterinary Resources". NC Agromedicine Institute ECU Faculty Affiliates Meeting, July, 2012.

"AAALAC Virtual Facility Tour." In "Preparing for an AAALAC International Site Visit." Workshop presentation, AALAS National meeting, Minneapolis MN, November, 2012.

2013

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2013.

"AAALAC Virtual Facility Tour." In "Preparing for an AAALAC International Site Visit." Workshop presentation, AALAS National meeting, Baltimore MD, October, 2013.

2014

"Non-Traditional Species in Far-Off Locations: What are the Committee's Obligations?" NCABR IACUC 2014, Raleigh, NC, April, 2014.

"Laboratory Amphibians and Reptiles." North Carolina Academy of Laboratory Animal Medicine Workshop in Laboratory Animal Medicine, Raleigh, NC, May, 2014.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2014.

"Field Research: Ensuring Optimal Animal Welfare in Unconventional Environments." Charles River Short Course, Boston, MA, June, 2014.

2015

"Diseases of Reptiles and Amphibians." NC Workshop in Laboratory Animal Medicine, Raleigh, May, 2015.

"Biology and Care of Amphibians and Reptiles." Charles River Short Course, Boston, MA, June, 2015.

"Avian Influenza." River Park North Bird Club, Greenville, NC, October, 2015.

"Biology and Care of Laboratory Amphibians and Reptiles." NCSU student chapters ASLAP and WAZM, Raleigh, November, 2015.

2017

"Lead Poisoning in Waterfowl." River Park North Bird Club, Greenville, NC, April, 2017.

"Wildlife and Field Considerations for IACUCs." NCABR IACUC Conference 2017: Advanced, RTP, May, 2017.

"IACUC Issues Specific to Agricultural Research." NCABR IACUC Conference 2017: Advanced, RTP, May, 2017.

"Lead Poisoning in Waterfowl." East Carolina Wildfowl Guild, Washington, May, 2017.

2018

"Controlled Substances". Three I's and Biosecurity Meeting, Chapel Hill, 2018.

"Laboratory Amphibians and Reptiles." North Carolina Academy of Laboratory Animal Medicine Workshop in Laboratory Animal Medicine, Raleigh, NC, May, 2018.

2019

"Field Research." NCABR IACUC Conference 2019: Advanced, RTP, April, 2019.

"Research Reptile Husbandry and Health." Potomac Regional Veterinary Conference, White Sulphur Springs, WV, October, 2019.

2020

"Restarting Research in a COVID 19 World." Virtual Member Conversation moderator, North Carolina Association for Biomedical Research, June, 2020.

2022

"Understanding the role of the Attending Veterinarian: Responsibilities, Requirements, and Why the Entire Research Team Should Care." Virtual Member Conversation moderator, North Carolina Association for Biomedical Research, March, 2022.

"Laboratory Amphibians and Reptiles." North Carolina Academy of Laboratory Animal Medicine Workshop in Laboratory Animal Medicine, Raleigh, NC, May, 2022.

RESEARCH AND OTHER EXTERNAL SUPPORT (P.I.):

Venture Grant. "Analgesic effect of buprenorphine in snakes." Schaeffer, DO. Awarded, July, 1995, $1500.00

Faculty Development Award to study surgery and microsurgery at NIH. Awarded, July, 1995, $3700.00.

Centers Of Excellence Grant. "Characterization of oval cell differentiation and involvement in hepatocellular carcinogenesis." Schaeffer DO and Wilkinson JE. Awarded, July, 1996, $22,000.

UT Office of Laboratory Animal Care subcontract with UT-Battelle for provision of interim veterinary care at the Oak Ridge National Laboratory, March 2002-March 2003, $47,944.

RESEARCH AND OTHER EXTERNAL SUPPORT (CO-INVESTIGATOR):

University of Tennessee COE Grant
"Acute transplacental effects of dietary carcinogens."
Co-investigator with M. Miller
July 1, 1995 - December 31, 1995
$3,000

NIH Grant R01 ES08252
"Transplacental carcinogenesis of heterocyclic amines."
Co-investigator with M. Miller
10% salary recovery
Awarded late fall, 1996
Requested budget $367,784.

ACLAM Foundation Grant
"Efficacy of glass bead sterilization for aerobic bacteria decontamination on surgical instruments in serial rodent surgeries."
Awarded May, 2011
Co-investigator with K Oppelt
$9,000

"Role of GPR65 in Immune Cell Function and Diabetic Nephropathy"
Boehringer Ingelheim Pharmaceuticals, Inc.
Collaborator - Li Yang, PI

MEETINGS/SEMINARS CHAIRED/ORGANIZED:

Co-Chair, "Care and Use of Reptiles, Amphibians, and Fish in Research", SCAW. New Orleans, LA, April, 1991

Animal Disease Research Workers in Southern States, March, 1994, Moderator, Sessions III& IV

Co-Chair, "The Well-Being of Animals in Zoo and Aquarium Sponsored Research", SCAW, New Orleans, LA, May 1995

Invited Chair, "Breeding, Maintenance and Use of Non-Mammalian Species" ICLAS/FELASA/SECAL Joint Meeting, Mallorca, Spain, May, 1999

AALAS District IV Annual Meeting Chair, Knoxville, TN, April, 2000

Seminar Leader, "Implementing Best Practices Through Training Programs: The AAALAC International Perspective," AALAS Annual Meeting, Tampa, FL, October, 2004

Organized and Chaired “The Humane Care and Use of Agricultural Animals in Research”, SCAW/FASS, St. Louis, MO, May, 2006

Organized and Hosted Research Triangle Branch AALAS Meeting, ECU, Greenville, NC, May, 2007

Organized and provided educational information to professionals and the public for North Carolina Venomous Snake Exhibit:
Oakwood School, Fall, 2015
12th Eastern Regional Trauma Symposium, September, 2015
Venom Week, March, 2016

Organized and hosted “Science and Society: Myths, Mayhem, and Strategic Misunderstandings”, presented by NCABR, 2018.

OTHER INFORMATION:

AAALAC ad hoc specialist, 1995-1999

External reviewer for promotion (+/- tenure) for laboratory animal veterinary faculty:
University of Hawaii (2006)
University of Arkansas (2007)
Stanford University (2011)
Duke University (2011)
University of Michigan (2011)
Penn State University (2012)
Tulane University (2016)
Tulane University (2016)
University of Illinois (2016)
Stanford University (2017)
University of Arizona (2018)
NIEHS/NTP (2018)
Duke University (2020)
University of Michigan (2020)

Veterinary Consultant/Collaborator, USGS, Canvasback project, Pass a Loutre and Catahoula Lake, Louisiana, 1988- 1993

Veterinary Consultant/Collaborator, USGS, Harlequin duck project, Prince William Sound, AK, Sept. 1996

Interview Team, College of Veterinary Medicine, 1995, 1997

Bicentennial Convocation, Sept. 1994

Teddy Bear Clinic, 1994, 1995, 1996

UT Summer Program for Science and Math Teachers, 1994, 1995, 1996, 1997, 1998, 2000, 2001

Attended Microsurgery course, March, 1996; received certificate of completion

Hosted Visiting Veterinarian, Christina Swanson, August 1996

AEW Club, noontime seminar “Laboratory Animal Medicine,” 1997, 1998, 1999, 2001, 2004

Explorer Scouts, lecture on snakes of Tennessee, 1998

Kids U, College of Veterinary Medicine, 1998

Mentor 4 veterinary students per year, 1994-2006

Established ACLAM recognized residency at UT in Laboratory Animal Medicine, 1998

Private consultant for animal care and use programs at land grant institutions, 2000, 2001, 2006, 2010, 2013

Invited guest, National University of Singapore IACUC, 2008.

Invited guest, Chiang Mai University animal care program, 2011

Washington High School Science Olympiad Coach, “Reptiles and Amphibians”, 2007-2008

Member of the Beaufort County Grange, 2008-present

Welcome address to Forensics Workshop, Rx for Science Literary, NCABR, ECU, March, 2009

Participated in NC National Guard sponsored “Bosslift” to observe training of employees (Heather Kittrell) prior to deployment to Iraq, Brownwood, TX, June, 2009

Participated as Internal Constituent of Department of Anatomy and Cell Biology and Department of Physiology during external reviews, 2010-2011

Involved in design and development of rodent facilities for East and Medical campuses, 2010-2011

Responded to 9 FOIA requests from animal rights’ groups and conducted interviews with the media regarding animal research, 2010- 2015

Completed semester course offered by the ECU/NC State/NC A&T Agromedicine Institute and successfully completed two exams for Agrisafe certification, spring semester, 2012

Submitted application for selection as regional lecturer in Agricultural Medicine Course, 2013

Participated in STEM^2 Girls Brown Bag Lunch at CM Epps Middle School, April, 2012

Completed SafeZone training and identified as SafeZone Ally, 2013

Wrote Program Description, prepared for, and hosted site visit team for ECU's triennial accreditation visit by AAALAC, International, April, 2014; visit resulted in continued full accreditation with program described as exemplary

Served as advisor on animal care and handling to Director of ECU's production of *Dracula*, September, 2013

Authored the ECU AAALAC Program Description *de novo* using the new required format (2016), coordinated efforts among Facilities, Prospective Health, IACUC, and DCM to gather data and prepare for the visit (2016-2017), and hosted the site visit team during ECU's triennial accreditation visit by AAALAC, International, March 20-22, 2017. Site visit team recommended Continued Full Accreditation at the exit briefing. Received final letter awarding Continued Full Accreditation with exemplary description of program in summer, 2017.

Restructured the DCM husbandry staff organizational scheme in 2016 following two key retirements. Replaced four team leader positions with two newly created supervisor positions by reconfiguring vacant slots and adding only one FTE to animal care staff total. Supervisors report to the new facility operations manager and strengthen on-floor direct supervision and trouble-shooting in real time with much greater efficiency and effectiveness.

Completed cost analysis with Huron in summer 2018 and implemented new per diem rates in 2019.

Restructured DCM husbandry staff positions to create 4 0.75FTE cage wash personnel positions to maximize workflow and biosecurity in 2019.

Renegotiated PHS OLAW Assurance for ECU, 2019.

Responded to one citizen phone request regarding research dogs and worked closely with ECU Legal Counsel in responding to 6 freedom of information requests from a national animal rights group (NEAVS). These responses involved days of accessing relevant information, carefully reviewing the information prior to sending to Legal, re-reviewing the redactions proposed by Legal, and submitting final redactions and suggestions to Legal prior to their release of the information.

Worked with Facilities on mitigating impact on research animals during numerous projects, including ensuring animal well-being throughout multiple power outages, roofing events, and other disruptive activities during 2019 and 2020.

Served on two 5 year administrative review committees for BSOM department chairs, 2019.

Served as interim chair for the Dept of Anatomy and Cell Biology for Jan 2020. During that time, appointed search committee, posted job description and initiated search for teaching assistant professor. Worked closely with teaching faculty to critically evaluate processes and determine needs for replacement of retiring lab tech responsible for teaching cadaver acquisition and maintenance.

Acquired, upgraded, and moved IACUC offices into new space adjacent to DCM animal facility. Upgraded and renovated newly acquired adjacent space to provide shared procedure space for investigators and expansion space for animal facility.

Reclassified IACUC coordinator position to IACUC Director and hired a highly qualified PhD to head the IACUC office.

Provided facility tour and discussion on careers in veterinary medicine and research opportunities to Pembroke, NC high school students in conjunction with USDA, 2019.

Established two “quiet rooms” for departmental personnel to use when dealing with the compassion fatigue commonly seen in animal care and use operations.

Coordinated data collection, updated, and submitted the ECU AAALAC Program Description in 2019. Worked closely with AAALAC to develop and implement a hybrid virtual/on-site reaccreditation visit in July, 2020. Awarded Continued Full Accreditation with no recommendations for improvement and exemplary description of the ECU animal care and use program by AAALAC, I. *It is noteworthy that only 2% of over 1,000 accredited units globally receive no recommendations for improvement (ECU has achieved this in 2010 and 2020).*

Responded to 5 freedom of information requests from NEAVS, all of which occurred during the pandemic, and several which were focused on pandemic responses. The ECU AAALAC program description (over 300 pages of detailed information on animal care and use operations) was included in these requests. Review and redaction of highly sensitive information required weeks of labor and close interaction with Legal throughout the pandemic.

Worked with veterinary faculty, IACUC Chair, and IACUC Director to develop virtual monthly IACUC meetings. Also implemented strategic processes to conduct NIH-compliant semi-annual facility and laboratory inspections of over 30 sites across campus.

Awarded CARES funding in July 2020 to upgrade two ABSL2/BSL2 animal housing and laboratory support spaces to ABSL3/BSL3 capability for conducting SARS CoV2 research. Worked closely with research faculty, Facilities, Biosafety, and Finance to design, renovate, furnish, and open the facilities by December, 2020. Specific activities included attending over 67 planning, progress, and troubleshooting meetings; overseeing renovations to ensure functionality and compliance; daily interactions with vendors and ECU personnel regarding purchasing and installing animal housing and support equipment; justifying, tracking, documenting, and reconciling expenditures; and

working closely with researchers to ensure purchase of appropriate laboratory equipment and supplies. Simultaneously, assisted researchers in developing studies and securing IACUC and IBC approval, and ensuring appropriate training in BSL3 practices. The facilities were fully operational and research was ongoing in December, 2020. Currently, there are 3 labs with approved SARS CoV2 studies in the two spaces, one COVID 19 IACUC protocol is under consideration, 2 additional projects have submitted funding requests for COVID studies in the BSL3, and another project is in the development stages.

The COVID 19 pandemic created special challenges for DCM's animal care and use program. The most challenging aspect has been the paucity of PPE and other supplies necessary for facility functioning. We proactively stocked essential items in anticipation of shortages. Although research paused for a while, valuable animal colonies had to be maintained. This required personnel on site 7 days a week throughout the pandemic. We initially worked compressed days, leaving after essential duties were completed (much the same as during natural disasters), in order to minimize potential exposure. Upon initial shutdown, we immediately implemented social distancing, increased sanitation of surfaces, and wore appropriate PPE. Requirements were updated as new information became available. Later, as restrictions relaxed, we returned to full work schedules and began to ramp up activities to handle the research uptick. Throughout the pandemic, DCM staff were responsible and compliant, and we experienced no cases of SARS CoV2. Vaccines were offered to all personnel as soon as possible. We have been fully operational for some time, and research is robust.

Responded to 3 FOIA requests, 2022-2023

Presented program on venomous snakes of North Carolina to Boy Scouts, Greenville, 2022

In conjunction with NCABR, organized and supervised a staff outreach video for URM high school students describing career opportunities in laboratory animal care; video sent to all NC high schools for program course, 2022

Hosted DEI presentation for ECU by Dr. Craig Fletcher, UNC-CH Attending Veterinarian, 2022

Nicholas R. Hill
252.826.3186 – nickhill@shwpark.com

Experience Summary

Zoological – Over forty-five years of experience as a bird keeper, assistant curator, and curator of several large collections in the United Kingdom and USA. Extensive experience in aviculture and aviary design and construction. Worked with over 400 species of birds and reared vast numbers of young birds including 7 species of penguins.

Field – Made 3 expeditions to Falkland Islands to collect eggs for captive research efforts on rare southern hemisphere species. Extensive field observations of avian species in Europe and North America.

Consulting – Advised television and motion picture industries in the United Kingdom and USA on wildlife shorts and full-length films. Also advising hand raising techniques for penguins at Belfast Zoo, Ireland and Edinburgh Zoo, Scotland. Consultancy work with Sea World San Diego on raising Kelp Geese.

Detailed Experience

Sylvan Heights Breeding Center General Curator – 2001-present

Responsible for the daily husbandry and care of 150 species of waterfowl.

Easter Ellister Waterfowl Collection Assistant – 1999-2001

Worked with waterfowl with a focus on seaducks. Successfully bred and hand reared 50 long tail ducks in one year, a species previously thought to only occasionally breed in captivity. Bred and hand reared Black Scoter. Responsible for the general husbandry and management of the collection.

Sylvan Heights Waterfowl II Avicultural Intern – 1987-1999

Starting in 1987 on an internship and as a volunteer on various trips throughout the 1990 expanded experience whilst staying with the owners of this facility, which has the largest collection of waterfowl in the world in terms of number of birds and number of species. Over 150 species of waterfowl and species of cranes, pheasants, parrots, macaws, emus and curassows. While at Sylvan Heights participated in first breeding and hand rearing of Black-headed Duck, White-backed Duck, New World Comb Duck, South Georgia Pintail, Freckled Duck.

SeaWorld Aviculture Intern – 1985-1986

Worked in the bird department during penguin hand rearing period each year. Gained valuable experience in working with young of several species in Sea World's state-of-the-facility.

Birdland Zoo Gardens Assistant Curator – 1979-1983

Worked maintaining one of the world's largest and most diverse bird collections. Collection included waterfowl, cranes, waders, softbills, penguins, hookbills, hornbills, flamingoes, ibis, seabirds and ratites. Experience included animal care; developing and preparing diets; veterinary care; designing; building and maintaining aviaries; educational presentations, and visitor services. Accomplishments included the European First Breeding of the Black Browed Albatross and Palm Cockatoo and hand rearing of Adelie and King penguins. Worked with over 300 species of birds.

Bredon School, Gloucestershire, U.K, General Studies – 1979-1983

P • R • O • J • E • T • O
PATO-MERGULHÃO

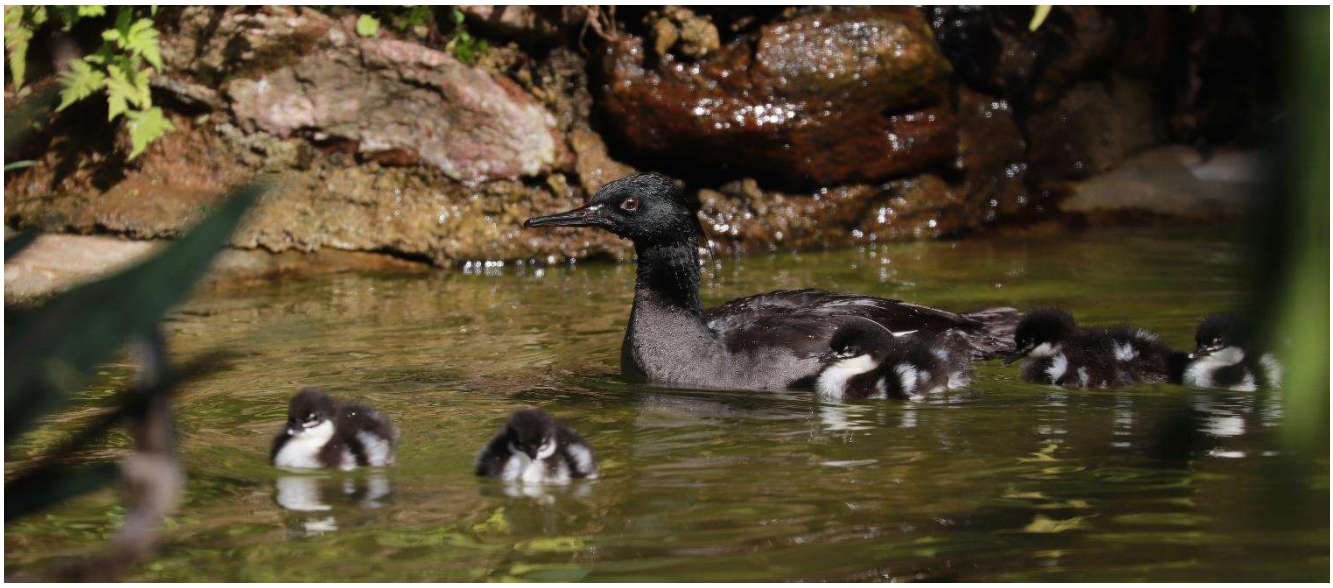
UPDATE – DECEMBER 2023

ZOOPARQUE ITATIBA

Brazilian Merganser (*Mergus octosetaceus*)

Update December 2023

The year 2023 was very successful for the Brazilian Merganser Project and we´d like to send this update to our sponsor.



Breeding season

In this year´s breeding season, we parent raised 11 ducklings. The number of ducklings is inferior to last year´s, for two different reasons; No more collecting of eggs in the wild and the temperature going up and down in no time from 15 until 35 degrees. However, the good news is that we formed new pairs before the breeding season and some of them already reproduced for the first time.

Offspring 2023.

Offspring 2023.

Tracking the birds

Considering the importance of monitoring the birds in the wild, Zooparque Itatiba purchased 2 transmitters units of a Solar Power PTT that provides the animal location through the Argos satellite system. Once the devices arrived at the zoo, our team tested the devices to see if they were operating correctly. And after a couple of weeks testing in different areas, it was time to test it on our bird.

We attached on device on a male for a month that was in the exhibition enclosure. We chose this male because it´s in an open enclosure, so there would be no interference in transmitting the signal.

Attaching the transmitter on a captive Brazilian merganser for testing.

Captive Brazilian merganser using the transmitter.

After the tests were finished, it was time to use it on the birds in the wild.

Working *in situ*

Throughout the year of 2023, Zooparque focused its activities in the wild in monitoring Brazilian Mergansers in the region of Serra da Canastra National Park. The goal is to find the pairs, monitor them during breeding season and follow up the development of their offspring, so we could capture two of them to attach the transmitters.

The work started in april, when the rainy season was finished. During the months of april, may and june, we monitored 5 different territories of the brazilian merganser along the São Francisco River. In this period, was possible to monitor new territories and breeding pairs of Brazilian mergansers in the wild. So we could do this work, Zooparque acquired two person kayak so the researchers in the field could search in areas where it wasn´t possible to reach by foot.

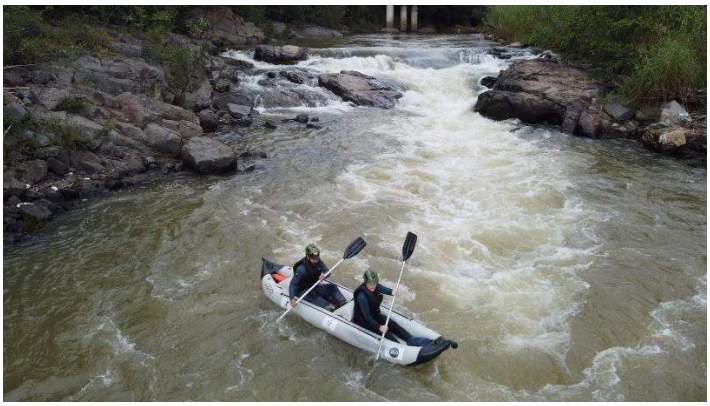


Image from the Serra da Canastra expedition.

Image from the Serra da Canastra expedition.

Image from the Serra da Canastra expedition.

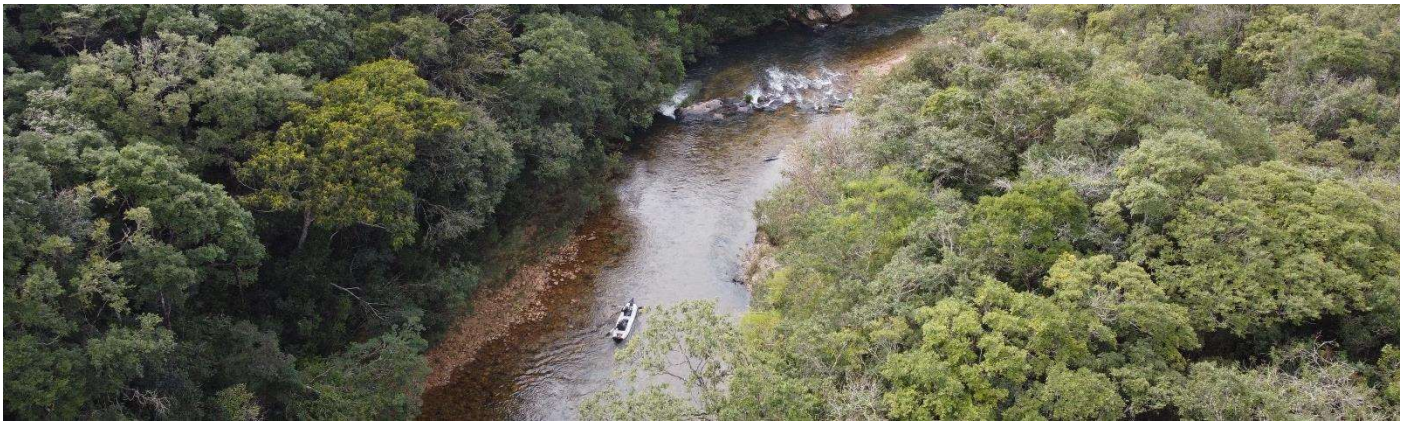


Image from the Serra da Canastra expedition.

Team that worked in the Serra da Canastra expedition and monitored the birds.

Pair of adult mergansers in Serra da Canastra.

One single individual adult merganser in Serra da Canastra.

The 5 territories that Zooparque monitored in Serra da Canastra (aprox. 70km).

The 5 territories that Zooparque monitored in Serra da Canastra (aprox. 70km).

Even though we found 3 different pairs and one single individual, only one of the pair nested properly and showed up with 7 ducklings. During the period we monitored the family, it was possible to observe that they lost 2 ducklings in a couple of months and 5 juveniles were observed with their parents in October.

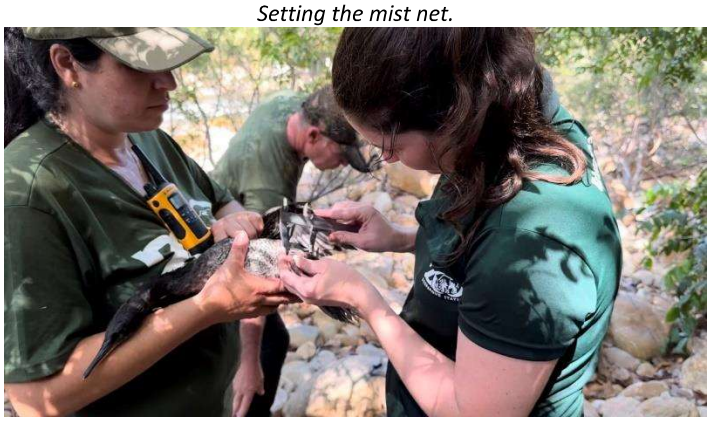
First picture of the pair with 7 ducklings in the wild.

In October, Zooparque assembled a team of experts to capture the bird in the wild. This group was formed by people that already work with the species at the zoo, therefore have experience in handling the birds and others that work with the mergansers in the wild and are familiar with the area where the capture would occur. in October 23th we had a successful opportunity to capture the birds in the wild.

Two males were captured and had the transmitters attached to their bodies. It was one young male and one adult male, its parent. To attach the device, we used the material that already has been tested in the zoo since 2021, using the correct measurements verified in captivity, which worked perfectly. We also took the opportunity to take measurements of the birds, so it would be possible to compare it with the ones we have of the captive birds. After the work was done, the birds where released and flew off to be monitored by us.

Setting the mist net.

Attaching the transmitter on the bird.



Measuring the wild birds.

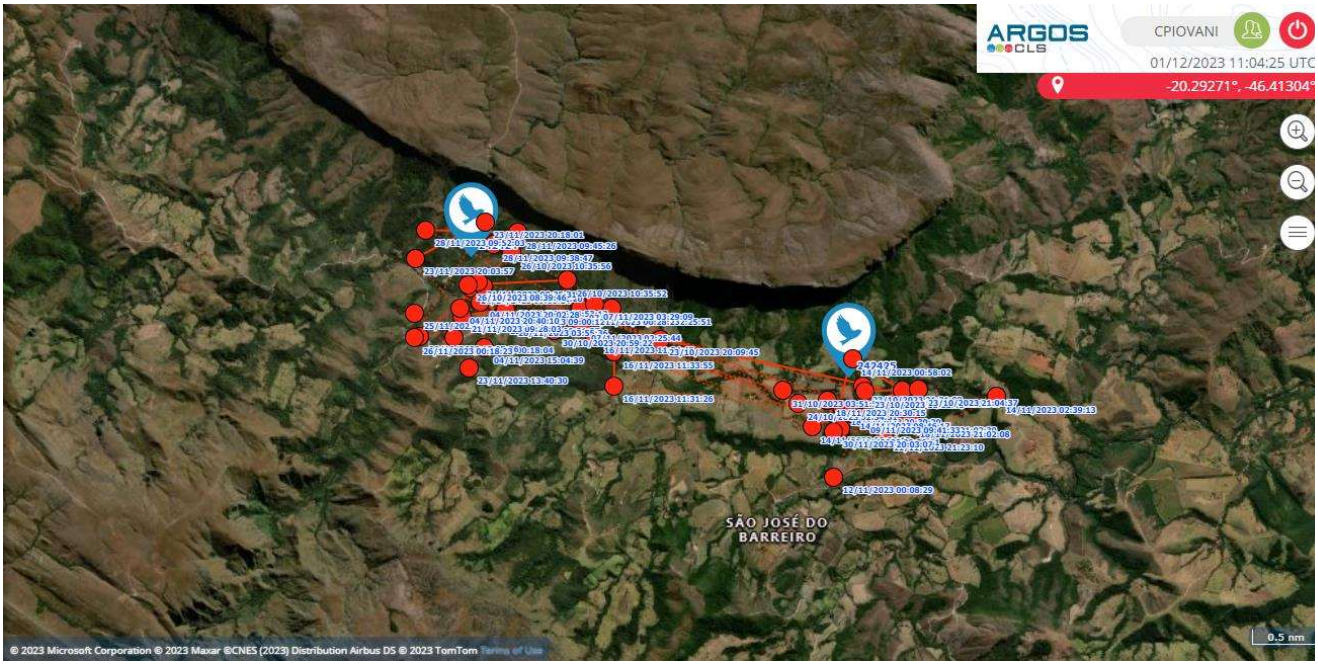
Weighing the wild birds.

Team that participated in the capture.

Collecting Argos data

The devices are working as expected and now it is possible to monitor the birds and see how they are moving in and outside their territory and most important, see the moment when the youngster will separate from their parents and where he is going.

Now it´s time to collect all the data possible and analyze that information and learn more about the species. The information and the experience of the transmitter we will need for the for the reintroduction program!

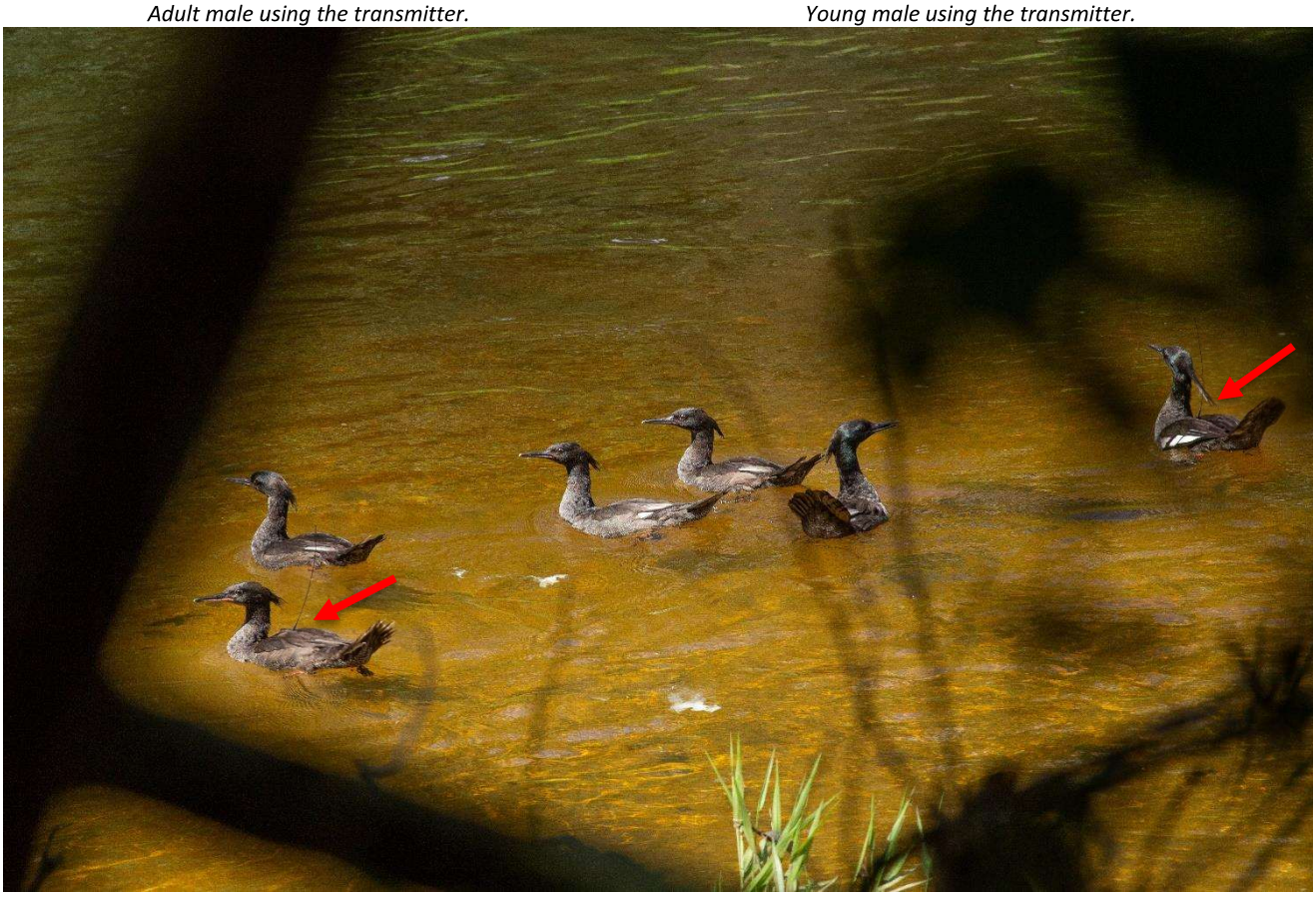


Location information collected by the transmitter using the Argos system.

Adult male using the transmitter.

Adult male using the transmitter.

Young male using the transmitter.



Family of mergansers with the two males using the transmitters.

Family of mergansers with the two males using the transmitters.

New institutions

Considering the importance of expanding the *ex situ* population, it´s crucial that new institutions can integrate in the program and keep the captive mergansers under human care. Therefore, this year two new institutions became members of the Brazilian Merganser Conservation Program and studbook: Prague Zoo and Sylvan Heights Bird Park. These institutions are partners of Zooparque Itatiba and have been supporting the program and sponsoring the *ex situ* activities since the beginning. Both signed the agreements necessary and committed with it, and with that, they agreed that the birds belong to the project.

This October 5 pairs of Brazilian mergansers were sent to Prague Zoo. The animals arrived there well and where kept in indoor aviaries for quarantine. After an adaptation period, the mergansers will be paired up and transferred to their permanent aviaries, including one in exhibition. This is essential for the environmental education program of the institution and so more people can get to know this species and understand the importance of protecting it.

Transport boxes shipped to Czech Republic.

Mergansers inside the boxes.

5 adult mergansers in the quarantine aviary.

5 adult mergansers in the quarantine aviary.

Next steps

For 2024, our goal is to track these two males in the wild using the information obtained by the transmitters, begin to understand how the juvenile mergansers migrate in the wild and work again in the Serra da Canastra region to monitor new territories and find more birds that we can work with.

In addition, is part of the National Action Plan (PAN) for the conservation of this species that we establish a pilot project for the reintroduction of the Brazilian merganser in the wild. For this, Zooparque will work together with other institutions in 2024 to elaborate this project so we can execute it in 2025.

Conclusion

All the work done in 2023 for the *ex situ* conservation of the Brazilian Merganser was only possible with the support of all our sponsors, so Zooparque Itatiba would like to thank all of you, without you this project wouldn't be so successful.

Hope that we will be working together again next year.

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THANK YOU VERY MUCH

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P • R • O • J • E • T • O
PATO-MERGULHÃO

UPDATE – DECEMBER 2024

ZOOPARQUE ITATIBA

Brazilian Merganser (*Mergus octosetaceus*)

Update December 2024

Breeding season

Because of the very unusual weather with extremely dry and hot months, the merganser in nature and with us at Zooparque had a bad and late season with lots of unfertile eggs. We only had three ducklings parent reared. This very instable weather may have affected the captive population, but even more the wild birds. According to researchers in the field, the birth rate in the wild was also inferior to previous years.

Offspring 2024.

Offspring 2024.

Tracking the birds

In 2023, we started working with the mergansers in Serra da Canastra and were able to capture two wild males and attach transmitters to them. Unfortunately, we had a few bumps along the way. After a couple of months, the transmitter of the young male stopped sending signals. We located the family using the location sent by the adult male´s signal and the young male using the transmitter was no longer with them. After visiting the last transition location, we couldn´t find neither the merganser nor the device. We believe that a predator took the young individual.

In the beginning of 2024, the transmitter of the adult male stopped sending signals, so we went back and tried to locate the family along the river. This time we were able to locate the family and find that the adult male was still alive, but no longer using the transmitter. We believe that the device detached from the bird and got lost in the water.

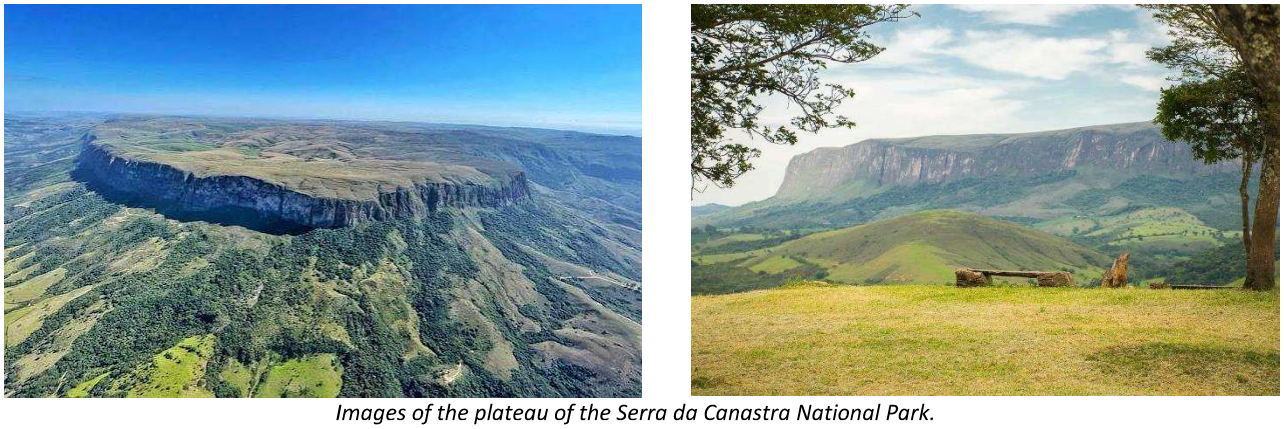
Even though the units were lost, we consider this first test using a satellite transmitter was successful. We were able to test the accuracy of the location points provided by Argos and see whether it would meet the

needs it had, so it can be used as tool for the reintroduction program. In addition, a new material has been tested in captive birds to avoid any future losses.

Attaching the transmitter on a captive Brazilian merganser for new testing.

Working *in situ*

This year Zooparque worked again in monitoring Brazilian Mergansers in the region of Serra da Canastra National Park. The area is made of two isolated metamorphic quartzite high plateau, separated by a large valley. Hundreds of streams originating on the plateau's flow downwards in waterfalls and cascades, including the São Francisco River.



Images of the plateau of the Serra da Canastra National Park.

The work started in April; we monitored five different territories of the brazilian merganser along the São Francisco River outside of the National Park limits and two territories in the same river but inside the National Park, on top of the plateau. We also monitored one pair, which we found in a territory of the Babilônia region, in the Rio Grande River.

It was very interesting to see the nest near the waterfall on the Rio Grande because the entrance of the nest was very open and the male had the habit of flying to the nest and stay there for up to 30 minutes while the female was inside her cave nest. The nest was very high and close to the waterfall, four ducklings were born, but all disappeared!

Even though we found three different pairs in different locations (two in the high part of the São Francisco River and one in the Rio Grande River), only one pair was successful and is currently with five individuals. Our goal was to use the three new transmitters we purchased with the help of our sponsors, and, in case of capturing juveniles; it will be very interesting to see where the offspring will go after their parents chase them away.

First picture of the pair with 7 ducklings in the wild.

In the second week of December 2024, Zooparque Itatiba went to Serra da Canastra for the capture. In the first day, the team went up the plateau to find the family of mergansers and try to capture them. We were very successful in our efforts and were able to capture three male merganser (1 adult and 2 juveniles). During the procedure, it was possible to collect biometrics data and to attach the transmitters. After this part of the work was over, the birds were released in the river and able to find the rest of their family.

Attaching the transmitter on the bird.

Attaching the transmitter on the bird.

Juvenile male.

Setting the mist net.

Team that participated in the capture.

Considering the importance of confirming the wellbeing of the animals, in the after the capture our team went up the plateau again to check on the birds. We followed the coordinates provided by the transmitters through the Argos satellite system to find the family and check that all of the birds were well and that the devices were properly attached.

Recent high quality location information collected by the Argos system.

All three males using the transmitter.

Young males using the transmitter.

Next steps

We hope that in the next few months, we´ll have a few answers about what is happing with the offspring once the parents chase them away, which should be around March- May. This way we gain more knowledge about the species and about what is happening to them once they leave their family in search of new territories. In addition, in 2025 we aim not only to continue tracking the birds in the wild, but also to redouble our efforts in breeding the captive population. This is a very important step for us, because next year our goal is to continue to elaborate a pilot project for the reintroduction of the Brazilian merganser in the wild alongside with ICMBio and the researchers of National Action Plan (PAN).

Conclusion

All the work done in 2024 for the *ex situ* conservation of the Brazilian Merganser was only possible with the support of all our sponsors, so Zooparque Itatiba would like to thank all of you, without you this project wouldn't be so successful. If you want to see a bit more about the expedition in Serra da Canastra, see the full video in the link bellow:

https://www.youtube.com/watch?v=L8x65ZEIR3M

Hope that that we will be working together again this year.

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THANK YOU VERY MUCH

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Galarreta, Angela A

From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, April 21, 2025 3:37 PM
To: [redacted]
Subject: 0543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Excellent, thank you Angela. It was a whirlwind of emails with the attachments bouncing back so just wanted to check.

Thank you,

Dust

--

Dustin Foote, Ph.D.
Director of Aviculture
Sylvan Heights Bird Park
PO Drawer 368 Scotland Neck, NC 27874
ph: (252) 826-3186 x224 • fax: (252) 826-3273
www.shwpark.com

From: [redacted]
Date: Monday, April 21, 2025 at 3:22 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email and apologies for not responding sooner to your previous email. I can confirm receipt of your emails and 13 attachments on April 4 and 5. I plan to review all very soon and let you know if I have any additional questions.

Thank you,

[redacted]
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service

5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs
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From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, April 21, 2025 9:57 AM
To [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Good morning [redacted]

I just wanted to touch base to make sure you received all the requested information we sent on the 4th. Let me know if there is anything else you need.

Best,

Dust

--

Dustin Foote, Ph.D.
Director of Aviculture
Sylvan Heights Bird Park
PO Drawer 368 Scotland Neck, NC 27874
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From [redacted]
Date: Thursday, March 6, 2025 at 4:22 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email. I will do my best to answer your questions.

These transport questions are new and I believe they are based on concerns for the transport of more sensitive animals. Therefore, I think the most important CVs/resumes to provide are for those personnel directly overseeing the transport. In this case, that seems to be the broker, Mersant International LTD. If you there is no CV or resume that can be provided from the broker, please provide a summary of their qualifications. Additionally, if no veterinarian or animal care staff will be attending, then we do recommend providing an explanation and if possible, a plan for care in the event of an emergency.

Please let me know if you have any additional questions.

Thank you,

[redacted]

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Falls Church, Virginia, 22041-3803, USA

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From: Dustin Foote <dustin@shwpark.com>
Sent: Thursday, March 6, 2025 2:29 PM
To: Galarreta, [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

[redacted]

Apologies for the delay, it is taking us longer than expected to pull together some of the details.

I had two questions however:

We are contracting a broker, Mersant International LTD who have a lot of experience shipping animals and are based at JFK where the mergansers would enter USDA quarantine. I've spoken with them about question 28e, (CV of individual conducting the transport of specimens) and they said to reach out to USFWS since it was a new question for them. I am the one coordinating the shipment; however, they will be the ones picking the birds up from the airport, taking them through the inspection process, and then transporting them to the quarantine facility. The quarantine facility is setting up the spaces based on our recommendations, and I have a colleague (Curator of

Birds at Bronx Zoo) who will stop by to inspect the setup and birds once they arrive. When the birds are released from quarantine, I will be the one picking them up and transporting them back to NC.

1. Based on that description, whose CV do you need to satisfy question 28e?

28d (will a vet or animal keeper accompany the specimen and be able to provide care). Since this would be a direct flight from Sao Paulo to JFK, we had not planned on sending a staff member. However, I do not want this to be a reason our application is denied.

2. Is providing our reasoning as to why a keeper is not accompanying the shipment followed by the caveat that if required, we would send a staff member along with the shipment considered an acceptable answer?

Thank you again for your time.

Best,

Dust

--

Sylvan Heights BIRD PARK

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

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www.shwpark.com

From: [redacted]
Date: Monday, February 24, 2025 at 4:04 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email.

There is no preference on our end, so long as all the requested information is provided. Considering how much has been provided to date, I would suggest just providing the additional information to make a cleaner record.

Please let me know if you have any other questions.

Thank you,

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Falls Church, Virginia, 22041-3803, USA

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From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, February 24, 2025 3:49 PM
To: [redacted]
Subject: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

[redacted]

Thank you for your feedback and we will put together the missing information over the next week.

I wanted to confirm that you wanted us to fill out just the requested information below on the updated application and answer the clarifying questions and not provide an updated application that has been completely filled out? Either is fine, just wanted to make sure.

Thank you for your time,

Dust

--

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

PO Drawer 368 Scotland Neck, NC 27874

ph: (252) 826-3186 x224 • fax: (252) 826-3273

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Fro [redacted]
Date: Wednesday, February 19, 2025 at 5:04 PM
To: Dustin Foote <dustin@shwpark.com>
Cc: Ali Lubbock <ali@shwpark.com>
Subject: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello,

We are in receipt of your application, CS10543003, for a permit to import 10 live Brazilian mergansers (*Mergus octosetaceus*) under the U.S. Endangered Species Act (ESA). The processing of your application cannot be completed because we require additional information.

Based on your submission, it appears that your responses were to an expired version of application form 3-200-37a. Our current application form (see attached) expires on 12/31/2026 as shown in the top right corner, and has additional questions not included on the previous form as well as additional details requested for some of the questions included on the previous form. I have highlighted those questions but specifically they include 10.c., 10.d., 12, 13, 19, and 21-28. We note that questions 10.d., 19, and 28 were previously included but a little more detail is requested on the current application form.

Additionally, for questions 15-18, please provide responses for similar species. We understand that you do not currently hold the requested species but you have indicated caring for similar species (e.g., *Mergus squamatus*, *Mergus merganser*).

Regarding the responses you have provided, we have a few clarifying questions:

- Although you have provided a letter from the Brazilian merganser studbook keeper, as the breeder's statement, it did not include the name and address of the facility where the parental stock is located. The studbook included some records of the parental stock but not all. Per question 5 of the application, please either provide a breeder's statement with the name and address of the facility where the parental stock is located or documentation such as records that provides this information.
- The letter confirms the intent to include your facility in the breeding program but also states the following:
  "To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Mendes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation."

  Can you provide the signed documentation and any documentation you may have received in return confirming your participation in this breeding program? Is there a breeding loan agreement?

- In response to how your breeding stock is managed to maintain genetic vitality, you stated "SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship." We recognize that this question is included under 10.d. of the current application form so presumably, you will provide additional information in your response. However, we do want to note that the current response does not fully address our question. When you respond to question 10.d., please clarify how average kinship is determined (i.e., methods). Moreover, is there an evaluation of the genetic make-up of the current population and can you provide the breeding recommendations for the ten animals you will be receiving?

Please provide the information and documentation indicated. Any response must be in written form (this includes email).

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office within 45 calendar days of the date of this email, ***April 5, 2025****, your application will be abandoned and administratively closed. Once a file is closed, you will need to submit a new application, and all required fees, for the Service to consider your proposed activity.*

Thank you,

[redacted]

Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

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Import/Export/Re-export of Live Animals (CITES/ESA)
☐New ☐Reissue/Renew ☐Amendment

APPLICATION FORM INSTRUCTIONS

The following instructions pertain to U.S. Fish and Wildlife Service (FWS) permit applications. The General Permit Procedures in 50 CFR 13 address the permitting process. For simplicity, all licenses, permits, registrations, and certificates are referred to as a permit.

If you are an individual, who would be named on the face of the permit, you need to complete the **Individual Applicant** section of this application.

If you are an individual seeking permits issued to yourself for activities not associated with your business or institution, you need to complete the **Individual Applicant** section as an individual permittee.

If you are an individual associated with a business or institution, and the business or institution's name would appear on the face of the permit, you need to complete the **Business Applicant** section of this application.

If you are a business applying on behalf of an individual, you need to complete the **Business Applicant** section of this application and include a limited power of attorney from the person for whom you represent.

A person/entity is qualified to obtain a U.S. Fish and Wildlife Service permit or license when they are "subject to the jurisdiction of the United States", per 16 USC 1532(13). A foreign person/entity with no permanent physical presence in the United States only qualifies for an import/export license when they physically enter or exit the U.S. with the wildlife items. The foreign entity is required to designate a U.S. agent for purposes of record keeping.

GENERAL INSTRUCTIONS:

- An incomplete application may cause delays in processing or may be returned to the applicant. Be sure you are filling in the appropriate application form for the proposed activity. Items marked with an asterisk (*) are required fields.
- Print clearly or type in the information. Illegible applications may cause delays.
- Sign the application. Faxes or copies of the original signature will not be accepted.
- If you choose to mail your submission, mail the original application to the address listed below or, if applicable, on the attached address list. We encourage electronic filing in the ePermits system.
- Keep a copy of your completed application.
- Please plan ahead. Unless otherwise indicated, allow at least 60 days for your application to be processed, however, some applications may take longer than 90 days to process (50 CFR 13.11). Longer processing times will be noted on those applications.
- Applications are processed in the order they are received.

Individual or Business Applicants:

Individual Applicant. **Complete if applying as an individual** [do not complete this application if applying for Import/Export License (3-200-3) or a Designated Port Exception Permit (3-200-2)]:

- Enter the information requested. Required fields must be completed. This is used to create your profile and consumer information in the ePermits system. **If you do not have an email address, enter not applicable.**
- **Doing business as (dba) / Affiliation**: The Division of Management Authority (DMA) and the Office of Law Enforcement (OLE) do **not** accept *doing business as* affiliations for individuals seeking permits on behalf of themselves. "Doing business as" affiliations apply to individuals seeking permits for a business, agency, Tribe, organizational, or institutional affiliation *directly* related to the activity requested in the application. For example, a taxidermist is an individual whose business can *directly* relate to the requested activity of exporting taxidermy (dba relevant permit); however, said taxidermist should not apply as a business for permits to non-business related travel with their pet exotic parrot (dba is **not** relevant to the permit; **complete** the **Business Applicant** section).

OMB Control No. 1018-0093
Expires 12/31/2026

Business Applicant. **Complete if applying as a business, corporation, public agency, Tribe, or institution:**

- Enter the information requested. Required fields must be completed. This is used to create your contact and account information in the ePermits system. **If you do not have an email address, enter not applicable.**
- If you are applying on behalf of a client, a document evidencing **power of attorney** must be included with the application.
- **Principal Officer** is the person in charge of the listed business, corporation, public agency, Tribe, or institution. The principal officer is the person responsible for the application and any permitted activities. Often the principal officer is a Director or President.
- **The Contact** is the person at the business, corporation, public agency, or institution who will be available to answer questions about the application or permitted activities. Often this is the preparer of the application. Each person that is associated with the business that would need to access the business account needs to create their own contact in the ePermits system.

Application processing fee:

- An application processing fee is required at the time of application, unless exempted under 50 CFR 13. The application processing fee is assessed to partially cover the cost of processing a request. **The fee does not guarantee the issuance of a permit, nor will fees be refunded for applications for which processing has begun. Checks or money orders must be for the exact amount for each application submitted. If you are making more than one request, you must submit a separate payment for each request, otherwise your application will be returned.**
- **Documentation of fee exempt status is not required for applications submitted by Federal, Tribal, State, or local government agencies; but must be supplied by those applicants acting on behalf of such agencies**. Such applications must include a letter on agency letterhead and signed by the head of the unit of government for which the applicant is acting on behalf, confirming that the applicant will be carrying out the permitted activity for the agency.

CERTIFICATION:

- The individual identified in the Individual Applicant Section, the principal officer named in the Business Applicant Section, or person with a valid power of attorney (documentation must be included in the application) must sign and date the application. This signature legally binds the applicant to the statement of certification. You are certifying that you have read and understand the regulations that apply to the permit. You are also certifying that all information included in the application is true to the best of your knowledge. Be sure to read the statement and re-read the application and your answers before signing.

ALL APPLICANTS COMPLETE THE QUESTIONS ASSOCIATED WITH YOUR APPLICATION

Please continue to next page. **DO NOT RETURN THIS PAGE WITH THE APPLICATION**

Mail applications to: U.S. Fish and Wildlife Service; Division of Management Authority; Branch of Permits, MS:IA; 5275 Leesburg Pike; Falls Church, Virginia 22041-3803 or as directed by specific applications.

If you would like expedited mailing, please enclose a self-addressed, pre-paid, computer-generated, courier service airway bill. If unspecified, all documents will be mailed via the U.S. Postal Service.

Please refer to the fee schedule for the appropriate fees for the activity you are requesting.

If you are making more than one request, you must submit a separate payment for each request, otherwise your application will be returned.

INDIVIDUAL APPLICANTS

*First Name	Middle Name	*Last Name

*Email Address	Telephone Number

*Street Address	*City

*State/Province	*Zip or Postal Code	*Country

If you wish to have your permit mailed to a different address, complete the following:

*Street Address	*City

*State/Province	*Zip or Postal Code	*Country

If you would like expedited mailing, please enclose a self-addressed, pre-paid, computer-generated, courier service airway bill. If unspecified, all documents will be mailed via the U.S. Postal Service.

Have you or your client (if a broker applying on behalf of your client), been assessed a civil penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the application is filed; been convicted, or entered a plea of guilty or nolo contendere, for a felony violation of the Lacey Act, the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act; forfeited collateral; OR are currently under charges for any violation of the laws mentioned above?

☐ No ☐ Yes

If you answered “Yes”, provide: a) the individual’s name; b) date of charge; c) charge(s); d) location of incident; e) court and f) action taken for each violation. Please be aware that a “Yes” response does not automatically disqualify you from getting a permit.

Certification Statement

Certification: I hereby certify that I have read and am familiar with the regulations contained in Title 50, Part 13 of the Code of Federal Regulations and the other applicable parts in subchapter B of Chapter I of Title 50, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

Signature and date

Include a check or money order, payable to the U.S. FISH AND WILDLIFE SERVICE, as **a nonrefundable processing fee [50 CFR 13.11(d)(4)]** (see instructions above). Federal, Tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – ***attach documentation of fee exempt status as outlined in instructions.*** (50 CFR 13.11(d))

*Required fields. Applications without this information are subject to delays or returns.

OMB Control No. 1018-0093
Expires 12/31/2026

BUSINESS APPLICANTS

***Business Name**	**doing business as (dba)**

*Indicate your business type:

☐ Business or other for profit ☐ Small business ☐ Government (Federal/State/Local/Tribal)

☐ Farm ☐ Not-for-profit institution

Name that will appear on the permit if you are applying on behalf of an individual/business

***Primary Contact Name**	***Primary Contact Email Address**
***Business Email Address**	***Preferred Contact Method** (e.g. phone, email)

***Principal Officer Name**	***Principal Officer Title**	***Principal Officer Email**
Tax ID Number	***Business Phone**	**Alternate Phone**

***Street Address**	***City**

***State/Province**	***Zip or Postal Code**	***Country**

If you wish to have your permit mailed to a different address, complete the following:

***Street Address**	***City**

***State/Province**	***Zip or Postal Code**	***Country**

If you would like expedited mailing, please enclose a self-addressed, pre-paid, computer-generated, courier service airway bill. If unspecified, all documents will be mailed via the U.S. Postal Service.

Have you or your client (if a broker applying on behalf of your client), been assessed a civil penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the application is filed; been convicted, or entered a plea of guilty or nolo contendere, for a felony violation of the Lacey Act, the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act; forfeited collateral; OR are currently under charges for any violation of the laws mentioned above?

☐ No ☐ Yes

If you answered "Yes", provide: a) the individual's name; b) date of charge; c) charge(s); d) location of incident; e) court and f) action taken for each violation. Please be aware that a "Yes" response does not automatically disqualify you from getting a permit.

Certification Statement

Certification: I hereby certify that I have read and am familiar with the regulations contained in Title 50, Part 13 of the Code of Federal Regulations and the other applicable parts in subchapter B of Chapter I of Title 50, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

Signature and date

Include a check or money order, payable to the U.S. FISH AND WILDLIFE SERVICE, as **a nonrefundable processing fee [50 CFR 13.11(d)(4)]** (see instructions above). Federal, Tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – ***attach documentation of fee exempt status as outlined in instructions.*** (50 CFR 13.11(d))

*Required fields. Applications without this information are subject to delays or returns.

OMB Control No. 1018-0093
Expires 12/31/2026

IMPORT/EXPORT/RE-EXPORT OF LIVE ANIMALS (CITES/ESA)

General Information
This application covers activities involving LIVE CITES and ESA listed animals.

Review this application carefully and **provide complete answers to all questions**. If you are applying for multiple species, be sure to indicate which species you are addressing in each response. **If more space is needed, attach a separate sheet with your responses, numbered according to the questions.**

Please allow **at least** 90 days for the application to be processed.

How do I determine whether the species is protected under CITES and/or the ESA?

CITES	**ESA**
To determine whether an animal species is protected under CITES, when the species was listed, or whether exemptions apply to your requested activity, see the list of CITES species	To determine whether an animal species is protected under the ESA, please review the list of ESA-listed species in the Code of Federal Regulations. Please be aware that any permit request involving an **ESA endangered species** must be published in the Federal Register for a required 30-day public comment period.

If you have any questions regarding an action you are requesting authorization, please contact the Division of Management Authority at managementauthority@fws.gov.

Please note: for renewal or amendment of a multi-use permit being requested **within the 5-year** Federal Register public notice period, use application 3-200-52.

This form should NOT be used for:

- Pre-Convention, Pre-Act, or antique (antique exemption criteria) specimens (use application 3-200-23)
- Captive Bred Wildlife Registration (use application form 3-200-41)
- ESA Plants (use application form 3-200-36)
- Import of LIVE African Elephants from Botswana, Namibia, South Africa, and Zimbabwe and Southern White Rhinoceros from eSwatini and South Africa (use application form 3-200-37f)

1. Type of Activity:

☐ Import

☐ Export

☐ Re-Export (e.g., exporting a specimen previously imported into the United States)

2. The current location of the **animal(s) (if different from the physical address**):

   Name:

   Address:

   City:

   State/Province:

   Postal Code:

   Country:

3. Recipient/Sender:

   - If **export/re-export**, provide name and **physical address** of the recipient in the foreign country.
   - If **import**, provide name and **physical address** of the sender in the foreign country.

   Name:

   Address:

   City:

   State/Province:

   Postal Code:

   Country:

4. For **each animal** involved in the import/export/re-export, provide (you may use the table on the following page):

   a. Scientific name (genus, species, and *if applicable*, subspecies)

   b. Common name

   c. Approximate or actual birth/hatch date (mm/dd/yyyy)

   d. Wild or captive-born

   e. Quantity

   f. Sex (males.females.unknown sex, (e.g., 10.2.3))

   g. Permanent markings and/or identification information (microchip #, leg band #, tattoos, studbook #).

a. Scientific name (genus, species, and *if applicable*, subspecies)	b. Common Name	c. Approximate or Actual Birth/Hatch Date (mm/dd/yyyy)	d. Wild (W) or Captive-born (C)	e. Quantity	f. Sex (male. female. unknown sex, ex: 1.0.0)	g. Permanent markings/ID information (e.g., microchip #, leg band #, tattoo, studbook #, etc.)
EXAMPLE: *Pan troglodytes*	Chimpanzee	08/01/2006	C	1	1.0.0 OR male	Studbook# 152; Microchip# 00056321-00

5. For each **captive-born/captive-hatched** animal(s**),** provide a signed and dated statement from the breeder or other appropriate documentation (e.g., Species 360 report or other records) that includes the following:
   a. Scientific name (genus, species, and *if applicable*, subspecies);
   b. Common name;
   c. Name and address of the facility where the animal was bred and born;
   d. Birth/hatch date (mm/dd/yyyy);
   e. Identification information (studbook, microchip, leg band, etc.);
   f. Name and address of the facility where the parental stock is located;
   g. A statement from the breeder that the animal was bred and born at the breeder's facility (including the facility's name and address); and
   h. If you are not the breeder, provide documentation demonstrating the history of transactions (e.g., chain of custody or ownership of the animal).
6. For each animal(s) **taken from the wild**, provide:
   a. Scientific name (genus, species, and *if applicable*, subspecies);
   b. Common name;
   c. Specific location (e.g. county, state, province, country) where the animal was removed from the wild;
   d. The name of the individual(s) who collected the animal(s) and their authorization to do so, including copies of foreign and domestic (Federal, State, and/or Tribal) government collecting permits, licenses, contracts and/or agreements;
   e. Method of collection, including capture protocol and any injury and mortality experienced during collection, transport, and holding;

f. Information related to any remuneration, either financial or in-kind, provided for acquiring the animal(s);

g. Efforts to use captive specimens (e.g., captive-born, captive-held) in lieu of taking animals from the wild.

7. For each animal being **re-exported** (e.g., exporting animal(s) previously imported into the US) provide:

   a. A copy of the CITES export or re-export document issued by the appropriate CITES office in the country from which the wildlife was imported (this document is **stamped cancelled** by FWS Office of Law Enforcement upon import inspection); and

   b. A copy of your Declaration for Importation or Exportation of Fish or Wildlife (Form 3-177) **cleared** by FWS Office of Law Enforcement;

   c. A copy of the ESA permit that authorized the original import;

   d. If you did not make the original import, provide documentation outlining chain-of-ownership since import, including:

      i. A copy of the importer's clearance documents (a, b & c above) and,

      ii. Subsequent invoices (or other documentation) showing the history of transactions leading to your ownership of the animals after import (chain of custody).

Description and Justification for Requested Activity

Describe the purpose of your proposed activity.

8. If **scientific research**, provide:

   a. A copy of the research proposal (outlining the purpose, objectives, and methods),

   b. Detailed information on capture methods including:

      i. Who will be capturing the animals,

      ii. Equipment used,

      iii. Measures taken to prevent injury and mortality.

   c. An explanation of whether other similar work has already been conducted or is currently being conducted,

   d. A copy of the study's Institutional Animal Care and Use Committee (IACUC) form (*if applicable*),

   e. Peer-reviewed scientific papers published from this research (*if applicable*).

9. If **conservation education and/or zoological display**, provide:

   a. Objectives of proposed activity in support of an education program,

   b. Copies of educational materials (e.g., handouts, text of signage or public presentations), incorporating the following information:

      i. Status in the wild

      ii. Current threats

      iii. Conservation efforts

10. If **captive propagation for the conservation and survival of the species**, provide:
    a. A description of how the species will be propagated (e.g. artificial insemination, breeding pairs/groups),
    b. Documentation showing your participation in an established breeding program (example: current breeding plan outlining your role in the program AND letter from the breeding coordinator confirming your participation in this breeding program.)
    c. A copy of your breeding protocol including information regarding separation of mother and young, use of cameras, etc.
    d. How your breeding stock is managed to maintain genetic vitality, including:
        i. Avoidance of inbreeding and considerations of average kinship,
        ii. Differences in paternal and maternal average blood relationships/relatedness,
        iii. Carrying capacity of your facility,
        iv. Disposition of progeny.
    e. Plans and agreements for future re-introduction (*if applicable*).
11. Please provide a detailed description on how the proposed activities will **enhance or benefit the wild population within its native range** (e.g., direct or indirect conservation efforts) and provide documentation (e.g., **signed** memorandums of understanding) demonstrating your commitment to supporting the program and how the program contributes directly to the species identified in your application.

Technical Expertise and Facilities

- For **export/re-export**, provide information for the **receiving institution**.
- For **import**, provide information for **your institution**.
- For **import to multiple facilities**, provide information for **all receiving institutions**.

12. Provide copies of or cite any species-specific care/husbandry manuals, protocols, or guidelines that are used at the facility.
13. Describe the facility's record keeping.
14. CV or resume outlining the technical experience of each caretaker, veterinarian, and administrator with direct oversight of the specimens working with, maintaining, and/or propagating each species/specimen, as it relates to the proposed activities, including experience with similar species.
15. Current inventory of the species or similar species at the facility (males.females.unknown sex, e.g., 10.2.3),
16. Number of years the species or similar species has been maintained at the facility,
17. Number of births by species or similar species per year over the last 5 years,
18. Number of mortalities by species or similar species per year over the last 5 years and steps taken to avoid, decrease, or mitigate such mortalities,
19. A detailed description, diagrams, and photos clearly depicting the existing facilities where the specimens will be maintained, including dimensions, type of construction materials, structures for the provision of food and water, climate conditions, and protective measures from the elements (e.g., direct sun, rain, snow). Do not provide blueprints.
20. Approximate carrying capacity for the species at the facility.
21. Describe any plans for ongoing staff training with regard to safety, security, record keeping, or animal management.

22. Describe any plans for ongoing animal training with regard to husbandry behaviors (e.g., crate or chute acclimation) or veterinary procedures (e.g., health exam or blood collection).

23. Describe how the dietary needs of the species will be met.

24. Describe how the facility addresses the social well-being and behavior of the species such as social grouping, methods of integration, and appropriate social and behavioral enrichment.

25. Will this import affect the current specimens at the facility? Are there any planned transfers of specimens currently at the facility? If so, provide detailed information regarding the transfer plans.

26. If accredited by a regional or national animal care organization, please identify the organization and provide proof of accreditation.

27. Please provide copies of any State or Federal licenses to display, exhibit, or hold the species, as well as a copy of the most recent USDA APHIS inspection report.

Transport/Shipment of Live Animals

28. Transport conditions for live animals must comply with the CITES Guidelines for Transport of Live Animals. All air transport must also comply with our regulations at 50 CFR 14, Subpart J and the International Air Transport Association (IATA) live animal regulations (contact airline for information). As such, provide:

    a. Duration of the trip (including airline flights and ground transport)

    b. The type, size, and construction of any shipping container and,

    c. The arrangements for watering or otherwise caring for the wildlife during transport.

    d. Will a veterinarian or animal keeper accompany the specimen and be able to provide any necessary care?

    e. CV or resume of the individual(s) arranging and/or conducting the transport of the specimen(s).

For additional information, please see the CITES guide for transport of live specimens.

All international shipment(s) must be through a designated port. A *list of designated ports* (where a wildlife inspector is posted) is available. If you wish to use a port not listed, please contact the Office of Law Enforcement for a Designated Port Exemption Permit (Form 3-200-2).

Imports must also comply with U.S. Department of Agriculture, Animal and Plant Health Inspection Service inspection and quarantine requirements. For additional information, please visit the USDA Import/Export website.

Appropriate and Acceptable Destination

For **import of live CITES Appendix-I listed species**, a determination that the **receiving facility** meets the CITES "appropriate and acceptable destination" annotation must be made.

For additional information, please see: Conf. 11.20 (Rev. CoP18) on *Definition of the term 'appropriate and acceptable destinations*.

29. Identify all persons and/or facilities who will be receiving a specimen, including persons and/or facilities who are likely to receive a specimen within 1 year after it arrives in the US.

For each person and/or facility identified in question 29, please provide the following information:

30. Description of the facility, including diagrams, photographs, or construction plans,

31. Description of the enclosures and their construction and maintenance, including information on whether or not there is sufficient space provided to the specimen(s) to allow each animal to make normal postural and social adjustments with adequate freedom of movement,

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32. Description of the adequacy of the enclosures or holding areas to prevent escape or unplanned exchange of genetic material with specimens of the same or similar species outside the facility,

33. Description of environmental enrichment elements provided to the specimen(s).

34. If the specimen(s) is/are on public display, provide a description of any off-exhibit area, consisting of indoor and outdoor accommodations, as appropriate, that can house the specimen(s) on a long-term basis, if necessary.

35. Provision of water and nutritious food of a nature and in a way that are appropriate for the species (if grazing in natural areas, provide information on the natural vegetation present).

36. Copies of all Standard Operating Procedures (protocols) used at the facility for the care and housing of the animal(s). Examples include, but are not limited to quarantine, diet, veterinary care, animal and staff training, enrichment, daily and seasonal routines, emergency measures, record keeping, routine medical examinations, etc.

37. Description and resumes of the recipient staff who will care for the specimen(s), including information on staffs' training and experience in providing proper daily care and maintenance for the animal(s) being imported, or for a closely related species,

38. Readily available veterinary care or veterinary staff experienced with the species or a closely related species, including emergency care (e.g., veterinarian names, clinic/facility names and locations, full-time or part-time vets, staff or contract vets, 24/7 availability),

39. Security measures to prevent theft or harm of specimens and measures taken to rectify any previous theft, harm or security problems involving elephants,

40. Survival rate of specimens of the same species or, alternatively, closely related species at the facility, mortalities for the previous 3 years, significant injuries to wildlife, occurrence of significant disease outbreaks during the previous 3 years, and measures taken to prevent similar mortality, injury, damage, or disease. (Note: significant injury, damage, or disease outbreaks are those that are permanently debilitating or re-occurring),

41. Sufficient funding on a long-term basis to cover the cost of maintaining the facility and the specimens imported.

CITES Appendix I and Marine Mammal Species

42. For **export** of a **CITES Appendix I-listed species**, provide a copy of the CITES import permit, or evidence one will be issued by the Management Authority of the country to which you plan to export the specimen(s). In accordance with Article III of the CITES treaty, it is required that import permits are issued before the corresponding export permit.

43. For **import** of **CITES Appendix-I listed species**, provide information to show the import is not primarily for commercial purposes as outlined in Resolution Conf. 5.10 (Rev CoP 15).

44. For **import** of **live CITES Appendix-I marine mammals**, provide a copy of your FWS or NMFS Marine Mammal Protection Act (MMPA) permit or authorization.

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Expires 12/31/2026

NOTICES

PRIVACY ACT STATEMENT

Authority: The information requested is authorized by the following: the Bald and Golden Eagle Protection Act (16 U.S.C. 668), 50 CFR 22; the Endangered Species Act (16 U.S.C. 1531-1544), 50 CFR 17; the Migratory Bird Treaty Act (16 U.S.C. 703-712), 50 CFR 21; the Marine Mammal Protection Act (16 U.S.C. 1361, et seq.), 50 CFR 18; the Wild Bird Conservation Act (16 U.S.C. 4901-4916), 50 CFR 15; the Lacey Act: Injurious Wildlife (18 U.S.C. 42), 50 CFR 16; Convention on International Trade in Endangered Species of Wild Fauna and Flora (TIAS 8249), 50 CFR 23; General Provisions, 50 CFR 10; General Permit Procedures, 50 CFR 13; and Wildlife Provisions (Import/export/transport), 50 CFR 14.

Purpose: The collection of contact information is to verify the individual has an eligible permit to conduct activities which affect protected species. This helps FWS monitor and report on protected species and assess the impact of permitted activities on the conservation and management of species and their habitats.

Routine Uses: The collected information may be used to verify an applicant's eligibility for a permit to conduct activities with protected wildlife; to provide the public and the permittees with permit related information; to monitor activities undera permit; to analyze data and produce reports to monitor the use of protected wildlife; to assess the impact of permitted activities on the conservation and management of protected species and their habitats; and to evaluate the effectivenessof the permit programs. More information about routine uses can be found in the System of Records Notice, Permits System, FWS-21.

Disclosure: The information requested in this form is voluntary. However, submission of requested information is required to process applications for permits authorized under the listed authorities. Failure to provide the requestedinformation may be sufficient cause for the U.S. Fish & Wildlife Service to deny the request.

PAPERWORK REDUCTION ACT STATEMENT

We are collecting this information subject to the Paperwork Reduction Act (PRA; 44 U.S.C. 3501 *et seq.*) in order provide the U.S. Fishand Wildlife Service the information necessary, under the applicable laws governing the requested activity, for which a permit is requested. Information requested in this form is purely voluntary. However, submission of requested informationis required in order to process applications for permits authorized under the applicable laws. Failure to provide all requested information may be sufficient cause for the U.S. Fish and Wildlife Service to deny the request. According to thePRA, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. OMB has approved this collection of information and assigned Control No. 1018-0093.

ESTIMATED BURDEN STATEMENT

We estimate public reporting for this collection of information to average 1.5 hours (electronically) to 2 hours (paper-based), including time for reviewing instructions, gathering and maintaining data and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of the form to the Service Information Clearance Officer, Fish and Wildlife Service, U.S. Department of the Interior, 5275 Leesburg Pike, MS: PRB (JAO/3W), Falls Church, VA 22041-3803, or via email at Info_Coll@fws.gov. Please do not send your completed form to this address.

Questions regarding permits from Management Authority should be sent to managementauthority@fws.gov.

Galarreta, Angela A

From: Dustin Foote <dustin@shwpark.com>
Sent: Friday, April 4, 2025 3:15 PM
To: [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)
Attachments: USFWS_2025_questions.pdf; Program_Vet_Care.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

He [redacted]

Apologies for cutting this so close to the deadline! I have included all the answers to your questions in the attached document (USFWS_2025_questions). In addition, I have included the documents as attachments that are referenced in the primary (USFWS_2025_questions) document.

Please note, due to size limitations, I am sending this in two emails.

Email 1 will contain the following:

1. USFWS_2025_questions
2. Program_Vet_Care

Email 2 will contain the following:

3. Brazilian_Merganser_Protocol
4. Cleaning_SOP
5. Diet_SOP
6. Enrichment_SOP
7. Routine_Health_SOP
8. Capture_SOP
9. Transportation_SOP
10. Part_E_Original
11. USDA_Report
12. Studbook_Letter_Robert

Please let me know if you have any additional questions. Thank you again for your time.

Best,

Dust

--

Dustin Foote, Ph.D.
Director of Aviculture
Sylvan Heights Bird Park
PO Drawer 368 Scotland Neck, NC 27874
ph: (252) 826-3186 x224 • fax: (252) 826-3273
www.shwpark.com

From: [redacted]
Date: Thursday, March 6, 2025 at 4:22 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email. I will do my best to answer your questions.

These transport questions are new and I believe they are based on concerns for the transport of more sensitive animals. Therefore, I think the most important CVs/resumes to provide are for those personnel directly overseeing the transport. In this case, that seems to be the broker, Mersant International LTD. If you there is no CV or resume that can be provided from the broker, please provide a summary of their qualifications. Additionally, if no veterinarian or animal care staff will be attending, then we do recommend providing an explanation and if possible, a plan for care in the event of an emergency.

Please let me know if you have any additional questions.

Thank you,

[redacted]
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs
https://fwsepermits.servicenowservices.com/fws/

From: Dustin Foote <dustin@shwpark.com>
Sent: Thursday, March 6, 2025 2:29 PM
To: [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hell [redacted]

Apologies for the delay, it is taking us longer than expected to pull together some of the details.

I had two questions however:

We are contracting a broker, Mersant International LTD who have a lot of experience shipping animals and are based at JFK where the mergansers would enter USDA quarantine. I've spoken with them about question 28e, (CV of individual conducting the transport of specimens) and they said to reach out to USFWS since it was a new question for them. I am the one coordinating the shipment; however, they will be the ones picking the birds up from the airport, taking them through the inspection process, and then transporting them to the quarantine facility. The quarantine facility is setting up the spaces based on our recommendations, and I have a colleague (Curator of Birds at Bronx Zoo) who will stop by to inspect the setup and birds once they arrive. When the birds are released from quarantine, I will be the one picking them up and transporting them back to NC.

1. Based on that description, whose CV do you need to satisfy question 28e?

28d (will a vet or animal keeper accompany the specimen and be able to provide care). Since this would be a direct flight from Sao Paulo to JFK, we had not planned on sending a staff member. However, I do not want this to be a reason our application is denied.

2. Is providing our reasoning as to why a keeper is not accompanying the shipment followed by the caveat that if required, we would send a staff member along with the shipment considered an acceptable answer?

Thank you again for your time.

Best,

Dust

--

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

PO Drawer 368 Scotland Neck, NC 27874

ph: (252) 826-3186 x224 • fax: (252) 826-3273

www.shwpark.com

From [redacted]
Date: Monday, February 24, 2025 at 4:04 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email.

There is no preference on our end, so long as all the requested information is provided. Considering how much has been provided to date, I would suggest just providing the additional information to make a cleaner record.

Please let me know if you have any other questions.

Thank you,

[redacted]

Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs

https://fwsepermits.servicenowservices.com/fws/

From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, February 24, 2025 3:49 PM
To: Galarreta, Angela A <angela_galarreta@fws.gov>
Subject: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hello Angela,

Thank you for your feedback and we will put together the missing information over the next week.

I wanted to confirm that you wanted us to fill out just the requested information below on the updated application and answer the clarifying questions and not provide an updated application that has been completely filled out? Either is fine, just wanted to make sure.

Thank you for your time,

Dust

--

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

PO Drawer 368 Scotland Neck, NC 27874

ph: (252) 826-3186 x224 • fax: (252) 826-3273

www.shwpark.com

From [redacted]
Date: Wednesday, February 19, 2025 at 5:04 PM
To: Dustin Foote <dustin@shwpark.com>
Cc: Ali Lubbock <ali@shwpark.com>
Subject: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello,

We are in receipt of your application, CS10543003, for a permit to import 10 live Brazilian mergansers (*Mergus octosetaceus*) under the U.S. Endangered Species Act (ESA). The processing of your application cannot be completed because we require additional information.

Based on your submission, it appears that your responses were to an expired version of application form 3-200-37a. Our current application form (see attached) expires on 12/31/2026 as shown in the top right corner, and has additional questions not included on the previous form as well as additional details requested for some of the questions included on the previous form. I have highlighted those questions but specifically they include 10.c., 10.d., 12, 13, 19, and 21-28. We note that questions 10.d., 19, and 28 were previously included but a little more detail is requested on the current application form.

Additionally, for questions 15-18, please provide responses for similar species. We understand that you do not currently hold the requested species but you have indicated caring for similar species (e.g., *Mergus squamatus*, *Mergus merganser*).

Regarding the responses you have provided, we have a few clarifying questions:

- Although you have provided a letter from the Brazilian merganser studbook keeper, as the breeder's statement, it did not include the name and address of the facility where the parental stock is located. The studbook included some records of the parental stock but not all. Per question 5 of the application, please either provide a breeder's statement with the name and address of the facility where the parental stock is located or documentation such as records that provides this information.
- The letter confirms the intent to include your facility in the breeding program but also states the following:
  "To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Mendes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation."

  Can you provide the signed documentation and any documentation you may have received in return confirming your participation in this breeding program? Is there a breeding loan agreement?

- In response to how your breeding stock is managed to maintain genetic vitality, you stated "SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship." We recognize that this question is included under 10.d. of

the current application form so presumably, you will provide additional information in your response. However, we do want to note that the current response does not fully address our question. When you respond to question 10.d., please clarify how average kinship is determined (i.e., methods). Moreover, is there an evaluation of the genetic make-up of the current population and can you provide the breeding recommendations for the ten animals you will be receiving?

Please provide the information and documentation indicated. Any response must be in written form (this includes email).

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office within 45 calendar days of the date of this email, ***April 5, 2025****, your application will be abandoned and administratively closed. Once a file is closed, you will need to submit a new application, and all required fees, for the Service to consider your proposed activity.*

Thank you,

[redacted]

Senior Biologist

Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
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Falls Church, Virginia, 22041-3803, USA

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Galarreta, Angela A

From: Dustin Foote <dustin@shwpark.com>
Sent: [redacted] PM
To: [redacted]
Subject: RE: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)
Attachments: USDA_Report.pdf; Capture_SOP.pdf; Routine_Health_SOP.pdf; Enrichment_SOP.pdf; Diet_SOP.pdf; Cleaning_SOP.pdf; Brazilian_Merganser_Protocol.pdf; Studbook_Letter_Robert.pdf; Transportation_SOP.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

H[redacted]

Sorry again, the attached bounced back. I will send a 3rd email that contains the original application (Part_E_Original).

Best,

Dust

--

Dustin Foote, Ph.D.
Director of Aviculture
Sylvan Heights Bird Park
PO Drawer 368 Scotland Neck, NC 27874
ph: (252) 826-3186 x224 • fax: (252) 826-3273
www.shwpark.com

From: Dustin Foote <dustin@shwpark.com>
Date: Friday, April 4, 2025 at 3:15 PM
To: [redacted]
Subject: RE: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

H[redacted]

Apologies for cutting this so close to the deadline! I have included all the answers to your questions in the attached document (USFWS_2025_questions). In addition, I have included the documents as attachments that are referenced in the primary (USFWS_2025_questions) document.

Please note, due to size limitations, I am sending this in two emails.

Email 1 will contain the following:

1. USFWS_2025_questions
2. Program_Vet_Care

Email 2 will contain the following:

3. Brazilian_Merganser_Protocol
4. Cleaning_SOP
5. Diet_SOP
6. Enrichment_SOP
7. Routine_Health_SOP
8. Capture_SOP
9. Transportation_SOP
10. Part_E_Original
11. USDA_Report
12. Studbook_Letter_Robert

Please let me know if you have any additional questions. Thank you again for your time.

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From [redacted]
Date: Thursday, March 6, 2025 at 4:22 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email. I will do my best to answer your questions.

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Please let me know if you have any additional questions.

Thank you,

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From: Dustin Foote <dustin@shwpark.com>
Sent: Thursday, March 6, 2025 2:29 PM
To: [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Angela,

Apologies for the delay, it is taking us longer than expected to pull together some of the details.

I had two questions however:

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28d (will a vet or animal keeper accompany the specimen and be able to provide care). Since this would be a direct flight from Sao Paulo to JFK, we had not planned on sending a staff member. However, I do not want this to be a reason our application is denied.

2. Is providing our reasoning as to why a keeper is not accompanying the shipment followed by the caveat that if required, we would send a staff member along with the shipment considered an acceptable answer?

Thank you again for your time.

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Dust

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From [redacted]
Date: Monday, February 24, 2025 at 4:04 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email.

There is no preference on our end, so long as all the requested information is provided. Considering how much has been provided to date, I would suggest just providing the additional information to make a cleaner record.

Please let me know if you have any other questions.

Thank you,

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From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, February 24, 2025 3:49 PM
To: [redacted]
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[redacted]

Thank you for your feedback and we will put together the missing information over the next week.

I wanted to confirm that you wanted us to fill out just the requested information below on the updated application and answer the clarifying questions and not provide an updated application that has been completely filled out? Either is fine, just wanted to make sure.

Thank you for your time,

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From [redacted]
Date: Wednesday, February 19, 2025 at 5:04 PM
To: Dustin Foote <dustin@shwpark.com>
Cc: Ali Lubbock <ali@shwpark.com>
Subject: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello,

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Based on your submission, it appears that your responses were to an expired version of application form 3-200-37a. Our current application form (see attached) expires on 12/31/2026 as shown in the top right corner, and has additional questions not included on the previous form as well as additional details requested for some of the questions included on the previous form. I have highlighted those questions but specifically they include

10.c., 10.d., 12, 13, 19, and 21-28. We note that questions 10.d., 19, and 28 were previously included but a little more detail is requested on the current application form.

Additionally, for questions 15-18, please provide responses for similar species. We understand that you do not currently hold the requested species but you have indicated caring for similar species (e.g., *Mergus squamatus*, *Mergus merganser*).

Regarding the responses you have provided, we have a few clarifying questions:

- Although you have provided a letter from the Brazilian merganser studbook keeper, as the breeder's statement, it did not include the name and address of the facility where the parental stock is located. The studbook included some records of the parental stock but not all. Per question 5 of the application, please either provide a breeder's statement with the name and address of the facility where the parental stock is located or documentation such as records that provides this information.
- The letter confirms the intent to include your facility in the breeding program but also states the following:
  "To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Mendes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation."

  Can you provide the signed documentation and any documentation you may have received in return confirming your participation in this breeding program? Is there a breeding loan agreement?

- In response to how your breeding stock is managed to maintain genetic vitality, you stated "SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship." We recognize that this question is included under 10.d. of the current application form so presumably, you will provide additional information in your response. However, we do want to note that the current response does not fully address our question. When you respond to question 10.d., please clarify how average kinship is determined (i.e., methods). Moreover, is there an evaluation of the genetic make-up of the current population and can you provide the breeding recommendations for the ten animals you will be receiving?

Please provide the information and documentation indicated. Any response must be in written form (this includes email).

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office within 45 calendar days of the date of this email, ***April 5, 2025****, your application will be abandoned and administratively closed. Once a file is closed, you will need to submit a new application, and all required fees, for the Service to consider your proposed activity.*

Thank you,

[redacted]

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Attachments: Part_E_Original.pdf

Follow Up Flag: Flag for follow up
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Best,

Dust

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Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Sylvan Heights Bird Park
Routine Health Care SOP

Introduction:
The purpose of this SOP is to outline the procedures used to monitor health and wellbeing of collection birds at Sylvan Heights Bird Park (SHBP). SHBP is dedicated to providing exceptional welfare to all birds. All aspects of bird health are integrated into the overall management including visual observations, behavior and training strategies, routine husbandry, nutrition, exhibit design, preventative care, and treating emergencies, illness, and injuries.

Responsibility:
- It is the responsibility of bird care personnel to follow these procedures.
- It is the responsibility of supervisory personnel to ensure compliance with the procedures and for personnel training.

Definitions:
- Animal welfare – refers to a bird's collective physical, mental, and emotional states over a period, and is measured on a continuum from good to poor.
- Self-maintenance behaviors – feather preening, bathing, other grooming behaviors
- Acute pain – short-term pain, usually in response to an injury or surgery. This pain is more easily recognizable and may correspond to a visible injury or may trigger a sudden change in behavior.
- Chronic pain – long-term pain which often develops slowly over time and can be difficult to detect as the bird may modify its behavior to 'mask' the pain. It can be associated with degenerative health problems such as osteoarthritis, ocular disease, or other chronic diseases.

Procedures:
Preventative medicine is critical to providing long term health care for birds in care. The goals of the preventive medicine program are to prevent and/or catch early signs of injury or illness in the bird collection, to ensure that the birds are properly maintained; and to avoid the spread of disease.

<u>Visual Checks</u>
The knowledge and understanding that bird care staff have regarding the species and individuals within their care is vital in maintaining good health and welfare. Performing regular visual health checks allows bird care personnel to identify, report, and act if abnormalities are found.

Each bird should be assessed daily to help identify early warning signs. It is important to recognize signs of good health; a bright, alert bird that reacts to stimuli, is in good physical condition with the absence of pain, disease, trauma or distress. The bird should also participate in species appropriate natural behaviors. Special attention should focus on the individual's normal activity level to identify, investigate and report any changes in the behavior that may be associated with pain or other medical concerns.

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Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Signs of Pain, Disease, Trauma or Distress

Birds will often hide signs of being unwell. Showing illness in the wild would put them at risk of predation or competition. It's important to know your birds so you can easily and quickly spot any changes to its behavior that may indicate poor health. Small changes in movement, body and feather condition, dietary intake and behavior that deviates from what is normal for that individual can be indications of pain, disease, trauma or distress.

Immediate action must be taken if a bird is injured or unwell or if poor welfare is identified at any time. Any bird showing signs of any of the following must be reported to the Area Supervisor immediately.

- Acute pain
- Chronic pain
- Lethargy, excessive sleeping or depression
- Abnormal gait or body posture
- Injury such as lameness, abrasions, bleeding, abnormal wing carriage
- Vomiting
- Unusual levels of aggression
- Reduced social interaction or social conflict in a normally social species
- Social conflict
  Hiding for extensive periods of time
- Over-preening (may have parasites)
- Reduced appetite or changes in dietary intake
- Abnormal repetitive behaviors or self-harming
- Abnormal feces, urates, or pellets
- Lack off flight in a previously flighted bird

Reporting Abnormalities/Signs of Illness and/or Injury

Bird care personnel must report welfare concerns, abnormalities, or any signs of injury or illness immediately. The staff is responsible for writing their observation in the daily log and verbally notifying Area Supervisor and/or Director of Aviculture. Supervisory personnel will evaluate and will decide if the bird should be captured for diagnostic testing and/or treatment.

Routine Health Checks

Staff should perform routine health checks whenever birds are moved for routine husbandry. While the bird is properly restrained, a staff member examines the bird using the following procedures as appropriate:

- Palpation of the skeletal structure and joint mobility; epidermis, and other palpable structures to check for irregularities
- Palpation and visualization of the body condition and pectoral muscle to determine scoring
  1 Emaciated, keeling severely and sharply.
  2 Keeling, only small amount of muscled dipped to either side of keel.
  3 Keel is palpable but muscled firm to either side.
  4 Muscle appears straight across over keel; keel is palpable between muscle.
  5 Cleavage, keel not palpable, muscle mounded to either side of keel.
- Observation of the face for symmetry

SHBP

- Observation of the eyes for symmetry, and signs of discomfort or vision loss, symmetrical pupil size, etc.
- Ear exam to check for external parasites, signs of infection or other abnormalities
- examine feathers for external parasites
- Cere and nares exam for normal air flow and to note nasal discharge
- External evaluation of cloaca and vent
- Examination of uropygial gland for symmetry or signs of impaction or infection
- Full body feather observation and flight feather check to track feather damage, breakage, abnormalities and external parasites
- Observe inside of mouth for parasite, injuries, dehydration or other abnormalities
- Evaluate bill/beak for irregularities and length
- Cope bill/beak as needed to maintain appropriate length and shape
- Observe feet and plantar fascia for signs of wearing
- Observe nails/talons to evaluate length
- Trim nails/talons as needed

Intestinal Parasite Screening

Intestinal parasites can be screened using a smear or fecal float analysis. Fecal material is collected from habitat and mixed with a solution to collect parasite eggs so they can be identified under a microscope. Parasites are treated as needed per attending vet.

Body Weight

All birds should be weighed during routine health checks or any time they are receiving medical treatment. Birds that participate in training programs should also be trained to voluntarily sit on scales. These birds are weighed daily or at least monthly which can assist in early identification of health problems and give a good indication of physical fitness.

Anesthesia

General anesthesia is defined as complete unconsciousness, combined with analgesia, muscle relaxation and the absence of reflex responses. SHBP is equipped with medical room with anesthesia. Anesthesia is not commonly utilized, however can be during invasive procedures for the safety of the staff and birds, in addition to minimizing pain and stress to the birds. Physical restraint without sedation should be limited to short, non-painful procedures in species that are tolerant to manual restraint.

Anesthesia is always monitored to maintain a stable patient during the procedure by an experienced and trained staff member. Heart rate and respiratory rate are observed throughout the procedure to detect changes and anticipate complications that may arise. The inherent risks of using anesthesia during a procedure are recognized by staff, and always taken into consideration when balancing the risks with the benefit of performing general anesthesia.

Medications

SHBP is equipped with commonly used drugs that meet regulatory standards. Medications are prescribed by the Attending Veterinarian or another licensed veterinarian and administered by trained staff in guidance with Attending Veterinarian. SHBP staff also have resources to readily acquire medications not already at hand if needed.

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Medical Records

Medical records are maintained under the direction of the Veterinary Program Coordinator. These include anything that requires veterinary attention, treatments, prescriptions, surgical procedures, laboratory findings, diet and nutrition, treatment plans, welfare concerns, behavioral observations, etc.

Necropsy

Any bird dying unexpectedly from unknown cause, or any death deemed necessary by the Attending Veterinarian and Veterinary Program Coordinator will receive a necropsy. In-house necropsies can be performed by the Attending Veterinarian, Veterinary Program Coordinator, and/or an Area Supervisor as necessary.

The carcass should be transferred to a refrigerator until the qualified staff member is available to perform a necropsy. Histological examination of tissues from birds should be performed if the cause of death is not evident and advised by Attending Veterinarian. Information gathered during necropsy should be used to inform future husbandry and medical practices.

SHBP has a refrigerator for holding dead birds (located in the Green Barn 223+) that is physically separate from live bird holding and food supply storage. If the necropsy is performed offsite, the carcass will be transported to ECU Department of Comparative Medicine or NCVDLS for a postmortem examination as soon as possible and no longer than 24 hours after death.

A reasonable effort is made to distribute postmortem specimens to institutions for further research, museum collections, universities, or SHBPs education collection. Disposition of dead birds and their parts will meet all legal restrictions. It is the responsibility of the Veterinary Program Coordinator to oversee the distribution of postmortem specimens to prevent the distribution of infectious materials. Dead specimens not used will be incinerated or disposed of as deemed suitable by the Veterinary Program Coordinator in accordance with local, state, and federal regulations.

Welfare Assessments

Providing good avian welfare encompasses both ethical and scientific responsibilities. A bird typically experiences good welfare when they are healthy, comfortable, well-nourished, safe, able to develop and express species-typical relationships, behaviors, and cognitive abilities, and not suffering from unpleasant states such as pain, fear, or distress. Because physical, mental, and emotional states may be dependent on one another and can vary from day to day, it is important to consider these states in combination with one another over time to provide an assessment of an animal's overall welfare status. When a bird has a less-than-optimal welfare status, appropriate changes should be made to improve their condition.

The purpose of welfare assessments is to provide a systematic approach to evaluate current welfare practices for individual birds and accommodate for needs throughout an individual bird's life. Welfare Assessments allow bird care professionals to develop plans to improve a bird's collective physical, mental, and emotional states and assess when changes are needed.

Staff will evaluate an individual and discuss any findings and will determine appropriate plans on how to improve and evaluate welfare moving forward, including determining when and how to follow up with further evaluations if necessary.

The Welfare Assessment should include the evaluation of the following:

- Self-maintenance behaviors
- Feather condition
- Activity level
- Disease
- Medical treatment plans
- Diet/Nutrition
- Environmental needs
- Ambulation
- Ability to rest
- General behavior and any aversive/undesirable behaviors
- Opportunities for choice and control
- Training procedures
- Enrichment opportunities
- Sensory abilities
- Welfare evaluation schedule

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Frequency of Assessments

Assessments are made throughout an individual bird's life. Regular assessments should also occur when there is a change in circumstances for each individual (physical or mental health event, change in habitat, change in ambassador role etc.) or if welfare concerns are communicated about an individual. Welfare Assessments should not be used exclusively when there is an obvious decline in welfare such as aging illnesses and ailments.

Geriatric Considerations

Special considerations are made for geriatric birds to allow us to evaluate the individual's quality of life. Welfare Assessments and health checks are performed more frequently to monitor age related conditions and any ongoing health concerns, current medications and to measure mobility, hygiene and good vs. bad days. The data generated through assessments and health exams allow us to track each older birds over time and make the best possible decisions for them.

Program of Veterinary Care
for
Sylvan Heights Bird Park

prepared by:

Director of Aviculture: Dustin Foote, PhD

Attending Veterinarian: Dorcas O'Rourke, DVM, MS, DACLAM

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I. Introduction

Sylvan Heights Bird Park (SHBP) has the humane and legal obligations to provide proper husbandry, veterinary medical treatment, and preventive medical and nutritional programs for its birds. Zoos and aquariums in the United States are required to have an attending veterinarian who will provide adequate veterinary care for the bird collection and to assure that certain minimal standards of veterinary care are in place according to the Animal Welfare Act of 1966 and the subsequent amendments that are enforced by the United States Department of Agriculture (USDA). Maintaining standards of veterinary care requires professional supervision of veterinary medical programs by a licensed veterinarian who has special training and experience in non-domestic animal medicine. Avian health is ensured by those who provide husbandry, prepare diets, monitor behavior, and maintain environmental quality.

In the United States, the Animal Welfare Act states that "Each zoo and aquarium shall assure that the attending veterinarian has appropriate authority to ensure the provision of adequate veterinary care and to oversee the adequacy of other aspects of animal care and use". As such, the attending veterinarian, with consultation of the other animal management staff, is responsible for the design, implementation, and surveillance of the veterinary care program at SHBP.

SHBP works closely with the Department of Comparative Medicine in the Brody School of Medicine at East Carolina University (ECU). A formalized memorandum of understanding outlines the agreement to develop, promote, and implement mutually beneficial projects and activities that allow both organizations to achieve their respective missions. Due to this, some of SHBP's collection birds are used for non-invasive research that has led to a close relationship between SHBP and ECU faculty and staff members.

For the purpose of this document, SHBP is divided into 5 areas:

Area 1: Wings-of-the-Tropics (WOT 222+), Green Barn (223+), Large Shorebird Pens (241), Small Shorebird Pens (241), Greenhouse (239), Corn Crib (243), Kookaburra Aviary (224), Softbill Aviary (221), Pheasantry (220), Ground Hornbills (232), Owls (215), Landing Zone (234), Old Ruffs (236), and Hornbills (237).

Area 2: Birds-of-Paradise (225+), Propagation Building (226+), Finch Aviary (229).

Area 3: Australia (230), Emu (231/216), Africa (233), Multi (201), Mews/Pigeons (242), Education Pens (235), South America (206), Seriemas (205), Saddle-billed Storks (207), Lower Goose Pens (208-213), North America (204), Demoiselles (203), Eurasia (202), Crown-cranes (238), Lesser Flamingos (214), and Endangered Species (217).

Area 4: Breeding Center (1-166)

Area 5: Cassowaries and Cranes (243, 244, 245)

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Under the direction of the Director of Aviculture, the 5 areas and their supervisors are:

Area 1 Supervisor: Lead Aviculturist Area 1

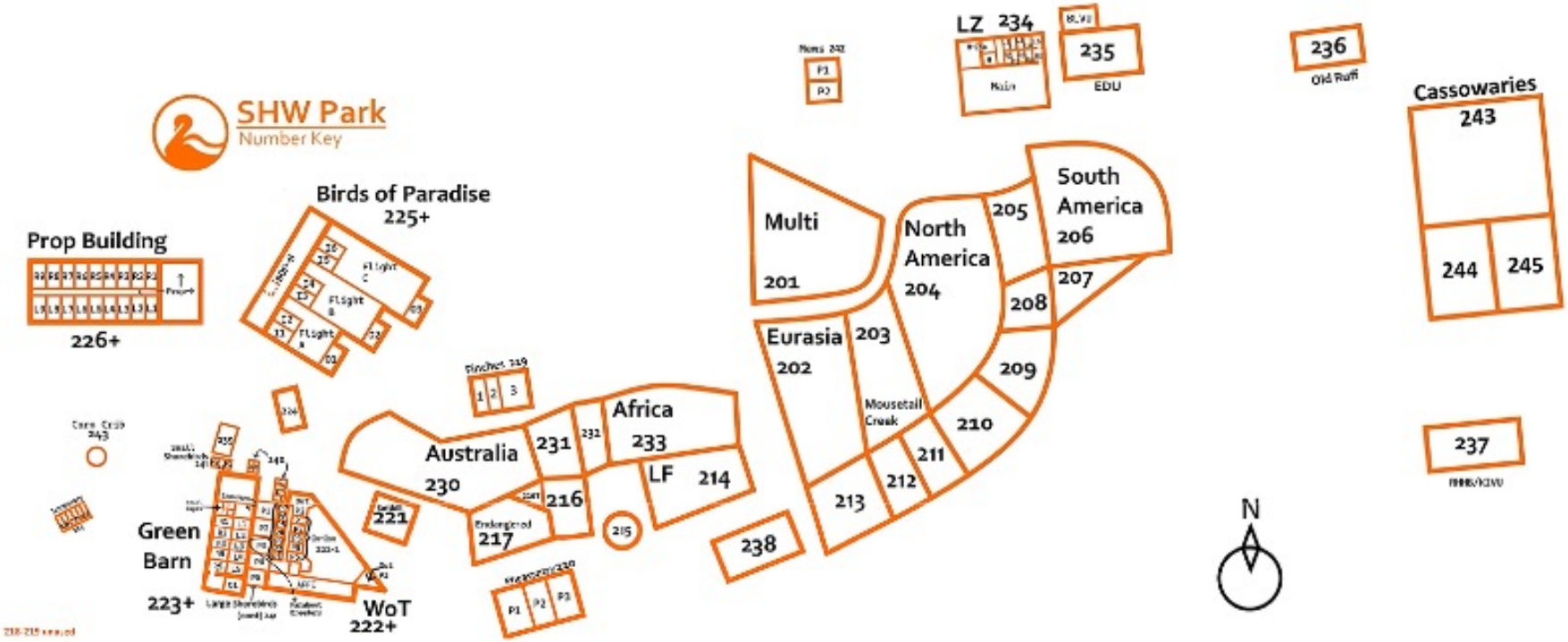
Area 2 Supervisor: Lead Aviculturist Area 2

Area 3 Supervisor: Lead Aviculturist Area 3

Area 4 Supervisor: General Curator

Area 5 Supervisor: Director of Aviculture

SHBP


SHW Park
Number Key
Birds of Paradise
225+
Prop Building
226+
Multi
201
North America
204
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South America
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212
213
Eurasia
202
203
Mousetail Creek
Africa
233
Australia
230
231
232
LF
214
216
217
215
221
238
Green Barn
223+
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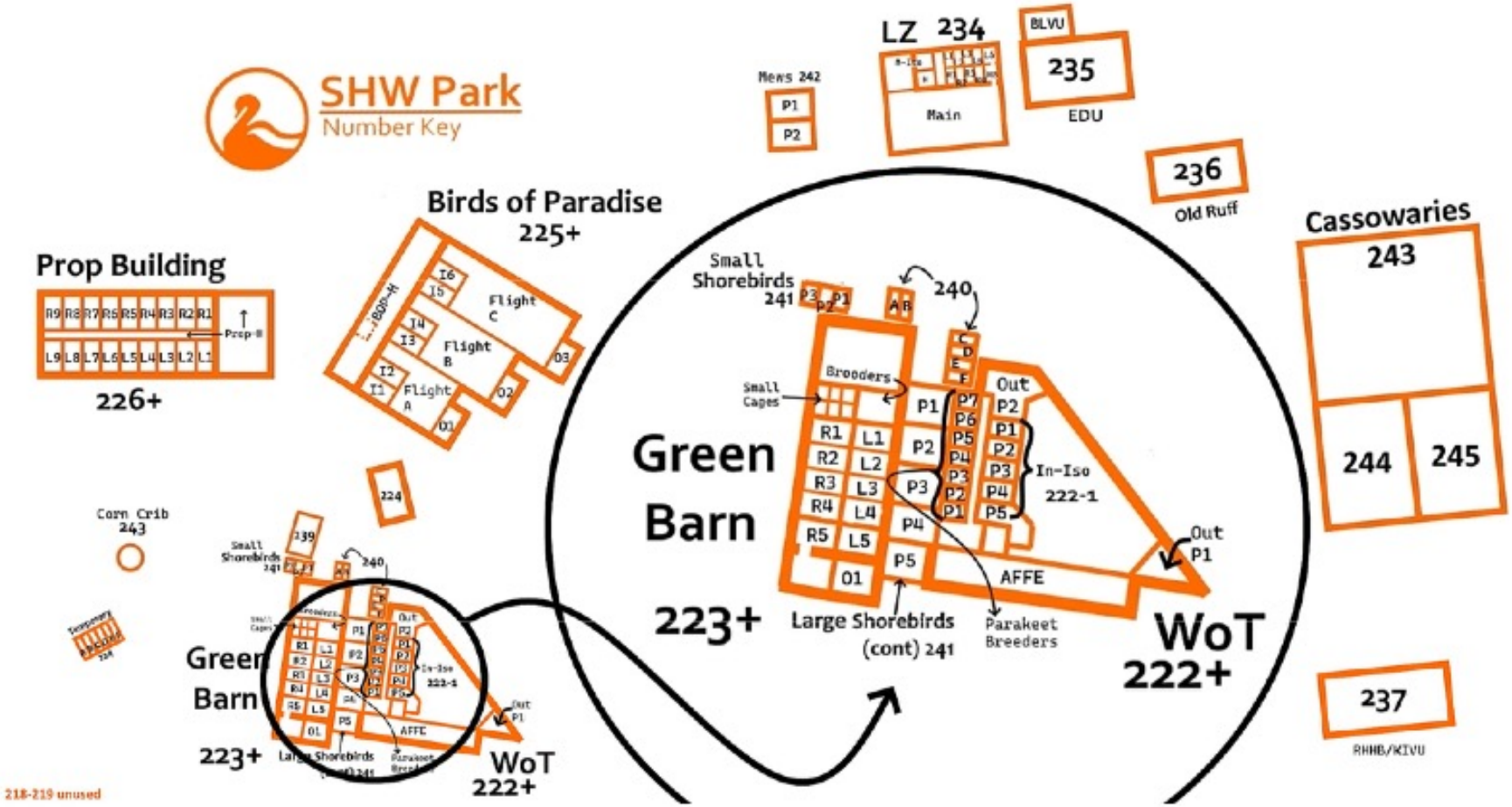
SHW Park
Number Key
LZ 234
Mews 242
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Main
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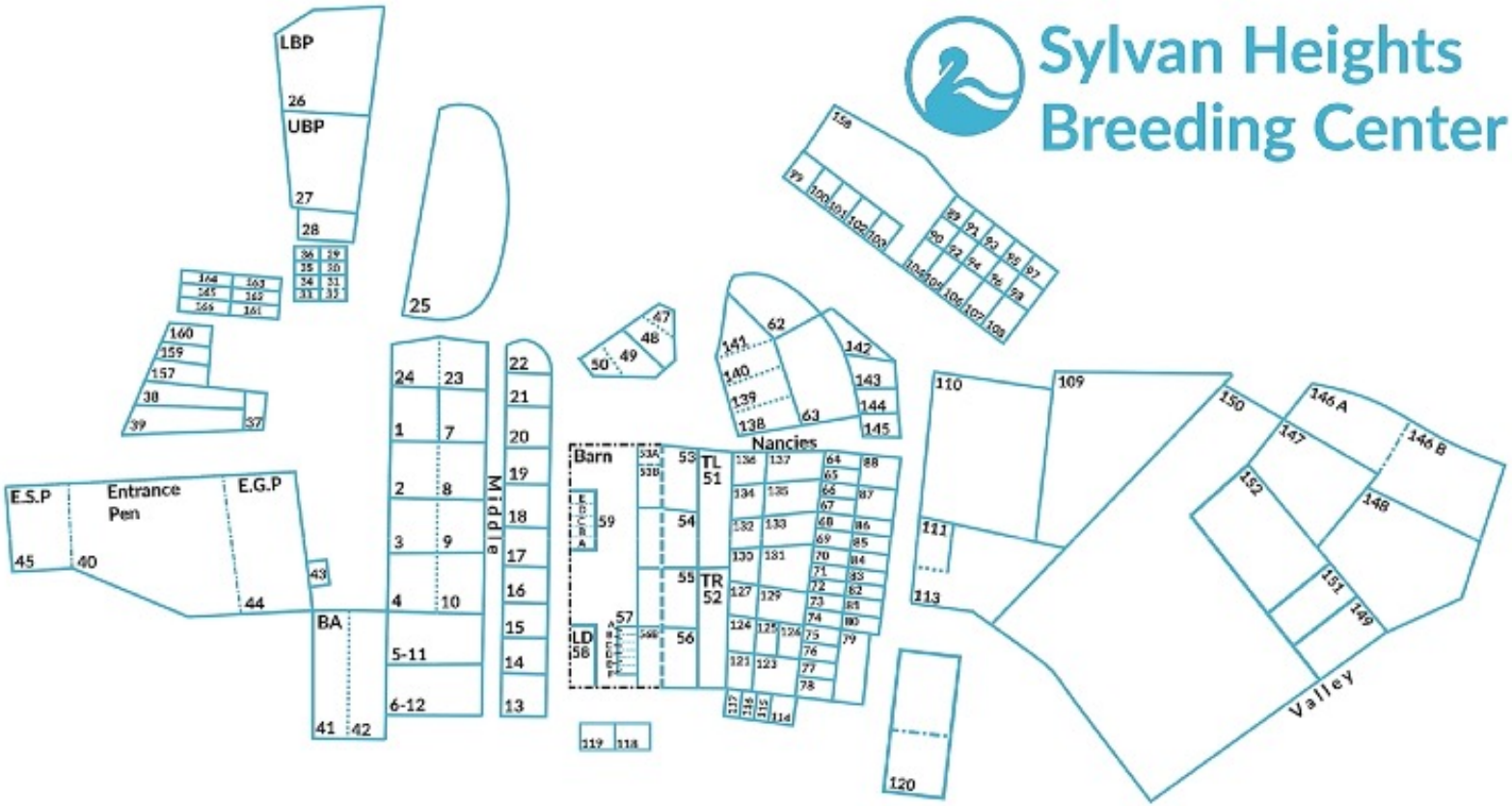
EDU
236
Old Ruff
Cassowaries
243
244
245
Birds of Paradise
225+
Prop Building
R9 R8 R7 R6 R5 R4 R3 R2 R1
L9 L8 L7 L6 L5 L4 L3 L2 L1
Prep-B
226+
I6
I5
I4
I3
I2
I1
Flight C
Flight B
Flight A
O3
O2
O1
Small Shorebirds 241
240
Brooders
Small Capes
Green Barn
223+
R1 R2 R3 R4 R5
L1 L2 L3 L4 L5
O1
P1 P2 P3 P4 P5
P6 P7
Out
In-Iso 222-1
AFFE
Out P1
Large Shorebirds (cont) 241
Parakeet Breeders
WoT
222+
237
RHHB/KIVU
Corn Crib
243
224
239
218-219 unused

Sylvan Heights Breeding Center



II. VETERINARY CARE

SHBP's veterinary medical program emphasizes disease prevention and avian wellbeing to include nutritional, behavioral, and reproductive health. All birds in the collection are observed daily either by the person in charge of avian management, or by someone working under the direct supervision of this person. All staff are trained to recognize abnormal behavior and clinical signs of illness and are knowledgeable concerning the diets, husbandry, and restraint procedures for the birds under their care. Diseased, injured, or stressed birds are reported promptly so that they can be assessed for their need for veterinary medical care.

a. Personnel

i. Veterinary Coverage: Dorcas O'Rourke, DVM, MS, DACLAM

The attending veterinarian is responsible for the medical and surgical care of the birds and is fully acquainted with the entire bird collection, care staff, and avian facilities. The veterinarian will arrange for the availability of other suitably experienced veterinarians to be on call when they are unavailable. The veterinarian makes regularly scheduled visits four times a year to SHBP in addition to any visits required to perform medical care.

ii. Veterinary Program Coordinator: Dustin Foote, PhD

The SHBP staff person serves as the veterinary program coordinator and supervises the veterinary care program under the direction of the veterinarian. The veterinary program coordinator makes note of which birds require examination by the veterinarian and accompanies the veterinarian during rounds and treatments. The program coordinator is also responsible for overseeing prescribed treatments, maintenance of medical equipment, and supervising drug inventories. The veterinary program coordinator is trained to deal with emergencies until the veterinarian arrives, able to direct the restraint of the birds, is responsible for administration of post-surgical care, and is skilled in maintaining appropriate medical records. The veterinary program coordinator communicates frequently and directly with the veterinarian to ensure that there is a timely transfer of accurate information about medical issues.

It is the responsibility of the Attending Veterinarian and Veterinary Program Coordinator to pursue additional veterinarians as needed to maintain proper veterinary coverage for SHBP.

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iii. Support Personnel

1. Husbandry or Bird Care Personnel

Director of Aviculture
Responsible for the direction and care of the living collection. Coordinates with curator and lead aviculturists to ensure birds, exhibits, and grounds are properly cared for.

Curator of Grounds/Aviaries
In close coordination with the director, responsible for the design, construction, and maintenance of exhibits as well as the supervision of avicultural team during the director's absence.

Lead Aviculturists
Work with the director on changes/concerns within their areas of responsibility and to communicate with all staff members on changes in feeds, bird movements, breeding, or medical concerns. Lead aviculturists are responsible for communicating exhibit concerns to senior staff.

Aviculturists
Maintain and care for birds within the park and to perform a variety of activities relative to the assigned area of responsibility. Works with lead aviculturists to implement husbandry, breeding, and maintenance objectives.

Bird Keepers
To maintain and care for birds within the park and to perform a variety of activities relative to the assigned area of responsibility.

Avian Interns or Avian Volunteers
To maintain and care for birds within the park and to perform a variety of activities relative to the assigned area of responsibility under the close supervision of a staff member.

2. Clerical

Registrar
To maintain records using the program Species360. Registrar works closely with husbandry staff to incorporate daily records that include husbandry, breeding, maintenance, medical, etc.

SHBP

b. Infection Control and Personal Safety

The term “biosecurity” is defined as those precautions taken to minimize the risk of introducing an infectious disease into an avian population. These general guidelines can be used to set up procedures for staff, veterinarians, volunteers, and contractors that work with and around birds.

All staff must take precautions to prevent cross-contamination between bird areas as they move about SHBP. Personnel safety standards conform to all local, state, and federal regulations concerning occupational health and safety in the workplace. Staff are aware of the potential hazards associated with handling birds (bites, kicks, scratches, etc.). In addition, they are familiar with the chemicals (anesthetic agents, medications, disinfectants, etc.), microbiological (including allergens) and physical hazards (radiation, etc.) found in the workplace. Safety and personal protective equipment are properly maintained. Material Safety Data Sheets (MSDS) are available for staff use on-site for all drugs and chemicals used in the facility. MSDS sheets are located in the propagation office (226+), staff are annually certified in MSDS location.

SHBP does not accept wild or injured birds directly from the public. If a wild bird is deemed safe by SHBP staff and a licensed rehabbers, veterinarians, North Carolina State Wildlife Resources Officer, or United State Fish and Wildlife Officer, SHBP may choose to accept a wild bird into its collection and follow appropriate quarantine procedures.

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Sylvan Heights Bird Park
Biosecurity SOP

Purpose:
The purpose of this Standard Operating Procedure is to provide an approach to biosecurity at SHBP for preventing and managing infectious diseases that could threaten the health of the avian collection, employees, guests, or others using the facilities.

Responsibility:
- It is the responsibility of Sylvan Heights Bid Park personnel (staff, volunteers, interns) to follow this procedure under guidance of the Attending Veterinarian.
- It is the responsibility of supervisory personnel to ensure compliance with this procedure and for personnel training.
- A group of senior staff may be assigned to address infectious disease and zoonosis threats. The group can draft, approve, and periodically review biosecurity guidelines and convene as needed to address specific infectious disease situations.
- Categories of biosecurity measures can include those for facilities, bird care staff, collection birds, bird feed, wild and feral animals, routine disease surveillance, biosecurity communications and education, employee preventive and occupational health care, and enhanced biosecurity and control measures in the event of a foreign animal disease in the region.
- All personnel must take every precaution that should be taken to prevent the transmission of zoonotic disease to humans. Management staff must assess the risk involved to determine the course of action with the patient and caregivers. Factors to consider include the potential severity of the disease in humans, the susceptibility of personnel, and the ability to effectively quarantine the animal safely regarding sanitation and hygiene protocols. Zoonotic concerns may dictate euthanasia of the bird, especially when the disease is likely to be fatal.

Definitions:
Essential personnel: Personnel required for the protection of the safety and welfare of the animal collection and the staff, and the protection of infrastructure of the institution.

Personal Protection Equipment (PPE): specialized clothing or equipment worn by employees for protection against health and safety hazards. Includes but is not limited to boots, gloves, Tyvec clothing covers, N95 respirator masks.

Emergency Response Team: a team of designated staff persons responsible for discussing and implementing biosecurity protocols at Sylvan Heights Bird Park.

Fomite: Any inanimate object (clothing, utensils, or furniture) that, when contaminated with or exposed to infectious agents, can transfer disease to a new host.

SHBP

Cohort: The practice of grouping together patients who are colonized or infected with the same organism to confine their care to a single area and prevent contact with other patients

i. Conceptual Biosecurity

Conceptual biosecurity is the primary level of biosecurity that considers the physical location and potential risks

- Proximity of main roads
- Proximity to other animal-related businesses
- Consideration of potential pathogens and risks in the surrounding area of the facility
- Planning and communication of potential outbreaks, pathogens, and hazards

Levels of Biosecurity Measures

Most biosecurity measures outlined are applied on a routine and daily basis. Maintaining routine biosecurity reduces the ongoing risk of disease transmission. Higher level biosecurity measures may be implemented as needed by leadership staff in circumstances or situations that present a higher level of risk to operations, and/or human and animal safety. Emergency Biosecurity Response Plans will be created and implemented as needed to increase biosecurity protection in the event of a suspected outbreak of an emergency disease or serious endemic disease. Senior staff are responsible for staying abreast of current events and communicating as frequently as necessary to mitigate risk and protect organizational operations.

Communication plan

- During an outbreak, the Emergency Response Team will convene and discuss the next necessary steps.
- Senior staff will be in contact with state veterinarians and federal agencies to discuss next steps to minimize the situation. All state and federal agencies will be contacted to inform them of the outbreak. These agencies will include but are not limited to USDA/APHIS, CDC, USFWS.

Staying up to date on current information

- The Emergency Response Team will be responsible for monitoring outbreaks and informing other staff of updates daily through USDA/APHIS, CDC, USFWS, and other recommended sources.

Zoonotic Disease

A zoonosis is an infectious disease transmitted between species from animals to humans (or humans to animals). Zoonotic diseases are caused by viruses, bacterial, parasites, and fungi that can cause many different types of illnesses in people and animals, ranging from mild to serious

SHDP

illness and even death. Anyone can get sick from a zoonotic disease, including healthy people. However, some people are more at-risk than others.

Groups of at-risk individuals include:

- Children younger than 5
- Adults older than 65
- People with weakened immune systems
- Pregnant women

Notification of Occupational Risks and Biosecurity Training

Staff and volunteers are notified of the risk of working at Sylvan Heights Bird Park and are required to review the Biosecurity SOP. All agree to the following statement: *"I have* the *ability to work with or around sick and injured birds, potentially hazardous materials, cleaning chemicals, gas anesthetics, zoonotic diseases, and unpleasant odors. If I am immunocompromised or pregnant/planning to become pregnant and have concerns, I will obtain medical clearance from my physician."*

SHBP will provide training to all staff and volunteers on proper biosecurity usage. This training can include but is not limited to, donning and doffing PPE, footbaths, restricted access areas, exposure risks, signs of illness/disease, and other precautions needed to prevent the spread of a biosecurity hazard.

Humans who may have contracted a zoonotic disease should be referred to a physician for diagnosis and treatment. The physician should be given any information necessary to facilitate diagnosis, particularly if the disease is unusual and would not ordinarily be among the differential diagnoses. Certain zoonotic diseases (eg, rabies) must be reported to public health authorities.

Personnel are advised to follow CDC, USDA, or NC State Health Department guidelines if experiencing illness, flu, or any zoonotic disease symptoms. If personnel have had exposure to infected birds or to virus contaminated materials or environments, they are advised to stay home and seek medical care if they develop symptoms within 10 days of exposure. PPE must be worn as directed by the Attending Veterinarian if a zoonotic exposure risk has been identified on premises.

Spreading of Disease

Diseases primarily spread in two different ways, direct or indirect transmission. How a disease moves should influence the biosecurity measures used. Biosecurity measures can also be increased or intensified if diseases are known to be present or an outbreak is occurring. Senior staff are responsible for determining potential biosecurity risks and threats and implementing biosecurity measures using reputable sources and CDC's, USDA, and the State Veterinarian.

<u>Direct Transmission:</u>

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In direct transmission, disease passes directly from one infected host to another. This can occur through direct physical contact, droplet infection, or through bodily fluids. A single infected animal can spread disease to the animals they share space with.

Indirect Transmission:
In indirect transmission, the disease passes from an infected animal to a vector, and then to a new host. The main sources of indirect transmission are pests and insects, contaminated food and water, or contaminated equipment, tools, vehicles, machinery and clothing.

ii. Structural Biosecurity

Preventing Exposure to Other Birds, Collections, or Animal Care Facilities

Pet Birds and Backyard Birds/Poultry

Exposure to pet birds, backyard birds, and poultry can increase the risk of spreading disease. Individuals with this exposure must wear clean clothing and shoes prior to coming into contact with any bird at SHBP.

Visiting and Volunteering at other Bird Care Facilities

Staff and volunteers that spend time at other animal care facilities must shower and arrive with freshly laundered clothing and shoes before they can come into contact with any bird at SHBP.

Contracted Veterinarians and Other Bird Care Personnel

Contracted veterinarians, or other personnel that have come into contact with animals in another care facility, must wear clothing and footwear that are freshly laundered before coming to SHBP.

Visitation

During high-risk threats when recommended by the State Veterinarian and other governing agencies, adjustments may be made to the general operations of SHBP that may affect visitation.

- The number of visitors, staff, and volunteers allowed onsite may be restricted to minimize the threat.
- Visitors may be asked not to enter SHBP facilities if they have had contact with wild birds.
- Visitors may be asked not to enter if they show signs of illness.
- SHBP may limit vehicles onsite to avoid cross-contamination or exposure to a biosecurity hazard.
- Contractors may be limited at any time to avoid exposure to a hazard. Contractors may be asked to park by the overflow parking lot and a designated staff person will assist them. All contractors should be scheduled to ensure staff oversee necessary biosecurity protocols. Contractors will be made aware of any potential threat prior to arrival at SHBP.

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Water Quality Monitoring

Water should be monitored for any changes in appearance, taste, or smell and notify local health department as soon as possible. Changes in appearance or smell may happen after prolonged periods of flooding. If water contamination is suspected, or if water must be shut off onsite, bathrooms and sinks will become inaccessible. Report any changes in water to the Area Supervisor and/or Curator of Grounds and Aviaries.

Water Drainage

Drainage must be provided for primary enclosures and areas immediately surrounding pools and water sources. Drainage systems must minimize vermin, pests, infestation, insects, odors, and disease hazards. All drains must be properly constructed, installed, and maintained. If drip or constant flow watering devices are used to provide water to the birds, excess water must be rapidly drained out of the bird areas by gutters or pipes so that the birds stay dry. Standing puddles of water in bird areas, on trails, and inside buildings, must be mopped up or sufficiently drained so that the birds remain dry and free from disease. Drainage effluent from primary enclosure water sources must be disposed of in a manner that complies with all applicable Federal, State, and local pollution control laws.

Pest and Vector Control

SHBP personnel, especially bird care and maintenance staff, are the first line of defense against pests, because they work in locations where evidence of a pest problem is likely to be first noted. If pests or evidence of a pest is observed in their respective areas, personnel must alert their area supervisor. Animal care staff and grounds staff may also be responsible for preparing areas for treatment, moving animals as necessary, removing dead and dying pests, maintaining and monitoring bait stations, and setting traps as supplied and recommended by the pest control team. All SHBP employees are responsible for promoting the health and well-being of the bird collection and should do their part to reduce pest contamination and infestation in their areas. Sanitation standards should be maintained throughout the facility, including concession, administrative, and education facilities and should ensure that garbage and recycling is inaccessible to pests.

- Prevention, inspection, and management of pests and vectors is critical to a successful control plan.
- *For more information, refer to Insect and Vector Control SOP.*

Food Quality Monitoring

Because it can support microbial populations, meat is included in the definition of potentially hazardous food. All food items must be inspected upon receipt of food, during thawing process, and prior to giving to birds.

SHBP

- An inspection should occur at the place of receipt of food (storage site) before or during unloading of the shipment so a representative number of boxes can be examined. A thorough inspection includes looking for signs of pests around and inside containers, maintenance of proper temperatures during shipment, and signs of thawing and refreezing reference to screening food shipments.
- SHBP staff should look for evidence that the meat may have been frozen, thawed, and refrozen. Indicators can include water or ice buildup on the boxes or floor beneath the boxes; wrappings that are moist, slimy, or discolored; meat that is brown; or prey with soft flabby flesh upon thawing, a sour odor, and/or an off color. If any of these indicators are present, the order will not be accepted.
- All food items must be free from contamination. If the quality of food is questionable, food items must be thrown out.
- USDA recommendations for thawing any meat product at a temperature not to exceed 40F. Meat must be processed immediately after the thawing stage and as close as possible to the feeding time.
- Food not consumed should be removed from bird habitats to prevent spoilage and the spread of microorganisms.
- *For more information, refer to Diet and Nutrition SOP.*

iii. Procedural Biosecurity

Quarantine

The quarantine period is under the supervision of the Attending Veterinarian and the Veterinarian Program Coordinator. During this period, a bird's health is monitored for signs of any underlying health conditions. They receive a physical exam and are evaluated for ectoparasites and treated accordingly. Fecal samples or representative samples from individuals housed in an enclosure should be collected and examined for gastrointestinal parasites. Parasiticide treatment should be prescribed by the Attending Veterinarian. Quarantine and isolation areas are thoroughly cleaned and disinfected with disinfectants recommended by the Environmental Protection Agency and used according to the manufacturer recommendations between patients.

Personal Hygiene

Personal hygiene is a key component in an effective biosecurity plan. Microbes can be found everywhere – in the soil, water, air, and even on hands, hair, clothing and shoes. Humans can be one of the many sources of biological contamination, especially if proper personal hygiene standards are not being met.

Handwashing:
Proper hand washing is the first line of defense against the spread of many diseases. Hand sanitizer is not a replacement for proper hand washing.

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CDC recommends the following handwashing procedure to prevent the spread of disease:

1. Wet hands with clean, running water (warm or cold), turn off tap, and apply soap
2. Later your hands by rubbing them together with soap. Lather the backs of your hands between your fingers, and under your nails.
3. Scrub your hands for at least 20 seconds
4. Rinse your hands well under clean, running water
5. Dry hands using a clean paper towel or air dry them.

Personnel should wash hands:

- Before and after work
- Before and after handling or preparing animal diets
- Before and after making or eating food
- After going to the bathroom
- After touching an animal or the animal's immediate environment
- After contact with blood, body fluids, or contaminated surfaces o
- After glove removal
- After coughing or blowing your nose.
- Before and after changing contact lenses
- Before and after handling medications
- Before and after smoking

Attire:

- Personnel should wear clean clothing daily. Clothing worn on premises should be laundered prior to next wear. During outbreaks, attire that could be in contact with infected agents warrant immediate laundering.
- It is recommended that personnel wear SHBP specific clothing and shoes to minimize the spread of infectious agents.
- Clothing and shoes must regularly be inspected to be free from excreta, blood or bodily fluids. Attire that has come in contact with birds outside of the facility or exposed to potential vectors should not be worn on premises.

Showering:

- Personnel must routinely shower after coming in contact with birds or any other potential vectors of disease. Showering removes, deactivates and/or destroys pathogens on the skin, in the hair and dust particles from the respiratory tract/nasal passages. Dust particles are not removed when clothing and footwear is changed.
- Certain pathogens (e.g. mycoplasma) can survive in dust particles for several days. Showering thoroughly removes dust particles that may contain pathogens.
- Showering will also deactivate and destroy pathogens such as AI and NCD viruses. These viruses have a greasy outer layer that is sensitive to soaps and solvents.

Personal Protection Equipment (PPE)

SHBP

For a potential threat or to avoid cross contamination, personnel are required to wear specialized clothing or equipment for protection against health and safety hazards. This includes but is not limited to boots, gloves, Tyvec clothing covers, N95 respirator masks.

Gloves

- Vinyl or Latex medical grade gloves should be worn by personnel to protect from potential vector threats. Hands must be clean prior to wearing gloves.

Face Masks and Eye protection

- N-95 grade face masks and eye protection should be worn to protect against respiratory agents and cross-contamination.

PPE

- For a potential threat, the Attending Veterinarian may recommend the wearing of specialized clothing or equipment for protection against health and safety hazards (PPE).
- In the case of requiring PPE for operations, SHBP will supply all items.
- PPE is discarded or laundered with approved disinfectant for the contaminant. Per Attending Veterinarian's recommendations, PPE may need to be donned when handling laundry.

Shoes

- Footwear should be regularly inspected for integrity, blood, excreta, dirt, and debris and replaced as needed.

Sanitation Practices

Cleaning and disinfection of people, equipment, birds and material are important for protecting bird health. Routine operations such as feeding, bird handling, medical treatments, contact with vehicles and equipment, interactions with outside visitors, are all possible contact points for the transfer of diseases and pests. Entry and exit routes from buildings have the potential to bring and take away disease- causing organisms. Sanitation practices of cleaning and disinfection are intended to stop the transmission of infectious agents. It involves inactivating or destroying disease-causing microorganisms on the premises, equipment, vehicles and personnel.

- Cleaning - removes germs, dirt and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection. Areas that are determined to be a low risk for disease transmission may only require cleaning.
- Sanitizing- lowers the number of germs on surfaces or objects to a safe level, depending on the requirements. This process works by either cleaning or disinfecting surfaces or objects to lower the risk of spreading infection.
- Disinfecting- kills germs on surfaces or objects. Disinfecting works by using physical or chemical agents to kill germs on surfaces or objects. This process does

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not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.

- Sterilization- kills all forms of microbial life. Steam under pressure, dry heat and liquid chemicals are used in this process.

Sanitation and Disinfecting Products:

- Only approved products by the CDC, EPA, and other governing bodies can be used. Certain disinfectants have specific uses and limitations and must be used appropriately. All cleaning items, disinfectants, and other chemicals must be approved by the Attending Veterinarian prior to use.
- Porous surfaces and items may require additional steps or adjustments to ensure proper cleaning and disinfection. Some porous surfaces may need to be discarded after use if unable to properly clean and disinfect.
- Excess waste and food items are discarded daily. Floors are thoroughly cleaned and disinfected as needed.
- Food-handling areas where animal food is prepared shall be cleaned at least once a day (more if more than one instance of food prep occurs) and sanitized at least once a week. This includes surfaces within the preparation areas not directly in contact with meat such as floors, tabletops, freezer doors and handles, and refrigerator doors and handles.
- Cleaning and disinfection of bird enclosures must be performed as often as necessary to prevent accumulation of excreta, debris, and waste. Bird Enclosure cleanliness is monitored by the Director of Aviculture and Area Supervisors.
- *For more information, refer to the Enclosure Cleaning SOP.*

Daily:

- Food waste and leftovers are removed
- Clean, fresh water must be available
- The cleanliness and condition of enclosure should be evaluated

Weekly:

- Deep cleaning and sanitizing of the enclosure and all furniture must be performed at least once per week.
- *For more information, refer to the Husbandry SOPs for each area.*

Bird Crates:

- Crates should be in good condition, provide ventilation, security, and have surfaces that are easy to clean.
- Crates are cleaned and disinfected regularly with approved cleaners and disinfectants.
- Newspaper or other substrate materials are also switched out for clean materials when needed.
- Prior to use by another bird, kennels should be thoroughly cleaned and disinfected. This includes the interior and exterior of the crates as well as perching.
- Perching may need to be replaced depending on the threat level of a biosecurity hazard.

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- Bird kennel cleanliness is monitored by the Director of Aviculture and Area Supervisors.
- *For more information please refer to the Transportation SOP.*

Volunteers and interns may be responsible for cleaning and disinfecting various items and areas depending on their assigned department. All are trained and monitored by the Director of Aviculture and/or Area Supervisors.

Monitoring and Managing Illness in Collection Birds

Daily Visual Assessments:
Performing regular visual health checks of an animal forms an integral part of this ongoing knowledge and understanding. A visual health check allows bird care personnel to identify, report, and act if abnormalities are found.

- Each bird is assessed two times daily to help identify early warning signs.
- It is important to recognize signs of good health; a bright, alert bird that reacts to stimuli, is in good physical condition with the absence of pain, disease, trauma or distress.
- The bird should also participate in species appropriate natural behaviors including eating, drinking, and defecating.
- Special attention should focus on the individual's normal activity level in order to identify, investigate and report any changes in the behavior that may be associated with pain or other medical concerns.

Reporting Abnormalities/Signs of Illness and/or Injury:

- Bird Care Personnel must report welfare concerns, abnormalities, or any signs of injury or illness immediately.
- The observer is responsible for writing their observation in the daily log and verbally notifying the Area Supervisor, Director of Aviculture, or Attending Veterinarian.
- Supervisory Personnel will evaluate the situation will decide if the bird should be captured for diagnostic testing and/or treatment and communicate with the Attending Veterinarian.
- Sick or dead birds on facility grounds must be immediately reported to the Director of Aviculture. If HPAI, zoonotic disease, or other reportable disease is confirmed or suspected, the Director of Aviculture must contact the State Veterinarian.
- *For more information, refer to the Routine Health Care SOP*

Treatment and Isolation of Sick Collection Birds

Isolation and quarantine techniques are utilized to if a bird is sick or suspected to have a pathogen. The bird should be separated from other animals to isolate and compartmentalize the spread of

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disease. The sick bird must be treated with guidance of the Attending Veterinarian and should stay in isolation/quarantine until cleared and released by Attending Veterinarian.

- At a minimum the isolation area should have a 6-foot "buffer zone" between any other bird housing facilities.
- The quarantine/isolation areas should be cleaned and disinfected between birds or groups of birds.
- A designated staff member should care for isolated birds or if necessary, after caring for all other birds.
- A separate set of equipment must be used to care for isolated birds and disinfected prior to using them with any other birds.
- *For influenza, please refer to the SHBP Avian Influenza Response Guidelines*

Management and Disposal of Deceased Birds, Carcasses, and Infectious Materials

Deceased Bird disposal:

Disposal and handling of bodies are based on recommendations by USDA, CDC, or other governing bodies for the particular hazard. All birds that are suspected or confirmed to be positive with a biosecurity hazard need to be handled using the procedures outlined in this document.

Deceased Collection Birds

- Pick up body with an inverted Ziplock bag or gloved hands
- Place body in sealed Ziplock bag
- Label with species and acquisition number and place in chest freezer.
- A necropsy may be performed per the attending veterinarian's recommendations.
- Birds are transported monthly or as needed to East Carolina University Department of Comparative Medicine for incineration.

Deceased Wild Birds

- All birds that are suspected or confirmed to be positive with a biosecurity hazard need to be handled using the following procedures:
- Pick up body with an inverted Ziplock bag or gloved hands
- Place body in sealed Ziplock bag
- Label with species and acquisition number and place in chest freezer.
- A necropsy may be performed per the attending veterinarian's recommendations.
- Birds are transported monthly or as needed to East Carolina University Department of Comparative Medicine for incineration.

Euthanized Birds:

- Birds that are humanely euthanized, but not at-risk of a biosecurity threat may undergo necropsy or testing based on veterinarian recommendations.
- Proper disposal of birds who have been humanely euthanized is necessary.
- Place body in sealed Ziplock bag
- Label with species and acquisition number and place in chest freezer.
- Birds are transported monthly or as needed to East Carolina University Department of Comparative Medicine for incineration.

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Necropsy:

The attending veterinarian and/or veterinary program coordinator may deem it necessary to perform a necropsy to evaluate reason for death, investigate potential medical issues, or to test for various ailments, disease, or biosecurity hazards.

For collection birds, if the cause of death is unknown or sudden, a necropsy is performed, and samples are sent out to evaluate the reason for death. During necropsies, personnel are required to wear PPE. All surfaces and equipment used during necropsy must be cleaned and disinfected after use. Necropsies may be done in house or sent out to a testing facility based on recommendations by USDA, CDC, or other governing bodies if a particular hazard is suspected.

For more information, please refer to the Routine Health Care SOP.

Histopathology Samples:

Per Attending Veterinarian recommendations, histopathology samples may be collected and submitted for evaluation.

Disposal of Biohazards:

A biological hazard, or biohazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

- Biohazardous materials should never be disposed of down the drain or in regular trash receptacles. They should be put into proper and compatible containers that can be securely sealed. A single, leak-resistant biohazard bag is usually adequate for containment of regulated medical wastes, provided the bag is sturdy and the waste can be discarded without contaminating the bag's exterior. The contamination or puncturing of the bag requires placement into a second biohazard bag. All bags should be securely closed for disposal.
- Puncture-resistant containers located at the point of use (e.g., sharps containers) are used as containment for discarded slides or tubes with small amounts of blood, scalpel blades, needles and syringes, and unused sterile sharps.
- Biohazards are transported monthly or as needed to East Carolina University Department of Comparative Medicine for incineration.

SIBP

c. Veterinary Program

i. General Considerations

Veterinary medical and surgical care is provided for all birds at SHBP. This care meets contemporary practice standards of zoo and aquarium veterinary care. Medical procedures, including those conducted without the use of anesthetics, analgesics, or tranquilizers, are supervised by a person qualified to assess the risks involved, and are done only in consultation with the veterinarian, and in accordance with local, state, and federal laws.

Medications are used in accordance with local, state, regional, provincial, and federal regulations and are administered in accordance with the relevant veterinary practice act. Procedures for the use of drugs should include at minimum the following: those persons authorized to administer animal drugs, situations in which they are to be utilized, location of animal drugs and those persons with access to them, and emergency procedures in the event of accidental human exposure.

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ii. Standard Procedures

Clinical Presentations and Standard Treatments
Dorcas P. O'Rourke, DVM, MS, DACLAM
Attending Veterinarian
June 2024

Note: Please consult the ZIMS website and/or the Exotic Animal Formulary for specific species doses. Any questions, call vet.

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Wounds

Superficial wounds

- Debride and flush with 0.05% chlorhexidine or sterile saline
- Apply topical triple antibiotic ointment or SSD cream
- SWAT can be applied if needed to repel insects

Deep open wounds (exposed tendons or bones; deep cuts)

- Debride and flush with sterile saline
- Apply manuka honey, hydrocolloid, or hydrogel
- Bandage
- Give oral enrofloxacin and meloxicam
- Call vet

Lacerations

- Debride and flush with sterile saline
- Bandage
- Give oral meloxicam
- Call vet

Fractures

- Call vet
- Immobilize and splint
- Give oral meloxicam

Concussion/shock/blunt force trauma

- Give dexamethasone 2-4 mg/kg once a day for 1-3 days
- Call vet

Toenail trauma

- Stop bleeding
- Remove any torn fragments
- Apply topical triple antibiotic ointment
- If wound severe, call vet

Broken blood feathers

- Pull blood feather out
- If residual bleeding, apply ferric subsulfate or another hemostatic agent

Eye injury

- Flush eye with sterile saline
- Apply triple antibiotic ophthalmic ointment
- Give oral meloxicam
- If no resolution or if worsens, call vet

Beak/bill trauma

- Stop bleeding
- Call vet

Capture myopathy

- Call vet

Respiratory difficulty

- Check nares, oral cavity for exudate or obstruction
- Put in warm, confined environment
- Give supplemental oxygen if necessary
- Call vet

Dehydration

- If see sunken eyes, paleness, tented skin, give subcutaneous saline or lactated ringers
- Call vet

Anorexia

- Weigh, check for injury, stress, abnormal behavior
- Correct underlying cause
- Call vet

Oral lesions

- Swab caseous material, make slides with saline to check for *Trichomonas* and to Gram stain for *Candida*
- Remove caseous material
- Flush
- Give nystatin or itraconazole for *Candida*
- Give ronidazole or metronidazole for *Trichomonas*

Crop stasis

- Flush crop
- Check exudate for Candida or Trichomonas
- Check saline fecal slurry for *Macrorhabdus*

SEBP

- Give nystatin or itraconazole for *Candida*
- Give ronidazole or metronidazole for *Trichomonas*
- Give sodium benzoate or nystatin for *Macrorhabdus*
- Call vet

No feces

- Check for fecal pasting on vent and remove if present
- Palpate crop and abdomen for abnormalities
- Flush crop if impacted
- Gavage with water
- Call vet

Diarrhea

- Collect fresh sample for parasitology exam
- Assess behavior and attitude
- Weigh
- If bird appears normal and eating and drinking, continue to monitor
- If bird not eating or drinking and not behaving normally, call vet
- If blood in feces, call vet

Prolapsed cloaca

- Reduce with cold water and saturated sugar solution and KY jelly
- If unsuccessful, call vet

Swollen joints

- DSMO if minor
- If unsuccessful, or worsening, call vet

Head tilt/stargazing/circling

- Examine bird for signs of trauma
- Call vet

Egg binding

- Place in warm, quiet environment
- Hydrate if necessary
- If no resolution after a few hours, call vet

Prolapsed phallus

- Immerse in cold water
- Apply KY jelly and replace phallus
- Isolate bird

Distended abdomen

- If poor body condition (BCS 3 or below) and abdomen feels soft and fluid filled, and the bird is pochard or merganser, presume avian TB and euthanize
- If firm mass is palpated, call vet for follow-up on possible tumor.

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Tumor

- Call vet

Bumblefoot

- Give oral enrofloxacin and meloxicam
- Chlorhexidine or betadine foot baths
- Correct environmental and management causes
- Call vet

Feather picking/self-mutilation/poor feather condition

- Call vet to develop plan to identify cause and manage

Uropygial gland impaction

- Gently squeeze to resolve impaction
- Give Vitamin A supplementation
- Call vet

Slipped tendons, contracted tendons

- Apply corrective bandage
- If no resolution, call vet

Angel wing

- Dorsolateral rotation of primaries due to rotational deformity of carpometacarpus
- Apply figure 8 bandage
- Correct high protein diet to slow feather growth until skeletal growth catches up.

Hyperthermy

- Remove to cool area
- If no resolution, call vet

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iii. Anesthesia

General anesthesia is defined as complete unconsciousness, combined with analgesia, muscle relaxation and the absence of reflex responses. SHBP is equipped with medical room with anesthesia. Anesthesia is not commonly utilized, however can be during invasive procedures for the safety of the staff and birds, in addition to minimizing pain and stress to the birds. Physical restraint without sedation should be limited to short, non-painful procedures in species that are tolerant to manual restraint.

Anesthesia is always monitored to maintain a stable patient during the procedure by an experienced and trained staff member. Heart rate and respiratory rate are observed throughout the procedure to detect changes and anticipate complications that may arise. The inherent risks of using anesthesia during a procedure are recognized by staff, and always taken into consideration when balancing the risks with the benefit of performing general anesthesia.

iv. Surgery

SHBP has an on-site area available for minor surgical procedures located in the Green Barn (223+). Separate surgical facilities are available at East Carolina University, North Carolina State Avian Exotics, Carolina Raptor Center, and Creekside Animal Hospital.

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Carolina Raptor Center
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kdean@carolinaraptorcenter.org

Dr. Cynthia Elias
Creekside Animal Hospital
661 Highway 125
Roanoke Rapids, NC 27870
252-519-8900

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Gatorvet1995@gmail.com

Major surgery can only be performed by a veterinarian or under their supervision. Staff appropriately trained by the attending veterinarian can perform minor surgical procedures such as pinioning and suturing that have been approved.

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v. Clinical Pathology

SHBP uses two diagnostic laboratory services, the department of Comparative Medicine at East Carolina University and the North Carolina Veterinary Diagnostic Laboratory System (NCVDLS). Diagnostic capabilities include access to cytology, microbiology, parasitology, hematology, blood chemistry, urinalysis, serology, and other appropriate laboratory procedures.

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Rollins Animal Disease Diagnostic Lab
4400 Reedy Creek Rd.
Raleigh, NC 27607
919-733-3986

SHBP has a microscope available in-house to perform fecal examinations and diagnostic cytology of blood, tissue, and body fluids when immediate examination is necessary. Equipment is properly maintained and calibrated by the veterinary program coordinator. The microscope is maintained in the Propagation Office (226+).

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iv. Necropsy

Any bird dying unexpectedly from unknown cause, or any death deemed necessary by the attending veterinarian and veterinary program coordinator will receive a necropsy. In-house necropsies can be performed by the attending veterinarian and/or veterinary program coordinator as necessary.

SHBP has a refrigerator for holding dead birds (located in the Green Barn 223+) that is physically separate from live bird holding and food supply storage. If the necropsy is performed offsite, the carcass will be transported to ECU Department of Comparative Medicine or NCVDLS for a postmortem examination as soon as possible and no longer than 24 hours after death.

A reasonable effort is made to distribute postmortem specimens to institutions for further research, museum collections, universities, or SHBPs education collection. Disposition of dead birds and their parts will meet all legal restrictions. It is the responsibility of the veterinary program coordinator to oversee the distribution of postmortem specimens to prevent the distribution of infectious materials. Dead specimens not used will be incinerated or disposed of as deemed suitable by the veterinary program coordinator in accordance with local, state, and federal regulations.

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vii. Medical Records

Medical records will be maintained on all birds in SHBP's collection that have received veterinary attention. The records indicate all treatments (types of medication, dosage, duration), surgical procedures, anesthetic procedures (type of agent and dosage), results of all laboratory tests (parasitological, hematologic, bacteriologic, etc.), and immunization records with all relevant dates. The same information, when appropriate, should be recorded for groups of birds that are not individually accessioned and are subjected to group treatments or diagnostic evaluations. Copies of these medical records will accompany birds when they are transferred to another institution or be sent in advance of shipment.

Medical records will be maintained under the direction of the veterinary program coordinator. The medical records will be computerized for easy retrieval and review by the veterinarian. Morbidity and mortality trends will be monitored to evaluate avian health and to develop or modify preventive health or husbandry procedures.

All birds will have some form of permanent identification if practical. Methods of identification can include transponders, wing tags, leg bands, and photography.

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viii. Preventive Medicine

Preventive medicine is important because it is often difficult to recognize and treat illness in birds. These programs include quarantine as required, risk-based health assessments, parasite surveillance procedures and control, immunization, infectious diseases screening, and periodic reviews of diets, husbandry techniques, and vermin control.

During routine bird movements, staff will provide quick assessments for birds already in the hand and report any abnormal findings to the attending veterinarian and the veterinary program coordinator. These "fast checks" will include examination for ectoparasites around the vent, wings, and other relative areas. The nares, ears, mouth, eyes, abdomen, and feet will all be examined. A keel score will be noted and scores outside norm that are not species or individual appropriate will be reported. (Influencing factors can include species, sex, age, pinioning, amputation, and hydration.) When possible, weights will also be taken however these fast checks should not overly delay routine bird movements.

Keel score system:

1 Emaciated, keeling severely and sharply.
2 Keeling, only small amount of muscled dipped to either side of keel.
3 Keel is palpable but muscled firm to either side.
4 Muscled appears straight across over keel, keel is palpable between muscle.
5 Cleavage, keel not palpable, muscle mounded to either side of keel.

ix. Parasite Control

Birds are treated as needed based on risk for parasites. High risk groups include young birds, gamebirds, and parrots exposed to natural bottom aviaries. These groups are treated preventively with ivermectin. Care will be taken in the movement of birds or perching from one exhibit to another to prevent exposure or spread of parasites.

x. Immunization

The attending veterinarian will determine what vaccinations are appropriate for each species in the collection. Vaccinations administered will be based on the disease status of domestic and wild animals in the area surrounding the facility. The type, serial and/or lot number, and source of product should be recorded in the individual medical records. Currently, no vaccinations are given at SHBP however staff monitor best vaccine practices for species at SHBP.

xi. Disease Surveillance

Specific screening protocols for diseases will depend on the nature and prevalence of disease either in the vicinity of the facility and government regulations. SHBP's Avian Influenza Response Guidelines are included at the end of this document.

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xii. Risk Analysis

Disease risk analysis is applied to the transfer of birds between institutions and consists of several individual steps. These include ***pathogen hazard identification, risk assessment***, ***risk management,*** and ***risk mitigation*** along with ***risk communication*** which occurs throughout the process.

Pathogen hazard identification is performed by SHBP for diseases that they wish to keep out of their collection. If no pathogen hazards are identified, then no ***risk assessment*** or ***risk management*** is needed, and animal transfers can occur without the need for further risk mitigation.

If pathogen hazards are identified, then each hazard undergoes ***risk assessment*** to determine the consequences of introducing it into the receiving collection.

Following ***pathogen hazard identification*** and ***risk assessment, risk management*** using ***risk mitigation*** is performed to lower the risk of pathogen introduction SHBP's collection.
Risk mitigation can involve preshipment procedures and diagnostics, preshipment isolation, post-arrival isolation (quarantine), and post-arrival procedures and diagnostics (e.g. quarantine exam and testing). ***Risk mitigation*** will focus on the preshipment part of the animal transfer.

Where ***pathogen hazard identification***, ***risk assessment***, and sufficient ***risk mitigation*** is performed prior to transfer, the animal can be transferred directly into SHBP's collection without the need for quarantine isolation and further testing. This can improve animal welfare during the transfer process. Where ***risk mitigation*** cannot be performed prior to transfer, traditional quarantine practices will be used.

xiii. Quarantine

Upon arrival all birds are inspected for injuries or disease. During quarantine the following procedures will be performed by qualified staff: examination, necessary clinical and laboratory tests, treatment for external and internal parasites as needed, evaluation of psychological well-being, and verification of permanent identification. The duration of quarantine will be agreed upon by the attending veterinarian and the veterinary program coordinator.

Any bird that dies during quarantine will receive a complete postmortem examination including histopathology unless the cause of death is known.

SHBP

xiv. Special considerations for birds that cannot be isolated.
Because some birds have unique care and environmental requirements, it may not be feasible to duplicate the appropriate enclosures in a separate location for quarantine. These birds must have a health history and status thoroughly characterized at the sending institution for disease transmission risk assessment since they may have to be kept near SHBP's collection animals. Efforts will be made to prevent direct physical contact, contact by aerosolization or drainage, or potential fomite transmission. Staff working in that area will tend to the quarantined bird last when no further contact with collection birds is necessary. A set of cleaning and feeding utensils will be dedicated to the quarantined bird and not used on other collection birds.

xv. Methods to prevent disease transfer during quarantine.
If a risk analysis indicates the need for isolation of the incoming bird(s), the length of that isolation and any disease testing to be done should be based on the specific diseases of concern. The degree of separation should be such that potential communicable disease agents may not be transmitted to other susceptible animals. In most cases this requires facilities remote from the main exhibit areas. Access should be restricted to prevent transport of infectious agents by facility personnel. All personnel working in quarantine facilities must observe established protocols such as personal hygiene and disinfection of footwear, clothing, and equipment. A bactericidal/virucidal footbath should be placed near the entrance to the quarantine area to prevent spread of potential pathogens by footwear. This footbath must be changed regularly as many products are inactivated by organic debris. Alternatively, disinfectant sprays or footwear dedicated to use only in quarantine may be utilized. Bird care in the quarantine space is to be performed by personnel assigned exclusively to that area, rather than one who will be working in other areas as well. Feeding utensils and containers, cleaning utensils, and any cage furnishings are to remain in the quarantine facility (not used elsewhere). Boots, gloves, masks, personal protective equipment (PPE) or other protective clothing used while working with the quarantined bird will be dedicated to the area and not used elsewhere. Waste removed from this bird area will be disposed of in such a way as to prevent exposure to other areas of SHBP.

Any bird that is severely stressed by quarantine procedures (e.g. social isolation, confinement etc.) may require a risk assessment and harm/benefit analysis for earlier release or modification of the facilities, if approved by the veterinarian in consultation with veterinary program coordinator and staff. Local, state, or federal regulations may also dictate quarantine length and procedures.

SHBP

xv. Zoonosis

If a zoonotic disease is diagnosed within the facility the veterinarian, in consultation with the veterinary program coordinator will inform and educate personnel about disease transmission and prevention. In the case of a reportable disease, the veterinarian will inform all appropriate governmental health authorities.

The veterinarian will consult with pertinent staff in all areas where the public is allowed physical contact with collection animals to assess and minimize the risk for the transfer of zoonotic diseases and plan preventive measures. For further information, the Compendium of Measures to Prevent Disease Associated with Animals in Public Settings (Reference Section).

For information related to the Landing Zone, please refer to the Landing Zone SOP

For more information related to zoonosis diseases of concern related to SHBP, please refer to the following documents:

- *Zoonosis: Psittacosis*
- *Zoonosis: Salmonella*
- *Zoonosis: Tuberculosis*
- *Zoonosis: Avian Influenza*

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d. Management Issues

SHBP management decisions including but not limited to bird shipments, nutrition, husbandry, pest control and euthanasia will involve the attending veterinarian, who will work closely with the Veterinary Program Coordinator.

i. Emergency Care

The Attending Veterinarian is available by phone or text for emergency situations. If the Attending Veterinarian is unavailable, veterinary faculty at ECU and veterinarian at Creekside Animal Hospital can be contacted.

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ii. Holidays

SHBP is staffed 365 days of the year with a minimum of 4 full time bird care staff onsite.

iii. Weather Events

For weather events, please refer to the Sylvan Heights Bird Park Emergency Response Plan

iv. Capture

The capture of birds will be under the supervision of the Veterinary Program Coordinator or by a trained staff member that minimizes the stress and threat to an individual and/or group.

For more information, please refer to the Capture and Restraint SOP.

v. Bird Transfers

The attending veterinarian or other USDA accredited veterinarian from ECU is responsible for preparing and signing the Certificate of Veterinary Inspection (Health Certificate). Pre-shipment

SHBP

examination is performed by the accredited veterinarian to ensure that birds may be safely transported and are free of clinical symptoms of infectious diseases. Any tests required by regulations of the receiving state or country will be performed. The consignor and consignee share the responsibility for health care prior to, during, and after shipment of birds. Complete medical records will be made available to the receiving institution prior to shipment.

For more information, please refer to the Transportation SOP.

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vi. Nutrition

When possible, the use of species specific, commercially prepared bird diets will be utilized as the basis for SHBP nutrition program. To ensure nutritional efficacy, review of dietary husbandry practices will be conducted by qualified individuals in consultation with the veterinarian and veterinary program coordinator. Changes will be recorded and maintained for future evaluation as part of the preventative bird health care.

Diets for individual birds will be modified to match physiological status e.g., hatchling vs. adult vs. breeding vs. growing and when feasible, will be based upon data obtained from peer reviewed publication or dietary guidelines established in Bird Care Manuals. Dietary considerations will also account for consumption. Current and historic diets on all birds will be recorded and maintained.

For more information, please refer to the Diet and Nutrition SOP.

Commercial Diets: Waterfowl feed is stored in two locations at SHBPs and is milled by Carolina Classics Catfish (CCC) in Winterville, NC. SHBP contracts CCC to produce its waterfowl pellet every 8-12 weeks and then transport the bulk diet to two commercial feed storage units. Mazuri feed is ordered monthly and current diets include Ratite Diet, Large Bird Diet, Small Bird Diet, Small Bird Breeder, Softbill Diet, Crane Diet, Diving Duck Diet, Seaduck, Gamebird Maintenance, and Flamingo Breeder. These commercial diets are kept in appropriate storage areas and kept on average 4-6 weeks. Diets past their use by dates are discarded.

Seed: White proso millet, black sunflower, and assorted nuts are all sourced from food or animal grade vendors and kept in appropriate storage areas on average 4-6 weeks. Seed past their us by dates are discarded.

Produce: The local Food Lion provides SHBP with produce daily. Produce is examined by staff prior to use to ensure freshness and palatability. Fruit and vegetables that are high in nutrition and low in sugar are used (i.e. Blue Berries, Apples, Papaya, Mango). Produce is typically kept less than 3 days. Frozen or fresh fruit is purchased as needed.

Insects: Insects are purchased bi-monthly from Rainbow Mealworms and kept on a nutritious gut-loading diet prior to being fed out. Insect colonies are examined daily for pests and kept in a temperature-controlled room.

Rodents: Mice and rats are purchased monthly from RodentPro and kept frozen on average 2-3 months. Rodents are thawed 24hrs prior to being fed.

Fish: Capelin, menhaden, trout, bluegill, bass, are purchased through food grade vendors such as SamRust or Nixon Fishery every 4-6 weeks. Frozen fish are kept on average 2-3 months and are thawed 12 hours prior to use. Local fish is sourced from fisherman and fed un-frozen when possible.

Other Protein: Quail and day-old-chicks are also purchased through RodentPro and kept on average 2-3 months. They are thawed 24hrs prior to being fed.

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Supplements: Fish and rodents are all dusted with a multivitamin to replaced nutrients lost during frozen storage.

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vii. Sanitation and Disinfection

Sanitation and disinfection protocols have been developed in consultation with the veterinarian. Sanitation includes removal of soiled materials (bedding, feed, enrichment items, and waste material) followed by thorough cleaning to remove excessive dirt and debris. Once the organic material is removed, the area is then disinfected to reduce or eliminate microbes. Disinfectants are chosen based on target organisms and safety of use in the animal or food area being disinfected. The frequency and amount of cleaning and disinfection will vary depending upon the animal's needs and physiological condition. Cleaning utensils are assigned to specific areas and not transferred between areas. All feed and water containers are routinely cleaned and disinfected.

For more information, please refer to the Enclosure Cleaning SOP.

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viii. Pest Control

SHBP has a formal integrated pest management program, that is approved by the attending veterinarian. Pest control is implemented in all areas of the SHBP. This program aims to prevent, control, or eliminate pests. Pesticides are used in accordance with government regulations and whenever possible, less toxic, or non-toxic agents will be given preference. SHBP contracts Peoples Termites and Pest Control, Inc. (Peoples) to supplement the pest control actions taken by staff. Peoples contract and SDS sheets located at the end of this document.

For more information, please refer to the Pest and Vector Control SOP.

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ix. Euthanasia

SHBP ensures that all birds are euthanized in accordance with the most current guidelines. See: AAZV Guidelines for Euthanasia of Non-domestic Animals and American Veterinary Medical Association (AVMA) Panel on Euthanasia.

Euthanasia is performed by personnel who are knowledgeable and skilled in performing the procedure. Euthanasia techniques will not interfere with postmortem examinations, when possible. The decision to euthanize a bird should be mutually agreed to by the attending veterinarian and veterinary program coordinator when possible.

Euthanasia may be necessary or appropriate where:

a. The bird poses a serious and unavoidable threat to human safety.
b. In the opinion of the staff responsible for an individual bird's health and welfare, the bird is suffering from a disease, age-related ailments, detrimental psychological state, or severe pain and/or stress which cannot be adequality alleviated.
c. It enables containment of a disease spread to birds or humans.
d. Current housing of a bird presents ongoing welfare concerns, and the only alternative is permanent transfer to accommodation which cannot assure an acceptable level of welfare for the bird, and which cannot be improved within a short or mutually agreed interval.

SHBP

x. Altricial Care

Altricial species are species in which the young are underdeveloped at the time of hatching. These babies rely on their parents to be fed and cared for until they mature. In human care, altricial species require specialized care that is critical for survival. The following guidelines should be used to ensure that we are using the best practices in aviculture. All guidelines are approved by the organization's veterinarian. Special considerations may be made for specific individual needs.

Good records are essential for proper care, tracking changes, and catching problems. Use the hand feeding log to record necessary information which may include date, temperature, humidity, weight, time, food amount/type, fecals, crop percentage, and feeding response. Young or immature birds should not be subject to unnecessary handling or exhibited for a time that could be detrimental to their health or wellbeing.

SHBP

III. Veterinary Facilities

a. On-Site

SHBP has a primary treatment room located in its Green Barn that allows for isolation of birds receiving medical care and facilitates observation and treatment of sick and injured birds. Traffic within this area is kept to a minimum.

b. Off-Site

The Department of Comparative Medicine at ECU has procedure rooms, surgical suites, radiology, diagnostic laboratory, and necropsy facilities.

East Carolina University
Department of Comparative Medicine
Brody School of Medicine
600 Moye Blvd.
Greenville, NC 27834
252-744-2454

Dr. Olivia A. Petritz, DVM,
North Carolina State University
1052 William Moore Drive
Raleigh, NC 27607
919-513-6999
NCStateExotics@ncsu.edu

Carolina Raptor Center
6000 Sample Road
Huntersville, NC 28078
704-875-6521
kdean@carolinaraptorcenter.org

Dr. Cynthia Elias
Creekside Animal Hospital
661 Highway 125
Roanoke Rapids, NC 27870
252-519-8900
Gatorvet1995@gmail.com

SHBP

Import of Live Animals (ESA) Part E

1. Name and Address where permit is to be mailed:

Sylvan Heights Bird Park
PO Box 368
Scotland Neck, NC 27874
Attn: Dr. Dustin Foote

2. Point of contact for questions about application:

Dr. Dustin Foote
Director of Aviculture, Sylvan Heights Bird Park
Cell: 315.406.7070
Office: 252.826.3186
Email: dustin@shwpark.com

3. Have you or the business owners been assessed a penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the application is filed; been convicted, or entered a plea of guilty or nolo contendere, for a felony violation of the Lacey Act, the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act, forfeited collateral, or are currently under the charges for any violation of the laws mentioned above?

No

4. Type of Activity:

Import

5. Current Location of the animals:

The mergansers have been bred and are being held at Zoo Parque Itatiba, Brazil. See full address below.

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

6. Recipient/Sender physical address:

Paraíso das Aves
Av. ZooParque Itatiba

Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

7. a. Scientific Name:

Mergus octosetaceus

b. Common Name:

Brazilian Merganser

c. Approximate Hatch Dates:

Hatch days are below and are in DD/MM/YYYY format.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016 – 14/07/2022
Studbook #74 – ID: SP 11.0 AAA 002962 – 13/08/2022
Studbook #91 – ID: SP 11.0 AAA 002977 – 03/09/2023
Studbook #94 – ID: SP 11.0 AAA 002980 – 03/09/2023
Studbook #95 – ID: SP 11.0 AAA 002981 – 03/09/2023

Females:

Studbook #46 – ID: SP 11.0 AAA 001732 – 04/08/2020
Studbook #58 – ID: SP 11.0 AAA 002021 – 09/08/2021
Studbook #77 – ID: SP 11.0 AAA 002965 – 13/08/2022
Studbook #80 – ID: SP 11.0 AAA 002968 – 13/08/2022
Studbook #90 – ID: SP 11.0 AAA 002976 – 26/08/2023

d. Wild or Captive-born:

All 10 mergansers are captive-born birds produced from at-least F2 generation parents. Please see the attached studbook for lineage (Brazilian_Merganser_Studbook).

e. Quantity:

10 individuals

f. Sex:

5 pairs (5.5.0)

g. Permanent Markings and/or Identification (microchip, band, or studbook #):
Below is the international studbook number and closed band number ID for the 5 male and 5 female mergansers.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016
Studbook #74 – ID: SP 11.0 AAA 002962
Studbook #91 – ID: SP 11.0 AAA 002977
Studbook #94 – ID: SP 11.0 AAA 002980
Studbook #95 – ID: SP 11.0 AAA 002981

Females:

Studbook #46 – ID: SP 11.0 AAA 001732
Studbook #58 – ID: SP 11.0 AAA 002021
Studbook #77 – ID: SP 11.0 AAA 002965
Studbook #80 – ID: SP 11.0 AAA 002968
Studbook #90 – ID: SP 11.0 AAA 002976

8. a. Scientific Name:

Mergus octosetaceus

b. Common Name:

Brazilian Merganser

c. Name and Address of where animal was bred:

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

e. Hatch Dates
Hatch days are below and are in DD/MM/YYYY format.

Males:

Studbook #67 – ID: SP 11.0 AAA 002016 – 14/07/2022
Studbook #74 – ID: SP 11.0 AAA 002962 – 13/08/2022
Studbook #91 – ID: SP 11.0 AAA 002977 – 03/09/2023
Studbook #94 – ID: SP 11.0 AAA 002980 – 03/09/2023

Studbook #95 – ID: SP 11.0 AAA 002981 – 03/09/2023

Females:

Studbook #46 – ID: SP 11.0 AAA 001732 – 04/08/2020
Studbook #58 – ID: SP 11.0 AAA 002021 – 09/08/2021
Studbook #77 – ID: SP 11.0 AAA 002965 – 13/08/2022
Studbook #80 – ID: SP 11.0 AAA 002968 – 13/08/2022
Studbook #90 – ID: SP 11.0 AAA 002976 – 26/08/2023

f. Name and Address of where parents are located:

Paraíso das Aves
Av. ZooParque Itatiba
Rod. Dom Pedro I, KM 95.5
Itatiba – SP
13254-762
Brazil

g. Statement from the breeder that the animal was bred at the breeder's facility (including the facility name and address):

Attached document (Breeder_Statement) is from the Brazilian Merganser Project Manager, Robert Frank Kooij, who is the Director at Zooparque Itatiba.

Description and Justification for Requested Activity

The primary purpose of this requested activity is for the captive propagation for the conservation and survival of the species (part E section 13); however, we have also provided information for SHBPs approach to scientific research (part E section 11) and how education/display (part E section 12) could be considered a secondary purpose for the requested activity.

11. Scientific Research:

Parts a, b, c, d, e all considered N/A for this requested activity since there are no plans to engage in scientific research with this species. Sylvan Heights Bird Park (SHBP) will use every opportunity to contribute to the collective knowledge of Brazilian Merganser husbandry. While scientific research is not the purpose of the proposed activity, the following paragraph summarizes SHBP overall position in using its captive avian collection in scientific research.

As a part of SHBP general research policy (www.shwpark.com/conservation/research), SHBP does not engage in any invasive research, but may contribute to research projects that are non-invasive (i.e. genetic material collection during routine health assessments or behavioral observations). A primary example of this is SHBP's colony of Ruff Sandpipers (*Calidris pugnax*) that are part of a behavioral and genetic sequencing research project at East Carolina University. Due to this relationship, SHBP aviaries are inspected by the East Carolina University's Institutional Animal Care and Use Committee (IACUC) and the Association for the Assessment and Accreditation of Laboratory Animal Care, AAALAC International The attached inspection documents (AAALAC_SHBP_2020 and AAALAC_SHBP_2024) demonstrate SHBP's commitment to ethical research practices.

12. Conservation education and/or zoological display:

a. Objectives of the proposed activity in support of an education program:

The primary goal for SHBP in importing Brazilian Mergansers is the captive propagation for the conservation and survival of the species long term (question 13 of this application). However, SHBP also plans on eventually utilizing them for conservation education in a zoological display by incorporating a non-breeding pair of mergansers into a "water is life" themed exhibit that is opening in 2026. This pair of mergansers will be integral components of the importance and delicate nature of mountain river systems. As Brazilian Mergansers are selective in their habitat (needing fast moving, clear water with forested edges) they are very sensitive to deforestation, mining, pollution, and even ecotourism such as rafting (Brazilian_Merganser_Protocol).

The following three paragraphs are meant to provide background and justification for SHBP to use Brazilian Mergansers in a zoological display:

The Brazilian Merganser project began in 2006 on the initiative of Dr. Luís Fábio Silveira, who started negotiations with IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources). In 2011, ICMBio (Chico Mendes Institute for Biodiversity Conservation created the Brazilian Merganser National Action Plan (PAN), in partnership with the NGOs Terra Brasilis, Naturatins, and CerVivo, and the Museum of Zoology of the University of São Paulo. The main objective of the project is to permanently ensure the maintenance of *ex situ* Brazilian Merganser populations in the medium and long term, to stimulate population growth. SHBP have been an active partner and consultant since the initial 2006 negotiations. SHBP's Founder, Mike Lubbock, M.B.E attended both the 2006 and 2011 meetings, and SHBP has sent staff to Zooparque Itatiba in 2022 to learn about the captive husbandry requirements of Brazilian Mergansers. SHBP has also hosted Zooparque Itatiba staff, Terra Brasilis members, and ICMBio members in its Avian Husbandry and Management Program (www.shwpark.com/education/avian-husbandry-program or AHP_Information_Guide_SHBP).

The following paragraph is from page 5 of the attached Brazilian Merganser Protocol (Brazilian_Merganser_Protocol). *"As an ex-situ reproduction program is part of the Merganser PAN, all birds of this species must be housed in aviaries outside the public exhibition area. In accordance with the PAN, some individuals were authorized to be in exhibition at Zooparque Itatiba with the goal of working with the institution's environmental education department. However, it is only possible to work with the exposure of individuals that are not breeding pairs and are not part of the group capable of reproduction (according to the guidelines of the studbook). Therefore, to date, Zooparque Itatiba does not have any individuals on display. If a new institution starts working with the species, it must meet the same parameters as above, and it is not possible to have animals on display at the first moment."*

SHBP will only exhibit Brazilian Mergansers to the public when it receives permission from the Brazilian Merganser National Action Plan members. The only other facility selected to become partners of the Brazilian Merganser captive conservation program was the Prague Zoo in the Czech Republic who imported 5 pairs in 2024. Exhibiting birds was a secondary objective for Prague Zoo as well, and only after the Brazilian Mergansers were settled at Prague Zoo, did they received permission to display a non-breeding pair to the public.

b. Copies of educational materials incorporating the following information (Status in Wild, Current Threats, Conservation Efforts)

Since incorporating the Brazilian Mergansers into the 2026 "water is life" themed exhibit is not the primary objective of this importation, the educational materials have not been developed yet. However, included below are two examples of exhibit signage (Figure 1 and Figure 2) at SHBP about the endangered Whooping Crane (*Grus americana*) and the endangered White-winged Duck (*Asarcornis scutulata*). SHBP maintains both species on exhibit and they are a part of the educational messaging in the Park's programming. In addition, SHBP participates in the Association of Zoos and Aquariums (AZA) Species Sustainability Programs (SSP) for these species. Additionally, both Whooping Cranes and White-winged Ducks are a part of the daily "Keeper Talks" rotation where a keeper will engage with guests outside various exhibits. The Brazilian

Merganser signage would be like the examples below and include information about their status in the wild, current threats, and conservation efforts.

Figure 1: Whooping Crane Sign at SHBP, sign is approximately 36” wide by 24” tall.

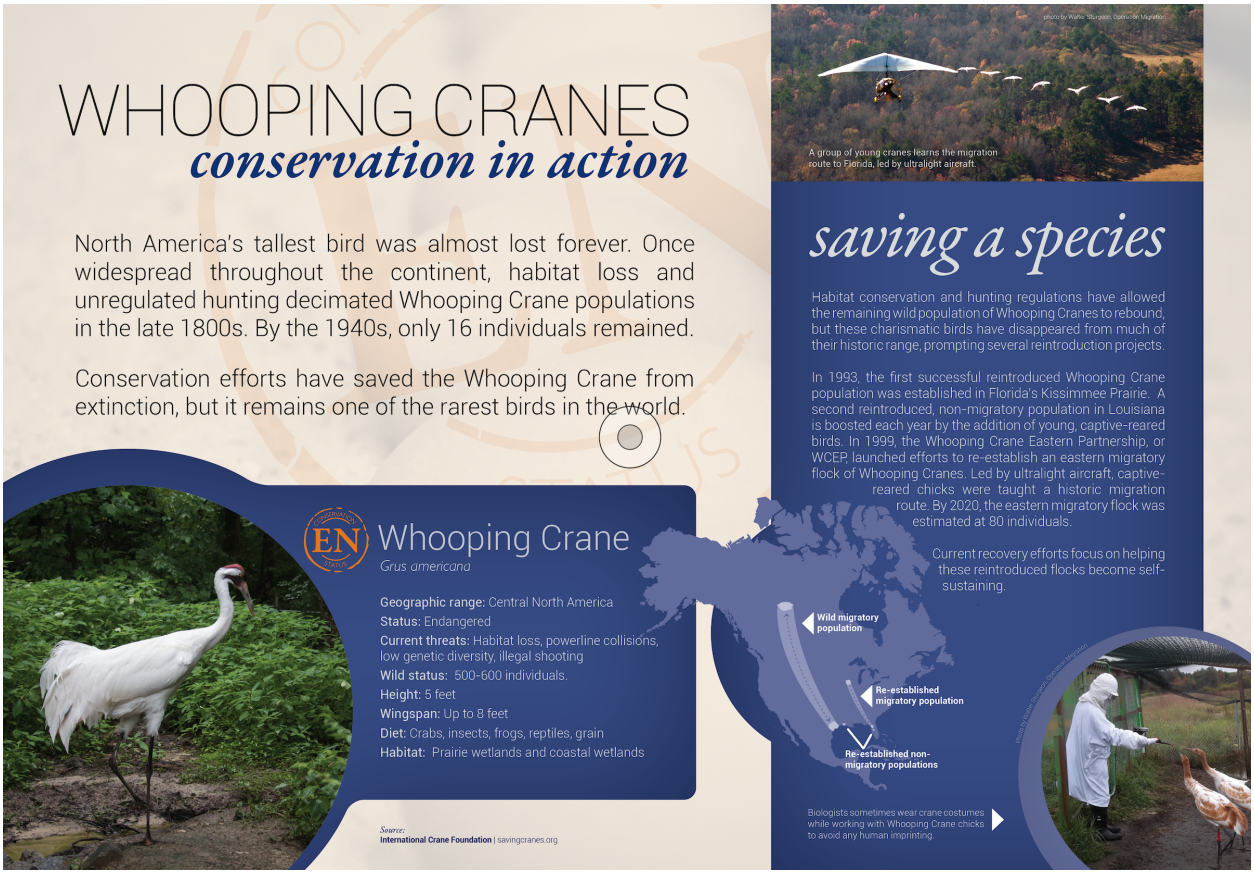


Figure 2: White-winged Wood Duck sign at SHBP, sign is approximately 36” wide by 24” tall.

13. Captive propagation for the conservation and survival of the species:

Captive propagation for the conservation and survival of the Brazilian Merganser is the primary objective of the proposed activity and will be accomplished by establishing a captive reserve population in North America. As outlined in the Brazilian Merganser National Action Plan, the *ex-situ* maintenance of the Brazilian Merganser is essential for the conservation of the species. Maintenance under human care allows the compilation of new data and information, enabling the creation of management models aimed at the *ex-situ* conservation of the species and helping in the recovery of its conservation status. The maintenance of *ex-situ* populations serves as genetic backup and these populations are of fundamental importance to work as re-stocking for future releases and reintroductions.

International partnerships are critical for the health and growth of captive breeding programs. Sharing expertise, diversifying stakeholders, and promoting awareness are all benefits from these partnerships. Prior to 2024, the entire captive Brazilian Merganser population was housed at one facility in Brazil, Zoo Parque Itatiba. SHBP and Prague Zoo were both selected by the Brazilian Merganser National Action Plan as international partners to ensure captive populations would exist outside of Brazil as contingency plans. The Brazilian Merganser National Action Plan is still working on identify stakeholders within Brazil. However, there are limited facilities within their native range that have the knowledge, financial ability, or stability to continue propagating or holding Brazilian Mergansers. To date, the Brazilian Merganser National Action Plan has approached multiple facilities within Brazil and have not found suitable placements for the birds being propagated at Zooparque Itatiba. This is another reason why SHBP was approached to participate in the breeding program.

SHBP has over 50 years of being recognized as an authority on breeding waterfowl and is one of the only facilities in the world that has the leadership and experience to maintain and propagate this unique species of merganser. In 2009, SHBP received the first captive breeding award in North America for the endangered Chinese Merganser (*Mergus squamatus*), the only other threatened species in the Mergus genus. In 2011, SHBP also received the first captive breeding for the Goosander (*M.m.merganser*) in North America, another large member of the Mergus genus.

The staff at ZooParque Itatiba are the only individuals that currently have captive experience breeding the Brazilian Merganser. However, SHBP staff have visited ZooParque Itatiba to learn about their captive husbandry. Furthermore, Zooparque Itatiba staff have visited SHBP and participated in Sylvan Heights Avian Husbandry Program to enhance their knowledge on waterfowl propagation. For more information about the program please see the attached guide (AHP_Information_Guide). While visiting SHBP, Zooparque Itatiba staff gave presentations on the care of Brazilian Mergansers.

The 10 mergansers we are requesting to import are being selected to provide a genetically diverse founding population in North America. This North American population will be a part of the international studbook that is managed for maintaining genetic viability. As the captive component of the Brazilian Merganser National Action Plan, the captive birds are meant to

provide a reservoir for releasing captive bred offspring. When suitable areas are identified by the Brazilian Merganser National Action Plan, captive mergansers that are selected for release would be raised appropriately and conditioned to survive in the wild. The 10 birds we are requesting to import would be the founders for a contingency population for the captive Brazilian Merganser population. Since a goal of the world captive Brazilian Merganser population is to be able to release birds into suitable habitats, the North American captive population is a safeguard for the future of the wild Brazilian Merganser Populations. The National Action plan has already determined that without reintroduction efforts, the species will not survive in the wild. As such, the plan has determined that international partners should be identified as a safeguard in the event the captive population in Brazil declines.

SHBP is committed to its agreement between Zooparque Itatiba, the Chico Mendes Institute for Biodiversity Conservation, and the Brazilian Merganser National Action Plan. If the partnership required Brazilian Mergansers back from SHBP, for either the Zooparque Itatiba's captive program or for wild reintroductions by the Brazilian Merganser National Action Plan, SHBP would go through the necessary steps to export birds back to Brazil. There are several realistic scenarios where the future North American captive population or the 10 birds we are requesting to import would be relied on to provide birds back into the captive Brazilian population as breeders who would then produce offspring for release. Scenario 1: large loss of birds in Brazilian captive population due to disease. Scenario 2: large loss of birds in Brazilian captive population due to chaotic event i.e. natural disaster, weather, theft, etc. Scenario 3: specific loss of birds in Brazilian captive population with genetic representatives in North America. In these scenarios, the 10 birds we are requesting to import and/or their future progeny would be available to the Brazilian Merganser National Action Plan.

There are fewer realistic scenarios where birds bred in North America would be released directly into their native range. Birds raised in their native habitat would be better suited for surviving in the wild. However, if this was an objective that the Brazilian Merganser National Action Plan ever proposed, SHBP would participate. It should be noted that the 10 birds we are requesting to import are all at least 2nd generation captive bred birds that were not raised to be released, but to be a part of the captive breeding program. As such, these birds would ultimately be ill suited for release due to their familiarity with people. Birds that are to be released will be raised in isolation, so they are unfamiliar with people.

In conclusion, the 10 birds we are requesting to import are to provide a safeguard for the captive population in Brazil, a captive population which was initiated for the purpose of reintroducing Brazilian Mergansers into the wild, while maintaining this species in captivity in the event of extinction. These 10 birds are the founders of a contingency plan for the prevention of the extinction of the Brazilian Merganser in their native range.

a. A description of how the species will be propagated (breeding pairs).

The maintenance of the Brazilian Merganser in captivity began in 2011 with the first collection of eggs in the Serra da Canastra National Park, in the State of Minas Gerais. The eggs were hatched

at the Scientific and Cultural Breeding Center of Poços de Caldas-MG. Under the egg collection protocol developed by Brazilian Merganser National Action Plan, additional wild egg collections have been carried out to establish a genetically diverse captive population. The eggs from these collections were sent to Zooparque Itatiba. In 2016, the Zooparque Itatiba became the headquarters of the *ex-situ* program. The *ex-situ* Brazilian Merganser captive conservation program is extremely important for maintaining a population that will serve as genetic backup and re-stocking for future releases and reintroductions. The Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol) serves as a standard for all institutions that participate in the project and includes relevant propagation information.

The Brazilian Merganser is monogamous and will be kept in solitary breeding pairs. A breeding pair will not accept any other Brazilian Mergansers or other species of waterfowl in the same aviary. Because of this type of territorial behavior, SHBP will only keep one pair of mergansers in each breeding aviary. Pairs will be determined by average kinship in the international studbook.

The five breeding aviaries at SHBP are 20' wide by 36' long by 9' tall. There is a complete visual barrier between the aviaries so pairs cannot interact. Like Zooparque Itatiba, SHBP is using a thick shade cloth as a screen between enclosures. Most *in situ* nests are in tree trunks and high riverbanks. Two wooden nests are used in each enclosure, one lower and the other higher of the ground, however both close to the water. The nests are standardized and SHBP have followed the model used by Zooparque Itatiba and the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol). Like other large mergansers, woodchips as a substrate will be used in the nest.

b. Documentation showing your participation in an established breeding program (example: current breeding plan outline your role in the program and letter from the breeding coordinator confirming your participation in this breeding program.)

The following paragraph is from page 11 of the December 2023 Brazilian Merganser Update produced by Zooparque Itatiba (Update_Brazilian_Merganser_December_2023) "*Considering the importance of expanding the ex-situ population, it is crucial that new institutions can integrate in the program and keep the captive mergansers under human care. Therefore, two international institutions have become members of the Brazilian Merganser Conservation Program and studbook: Prague Zoo and Sylvan Heights Bird Park. These institutions are partners of Zooparque Itatiba and have been supporting the program and sponsoring the ex-situ activities since the beginning. Both signed the agreements necessary and committed with it, and with that, they agreed that the birds belong to the project.*"

SHBP participates in over 20 Association of Zoos and Aquariums (AZA) Species Sustainability Programs (SSP). Please see the attached letter (SHBP_Sustainability_Letter_2024) from the Saddle-billed Stork Program Coordinator, Marcie Herry, to the AZA Animal Population Management Committee, that outlines our role and participation in this breeding program.

c. How your breeding stock is managed to maintain genetic vitality including avoidance breeding, considerations of average kinship, differences in paternal and material average blood relationships, carrying capacity of your facility, disposition of progeny).

SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship. SHBP has a target adult population of 20 mergansers, which includes 5 breeding pairs and 5 reserve pairs. In addition, SHBP can hold 20 adolescent mergansers in four groups for a total carrying capacity of 40 individuals. Once SHBP successfully breeds Brazilian Mergansers and with the guidance of the Brazilian Merganser Conservation Program and Studbook, SHBP plans to send out birds to other suitable facilities such as the Fort Worth Zoo, Pinola Conservancy, and Dry Creek Waterfowl. SHBP will only send out mergansers to facilities that have been approved by the international studbook and follow the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol).

d. Plans and agreements for future reintroduction if applicable.

In 2023, 2 wild male Brazilian Mergansers were captured by the Brazilian Merganser National Action Plan members and equipped with transmitters to understand where young birds are dispersing (Brazilian_Merganser_Update_Dec2024) in Serra da Canastra, Brazil. One male was believed to be predated in 2023 and the transmitter of the adult male stopped sending signals in 2024. He was confirmed alive but missing the transmitter. Even though two transmitters were lost, the first test using a satellite transmitter was deemed successful. It was important to test the accuracy of the location points provided by Argos and see whether it would meet the needs it had, so it can be used as tool for the reintroduction program. In addition, new materials have been tested on captive birds to avoid any future losses of a transmitter falling off. In December 2024, three wild males (including two juveniles) were fitted with transmitters. Over the next few months these birds will be monitored to gain more knowledge about the species and about what is happening to them once they leave their family in search of new territories.

In the attached (Brazilian_Merganser_Update_Dec2024), the Brazilian Merganser National Action Plan will continue tracking the wild mergansers and redouble efforts in breeding the captive population. “This is a very important step for us, because next year our goal is to continue to elaborate a pilot project for the reintroduction of the Brazilian Merganser in the wild alongside with ICMBio and the researchers of National Action Plan (PAN).” Part of the redoubling of effort into the captive breeding program is establishing contingency populations of captive birds at SHBP and Prague Zoo, so that Zooparque can feel safer focusing their efforts on producing mergansers suitable for release.

14. Please provide how proposed activity will enhance or benefit the wild population within its native range (direct or indirect conservation efforts, provide documentation, signed MOU demonstrating your commitment to supporting the program and how the program contributes directly to the species).

The attached MOU from January 7th, 2023, between the Chico Mendes Institute for Biodiversity Conservation and SHBP demonstrates our commitment to working with Brazilian Mergansers, both in captivity and in the wild (SHBP_Letter_of_Commitment). The captive populations are necessary, as sources for reintroductions, as opportunities to understand more about this species, and as symbols to engage with the public on this species' precarious status. Also attached is a letter (Luis_Sao_Paulo_Letter_2024) from the Museum of Zoology at the university of Sao Paulo Vice-director Dr. Luis Fabio Silveira on SHBP's involvement with the Brazilian Merganser National Action Plan.

15. Resumes outlining the technical experience of each caretaker working with, maintain, and/or propagating species, as it relates to the proposed activities, including experience with similar species:

SHBP employs fourteen husbandry staff which includes the Director of Aviculture, the Breeding Center General Curator, the Curator of Grounds, 4 Lead Aviculturists, 3 Aviculturists, and 5 Bird Keepers. All staff are trained and supervised by the Director of Aviculture and the Attending Veterinarian, with support from the Breeding Center General Curator. SHBP has bred Common Mergansers (*Mergus merganser*), Chinese Merganser (*Mergus squamatus*), Hooded Merganser (*Lophodytes cucullatus*), Smew (*Mergus albellus*), and Red-breasted Mergansers (*Mergus serator*). Sylvan is a part of the AZA SSP for *M. squamatus*. All staff are familiar and experienced with the care of waterfowl and in particular mergansers. The 10 mergansers we are requesting to import will be cared for by the Director of Aviculture, the Breeding Center General Curator, the Attending Veterinarian, and the primary Lead Aviculturist. Their four resumes are attached along with brief overviews of their experience with species of merganser.

Dr. Dustin Foote, SHBP Director of Aviculture (Resume_Director_of_Aviculture_Dustin_Foote)

Dr. Foote spent time training at Zoo Parque Itatiba in 2022 and learning about the husbandry requirements of the Brazilian Merganser (*M.octosetaceus*) by the zoo staff who are in charge of the merganser breeding program. Based on this, along with his experience with breeding Chinese Mergansers (*M.squamatus*), Dr. Foote designed the merganser breeding aviaries at SHBP that were constructed in 2024. He has extensive experience with husbandry requirements of the Common Mergansers (*M.merganser*), Chinese Merganser (*M.squamatus*), Hooded Merganser (*L.cucullatus*), Smew (*M. albellus*), and Red-breasted Mergansers (*M.serator*), all gained during his time at SHBP from 2012-2024. He is a board member of the International Wild Waterfowl Association and serves as the Conservation and Grants chair. As the Director of Aviculture at SHBP, Dr. Foote oversees the daily care of the living collection, which includes husbandry, medical care, nutrition, and propagation.

Nick R. Hill, SHBP Breeding Center General Curator (Resume_Curator_Nick_Hill)

Mr. Hill has over 45 years of experience breeding rare and difficult species of waterfowl which includes all other members of the Mergus genus; Chinese Merganser (*M.squamatus*), Goosander (*M.m.merganser*), Common Merganser (*M.m.americanus*),

Red-breasted Merganser (*M.serator*), and Smew (*M.albellus*). He and SHBP founder, Mike R. Lubbock, M.B.E, were directly responsible for SHBP receiving the North American first breeding of the endangered Chinese Merganser (*M.squamatus*) and the Goosander (*M.m.merganser*). Mr. Hill oversees the daily care of 150 species of waterfowl at one of the largest waterfowl breeding centers in the world.

Tammy Stanton, SHBP Lead Aviculturist (Resume_Lead_Aviculturist_Tammy_Stanton)

Mrs. Stanton has experience with large merganser species that originated during her internship at Sylvan Heights Waterfowl Breeding Center in 2007. She has worked with Chinese Mergansers (*M.squamatus*) and Common Mergansers (*M.merganser*), and her experience includes aviary design, nutritional needs, daily husbandry, behavior, breeding, and nesting. While at Palm Beach Zoo from 2004-2008, she gained experience with Red Breasted Mergansers (*M.serator*) and continued to work with Common Mergansers (*M.merganser*), Hooded Mergansers (*L.cucullatus*), and Smew (*M.albellus*). During her time there, Palm Beach had the second largest collection of waterfowl in North America. During her time at Palm Beach Zoo and Busch Gardens Tampa Bay (2004-2024), she worked with the AZA Anseriformes Taxon Advisory Group and stayed up to date on conservation programs and captive population statuses in North America which included the Chinese Merganser (*M.squamatus*). While working at Busch Gardens Tampa, she worked in the wildlife rehabilitation program and would assist with the care of Red Breasted Merganser (*M.serator*) that would need temporary housing and medical treatment before being released. This required knowledge about nutritional needs, husbandry, and safe handling of the birds daily

Dr. Dorcas O'Rourke, SHBP Veterinarian (Resume_Attending_Vet_Dorcas_ORourke)

Dr. O'Rourke has worked as a consultant for SHBP since 2014 and has served as the park's Attending Veterinarian since 2019. She is responsible for the medical care of all birds at SHBP, which includes Chinese Merganser (*M.squamatus*), Common Merganser (*M.merganser*), Red-breasted Merganser (*M.serator*), Smew (*M.albellus*), and Hooded Merganser (*L.cucullatus*). Dr. O'Rourke is onsite regularly once a week and as needed for emergency care, and is available by phone, text, and email at other times. Dr. O'Rourke and Dr. Foote compiled SHBP's Program of Veterinary Care which outlines standard medical procedures and emergency procedures (Program_of_Vet_Care).

As a facility, SHBP has over 50 years of experience breeding waterfowl and has worked with and bred over 75% of the world's waterfowl (135 of the 178 species). Most of the waterfowl species that SHBP has not worked with are either polar species like scoters (*Melanitta*) or endemic species outside aviculture such as the Blue Duck (*Biziura lobata*). Since there is only one facility in the world that currently has experience breeding Brazilian Mergansers, we highlighted two examples that we believe relate in taxonomy and avicultural requirements to the Brazilian Merganser and that SHBP has extensive experience with.

Taxonomic example: SHBP has regular success breeding and rearing Hooded Mergansers (*Lophodytes cucullatus*) for more than 30 years, a species that is closely related to the Brazilian

Merganser. We spend roughly 2-3 months rearing them before they are moved to a less hands-on aviary. This year, we raised 53 out of 56 hatched. They are fed a higher protein diet than our other waterfowl for rearing, and based on experience over the years, they are put on wet brooders (temperature-controlled space with a constantly flowing water pool) younger than many other species to allow them to practice diving behavior as early as is safe. This helps to prevent development issues with natural behaviors as well as uropygial glands. The 3 mortalities were due to yolk sack absorption issues among one clutch of birds, potentially due to unfavorable nesting conditions (wet nesting area due to heavy rainfall).

Avicultural Example: SHBP has regular success breeding and rearing Harlequin Ducks (*Histrionicus histrionicus*) for over a decade, a species that has similar avicultural requirements to the Brazilian Merganser. We spend roughly 4-6 months rearing them in our duckeries before they are moved to an outdoor aviary. This year we raised 6 with no mortality. They are fed a higher protein diet than our other waterfowl for rearing, and based on experience through the years, they are put on wet brooders (temperature- controlled space with a constantly flowing water pool) younger than many other species to allow them to practice diving behavior as early as is safe, to prevent development issues with natural behaviors as well as uropygial glands. Through years of different configurations, we have found that their breeding behavior is heavily encouraged due to moving water in their aviaries, and we have water features in all the aviaries where we have breeding adults set up.

16. Current inventory of the species at importer facility

SHBP does not currently maintain any Brazilian Mergansers onsite and there are no locations outside Brazil and Prague Zoo in the Czech Republic that do. For a complete inventory of all species held at SHBP, please see the attached USDA inspection report #INS-0001051151 from June 20th, 2024, (USDA_2024_Inspection_Inventory).

17. Number of years the species has been maintained at the facility.

N/A

18. Number of hatches at the facility.

N/A

19. Number of mortalities at the facility.

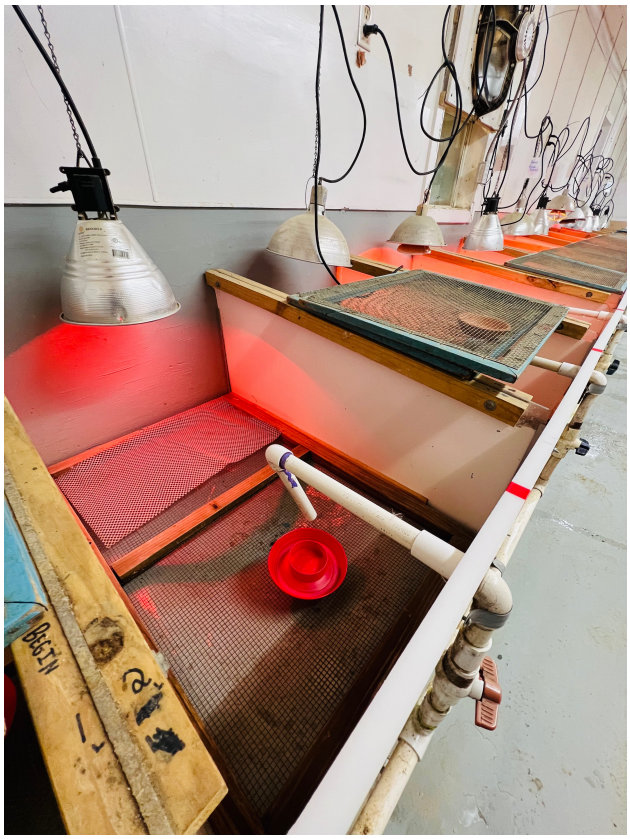
N/A

20. A detailed description, diagrams/photos the clearly depict existing facilities where the wildlife will be maintained. Dimensions, construction materials, protection from elements.

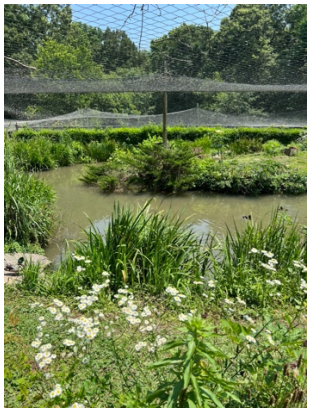
The five breeding aviaries at SHBP are 20’ wide by 36’ long by 9’ tall. There is a complete visual barrier between the aviaries so pairs cannot interact. SHBP uses well water that is on a continual flow through system and stays at 50 degrees Fahrenheit in both winter and summer. The aviaries are made from chain-link with a heavy nylon netted top. Small gauge wire is placed in a L shape along the bottom to prevent anything from digging into the aviary. Electric wire is also used to prevent predators.

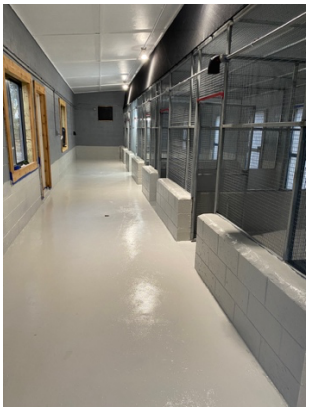
Picture 1: Breeding Aviaries with ponds.

Pictures 2 & 3: Rearing facilities for waterfowl at SHBP.



Picture 4: Waterfowl aviaries and indoor holding at SHBP.





21. Approximate carrying capacity of species at facility.

SHBP has a target adult population of 20 mergansers, which includes 5 breeding pairs and 5 reserve pairs. In addition, SHBP can hold 20 adolescent mergansers in four groups for a total carrying capacity of 40 individuals. Once SHBP successfully breeds Brazilian Mergansers and with the guidance of the Brazilian Merganser National Action Plan and international studbook, SHBP plans to send out birds to other suitable facilities such as the Fort Worth Zoo, Pinola Conservancy, and Dry Creek Waterfowl. SHBP will only send out mergansers to facilities that have been approved by the international studbook.

22. Transport conditions comply with IATA, provide type, size, and construction of shipping container, arrangements for watering/carrying for wildlife during transport.

SHBP will use the same IATA approved shipping containers outlined on page 13 of the Brazilian Merganser Protocol (Brazilian_Merganser_Protocol) and that were also used in the successful export of Brazilian Mergansers from Brazil to the Czech Republic in 2024. SHBP is contracting Mersant International, LTD to oversee the transport of the Brazilian Mergansers we are requesting permission to import. Mersant International is a reputable broker in the zoo community, and they will be responsible for receiving the birds from Sao Paulo at JFK, transporting the birds to the USDA/APHIS veterinary inspection, and then transporting the birds to the USDA quarantine Center in Newburgh, New York. Once released from quarantine, the birds will be picked up by SHBP staff and transported by vehicle directly back to North Carolina.

Attachments:

1. Brazilian_Merganser_Studbook (page 2)
2. Breeder_Statement (page 4)
3. AAALAC_SHBP_2020 (page 5)
4. AAALAC_SHBP_2024 (page 5)
5. Brazilian_Merganser_Protocol (pages 5, 6, 12, 13, 20)
6. AHP_Information_Guide_SHBP (page 6)
7. Update_Brazilian_Merganser_December_2023 (page 12)
8. SHBP_Sustainability_Letter_2024 (page 12)
9. Brazilian_Merganser_Update_Dec2024 (page 13)
10. SHBP_Letter_of_Commitment (page 14)
11. Luis_Sao_Paulo_Letter_2024 (page 14)
12. Resume_Director_of_Aviculture_Dustin_Foote (page 14)
13. Resume_Curator_Nick_Hill (page 14)
14. Resume_Lead_Aviculturist_Tammy_Stanton (page 15)
15. Resume_Attending_Vet_Dorcas_ORourke (page 15)
16. Program_of_Vet_Care (page 15)
17. USDA_2024_Inspection_Inventory_SHBP (page 16)

Enrichment and Wellness Program

Sylvan Heights Bird Park

The goal of the Enrichment Program at Sylvan Heights Bird Park (SHBP) is to improve/enhance the overall life experience for the birds in our care by better replicating a naturalistic environment and providing opportunities for the birds to exhibit species typical behaviors. Enrichment opportunities are based on both species-specific ecology and individual history. SHBP recognizes that a successful Enrichment Program is only one part of providing a successful welfare and husbandry program for the birds in our care. The Enrichment Program is subject to regular internal review and modification based on relevant information, current research, and industry standards.

The SHBP Enrichment and Wellness Program is overseen by the Director of Aviculture in tandem with the General Curator and Lead Aviculturists relative to their areas of supervision (areas 1-5 defined on page 4 of emergency response plan), collectively known as the Enrichment Committee. Any questions or concerns in the program can be directed to the Director of Aviculture. SHBP recognizes the cognitive needs and capabilities of certain avian taxa and groups (i.e. corvids, parrots, raptors, ambassador birds) to be higher than the needs of others and places a priority on creating enriching environments for those taxa when possible. SHBP also recognizes that all avian taxa benefit on some level from an increased enrichment experience and seeks to provide enrichment opportunities to the full collection.

Enrichment opportunities at SHBP are broadly divided into the following seven categories:

1.) **Dietary**- involving the type of food item presented, how it's presented to the animal, where, when etc.

2.) **Sensory**- providing novel sights, sounds, tactile experiences

3.) **Manipulatable**- any new items introduced to elicit specific behavioral reactions from the birds, more conventionally defined as "toys"

4.) **Environment**- changes to the habitat the bird resides in, i.e. as part of routine perch/substrate replacement

5.) **Social**- either adding or removing birds from the habitat to create new flock dynamics, either for an intended breeding goal, or to provide appropriate social groupings. This may include nesting and breeding opportunities, both real and artificial

6.) **Cognitive**- training sessions with birds, or groups of bird

7.) **Husbandry**- cleaning portions of the habitat, i.e. inside holding, or outside ponds

One or more of these categories will be met three times throughout a seven-day week period, keeping in mind that Dietary, Environment, Social, and Husbandry are all categories built into the daily care of each aviary. The specific type and complexity of the enriching experience should vary. All enrichment activities should be recorded as part of the daily record keeping done by avian

SHBP

staff. Specific types of enrichment must be pre-approved by the Area Supervisor or Director of Aviculture. These include, but are not limited to, novel manipulatable items, novel food items, environmental changes, and social changes.

In addition to recording the enrichment category and specifics, the individual overseeing the enrichment should record the seen engagement level regarding said enrichment on a 5-point scale from no response to immediate engagement. On a regular basis (i.e. quarterly), enrichment systems will be reviewed and evaluated by the enrichment committee and adjusted appropriately based on engagement levels from birds, and success at eliciting target behaviors.

Enrichment opportunities are a part of daily husbandry at SHBP. Failure to provide or appropriately record enrichment will be handled the same as failing to appropriately perform or record other daily husbandry tasks such as feeding and cleaning.

SHBP

Enrichment and Wellness Program
Exemptions

Medical Issues

Birds actively receiving treatment for medical concerns, especially those moved off exhibit into hospital spaces may be exempt from regular enrichment opportunities. Every opportunity to enrich their environment will be taken, but the primary objective will be their wellbeing and improvement. Smaller spaces, reduced perching, reduced mobility, isolation may be important to their recovery.

Breeding Activities

Birds actively involved in breeding programs may have reduced enrichment opportunities outside of those related to breeding/rearing offspring to minimize disturbing them during a more sensitive period.

Standard Breeding Exemptions

Lesser Flamingos

December through June while birds are in Lesser Flamingo Breeding Barn minimal interaction should be maintained. Birds should not be disrupted from their nesting area. Husbandry should be limited to several staff members so that they become attuned to any changes in behavior.

African Fish Eagles

January through fledge (typically June) the eagles should have reduced interactions with staff while they are engaged in nesting behaviors (copulating, nest building, incubating, rearing, etc.)

Eurasian Eagle Owls

February through fledge (typically July) the owls should have reduced interactions with staff while they are engaged in nesting behaviors (copulating, nest building, incubating, rearing, etc.)

Propagation Building and Breeding Center

Depending on the species, many of the birds in these areas are actively engaged in breeding behaviors through out the year. The Area Supervisors or Director of Aviculture will recommend when staff should minimize their disturbance and alter enrichment and/or husbandry schedules.

SFBP

Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Sylvan Heights Bird Park
Diet and Nutrition SOP

Introduction:
A diet is considered nutritionally balanced when it provides appropriate levels of known dietary essential nutrients based on current knowledge and information. Nutritional status, natural feeding ecology, and nutrients in the diet of free-ranging individuals are taken into consideration.

Purpose:
The purpose of this SOP is to provide the procedures used to ensure all birds receive nutritionally balanced diets at Sylvan Heights Bird Park (SHBP).

Responsibility:
- It is the responsibility of bird care personnel to provide birds with a nutritionally balanced diet.
- It is the responsibility of supervisory personnel to ensure compliance with this procedure and for personnel training

Definitions:
Diet- all foods and water sources offered and/or accessible to a bird, regardless of purpose. This includes food used for training and enrichment.

Procedures:

Food Storage
- Meat items are purchased or donated through approved venders only.
- Frozen food is immediately inspected and stored in a Walk-in Freezer stored at minus 10-20 degrees Fahrenheit.
- Meat is stored in original cardboard shipping containers and food storage bins.
- Meat storage boxes and containers are labeled with meat type, amount and date received.
- Food follows first in first out protocol, meaning that oldest food is used first.

Food Thawing
- SHBP uses a slow thaw method for thawing all frozen food to preserve nutritional quality. Food is pulled from walk in freezer and placed in the bottom of the refrigerator for 24 hours.
- The thawed food is available for use for up to two days and monitored for quality and freshness before distributed to birds.

SHBP

Food Preparation

- Individual and/or aviary diets are written and prepared for each individual bird and/or aviary at SHBP.
- Diet plans are managed and reviewed by Director of Aviculture and Area Supervisors in accordance with the individual's needs, species, metabolism, nutritional status, activity level, dietary requirements, age, etc. to meet the nutritional needs of the bird.
- Bird care personnel prepare diets as indicated in the diet plan.
- Tools, equipment, and workspaces used during food preparation are cleaned and sanitized after use.
- Knife safety should be followed at all times.
- Fish preparation uses blue knives and blue cutting boards.
- Rodents and meat preparation uses red knives and red cutting boards.
- Vegetable and fruit preparation uses green knives and green cutting boards.

Nutrition

- Birds are given fresh fruit, vegetables 7 days a week unless indicated otherwise and approved by the Director of Aviculture.
- Birds are given a whole-animal diet 7 days a week unless indicated otherwise and approved by the Director of Aviculture.
    - Whole prey items used regularly include mice, rats, chicken, quail, fish, rabbits, squirrels, mealworms, super worms, wax worms, and crickets.
- New food items must be vetted through research and approved by senior staff. It must follow the guidelines of industry standards and this document.

Personnel Training

Staff, volunteers, and interns are trained to prepare and distribute diets by experienced supervisory staff. Training includes following meat handling guidelines, how to read diet sheet instructions, abbreviations used, scale use, distributing food to specific individuals, looking for and removing left over food, weighing left over food, and documenting feeding details in the daily log.

Diet Writing and Management

Diets are monitored and adjusted as needed throughout an individual's life by the Attending Veterinarian, Director of Aviculture and Area Supervisors to maintain optimal health and wellbeing. Diet intake is monitored by bird care personnel to ensure that the bird(s) are consuming the majority of the diet and not selecting only certain items.

Record Keeping

Nutrition records are an integral part of the feeding program. Records can track weight trends, food intake and help document thought processes regarding diet formulation and presentation

- Food type and weight (in grams) is recorded in diet records
- Abnormal left-over food amounts are removed daily and recorded daily log

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Feeding Groups of Birds

When housed in shared aviaries, special care is taken to ensure all birds have access to their individual portion of food. Birds can be monitored by weight and/or feeding behavior to ensure appropriate diet intake.

SHBP

SHBP

Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Sylvan Heights Bird Park
Enclosure Cleaning SOP

Introduction:
Clean habitats are necessary for good avian welfare. By keeping enclosures cleaned and disinfected regularly, we can provide birds with an environment that is free of debris, bacteria, and illnesses.

Purpose:
The purpose of this SOP is to outline when and how bird enclosures are cleaned and disinfected at Sylvan Heights Bird Park (SHBP).

Responsibility:
- It is the responsibility of bird care personnel to follow this procedure
- All bird care personnel receive standardized training before being assigned to clean and care for bird enclosures.
- It is the responsibility of supervisory personnel to ensure compliance with this procedure and for personnel training

Definitions:
- Sterilization- kills all forms of microbial life. Steam under pressure, dry heat and liquid chemicals are used in this process.
- Disinfection- process of destroying microorganisms using cleaning techniques and an approved disinfecting agent. The approved disinfectant must be used according to product instructions that include storage, effective dilution, contact time, surface preparation, rinse and dry time.
- Sanitation- process of removal of soiled materials (bedding, feed, enrichment items, and waste material) followed by thorough cleaning to remove excessive dirt and debris.

Procedure:
Cleaning Schedule and Frequency
- Cleaning and disinfection must be performed as often as necessary to prevent accumulation of excreta, debris, and waste.

  Daily:
  - Food waste and leftovers should be removed daily
  - Clean, fresh water must be available daily
  - The cleanliness and condition of enclosure should be evaluated daily

  Weekly:

SHBP

- Deep cleaning and disinfection of the enclosure and must be performed at least once per week unless there is approval by the Director of Aviculture for a medical or breeding reason not to do so.

Leftovers:
If leftover diet/food from the previous day is present, staff must remove them from the habitat. If there are abnormal amounts of diet/food present, staff must notify the Area Supervisor.

Feathers:
- During active molting, feathers can be found in enclosures. According to the MBTA, it is unlawful for SHBP Personnel to remove and keep molted feathers from any species native to the USA. Feathers should be discarded along with other debris from the enclosure.
- At SHBP, there are many birds that are considered “non-native” and do not fall under the protection of MBTA. Non-native bird feathers that are in “good” condition (intact, smooth, and clean) may be collected and used to promote SHBP in our gift shop, guest experiences, and as programing tools.

Hoses:
All enclosures have a hose nearby to use for spraying down enclosures and refilling water pans. Nozzles of hoses and handles of hose pumps should be placed in the "off" position and coiled or wrapped up in an orderly fashion. When cleaning, the hose may be placed through the side of the enclosure/mesh material to allow easy access into the enclosure. The hose may also be placed through the doorway of the enclosure only IF the double door system is able to be in place. Hoses should not be removed from their designated areas.

Buckets:
All buckets should be labeled that contain food or bedding and not used for enclosure cleaning. Buckets should be cleaned in the outdoor sink by the Green Barn and placed on the drying rack after each use.

Double Door System:
All enclosures with heavily flighted species (i.e. songbirds, jays, raptors) have a system of two doors that prevents the escape of birds while entering/exiting enclosures. These areas are known as a "double door system/area" or "keeper area". At least one set of doors must shut at all times during entering or exiting. When staff are fully inside or outside of the enclosure, both doors should be shut. Report damaged locks and latches to the Area Supervisor. In case of a bird escape, senior staff should be notified immediately. Refer to the protocol for Escaped Birds.

Cleaning with a bird inside:
- When cleaning enclosures with birds inside, careful consideration should be made to ensure that cleaning strategies do not place excess stress on the birds. Stress may be caused by over stimulation or distress from being placed in a situation which causes a fear or loss of control. Some of the signs of stress may include but are not limited to tight grip on the

perch, panting, dilating pupils, loose stools, feathers pulled in tight to the body, wrists held slightly away from body and wings dropping, vocalizations, gular fluttering, and escape and avoidance behaviors – such as quick darting look or crouching.

- To avoid these behaviors, staff should be aware of the bird's location and behavior throughout the cleaning process. Birds should be given enough space to safely fly or move away from the staff or any tools at all times. Working in a clockwise or counterclockwise motion, move tools and cleaning supplies carefully, to minimize instances that a bird may feel trapped. Special care must be taken to avoid wetting the birds with water or disinfectants.
- For birds that are easily disrupted, cleaning may be delayed temporarily. The modification to the cleaning schedule must be approved by the Director of Aviculture with the reason and when cleaning can be safely resumed.
- Weather conditions should always be monitored while cleaning enclosures. High and low temperatures or bad weather should not contribute to stress while cleaning.

Perches:

- Perches and the surrounding areas should be clear of all debris (leftover diet, leaves, fecal matter/mute, etc.) scrubbed, cleaned/disinfected, and washed off thoroughly with water. Cleaning solution must be rinsed off completely to prevent contamination of a bird's food or possible contact or ingestion of chemicals. Perches that are decomposing, missing artificial turf, have become smooth, or missing, should be reported to Area Supervisors and replaced. Perching must be approved by the Area Supervisor before placing in an enclosure.
- All old perching must be removed to the onsite debris pile.

Raking:

- Raking is used to collect debris (pine needles, leaves, feathers, etc.) into piles to collect and discard. Once these items have been raked into piles, they should be bagged and discarded into the trash. During the raking process, staff should be careful to not throw away large amounts of substrate that may have been piled up with the debris.
- Raking is also used to even out and rotate the gravel/substrate in an enclosure. By rotating the substrate, staff can increase the rate of decomposition and break up debris, thus leading to a cleaner environment for the bird.
- All debris must be removed to the onsite debris pile.

Substrate:

- All substrates should be cleaned and rinsed off thoroughly. Debris such as leaves and pine needles should be picked up and thrown away. Fecal matter should be broken up with a rake or brush and rinsed off thoroughly.
- Substrate should lay evenly on the ground of the enclosure unless species appropriate.

Water Bowls:

- Every enclosure should contain a water bowl of minimum dimensions necessary to allow the individual drink and to submerge and bathe freely without bumping its wings on the

SHP

sides of the pan. Multiple water bowls may be made available if birds are housed in groups and there are concerns of bowl guarding.
- Birds in temporary enclosures for medical treatment may have smaller water bowls if necessary for their recovery.
- Water bowls should be cleaned, scrubbed, and rinsed thoroughly before filling with fresh water. Water bowls should be kept full, to within one inch of the top, for easy bathing access. Special considerations may need to be taken for young birds or birds with physical injury preventing from moving easily in and out of the bowl.

Aviary Netting:
- Aviary netting should be inspected during the cleaning process. Staff should look for any holes in predator proofing material as well as anything that may affect the integrity of the net and report to Area Supervisor if found.
- Leaves, smaller sticks, gumballs, etc. can be cleared off by the staff. If large amounts of debris remain notify the Area Supervisor. Staff may use a ladder as necessary to access roof and brush the items off with a rake or remove them by hand.
- Special care should be given during this process to not stress the birds. During hot days this activity should be limited to early hours.

Walls:
- Walls of the enclosure should be inspected during the cleaning process and any sign of damage should be reported to Area Supervisor. Staff should make notes of signs of rotting, holes, attempted predator entry, etc.
- For cleaning purposes, walls should be clear of all debris (food, cobwebs, leaves, fecal matter, etc.) scrubbed, cleaned, and washed off thoroughly with water. Occasionally algae will accumulate on walls, and it will turn to green. If this happens, notify senior staff and a group may be scheduled to help.
    - Note: The main greenhouse of WOT (222+) is pressure washed annually for algae. During this time, the shade cloth is removed and disinfected and major repairs performed.

Additional Cleaning for Public Enclosures:
- Public enclosures are seen daily by the public and have additional requirements to maintain the standards.
- Signage/Railing: all signage and railing to enclosures should be free of debris, scrubbed, cleaned and rinsed off thoroughly.
- Walkways: the public walkways in the immediate area of the enclosure should be raked to remove excess leaves, branches, sticks, etc. This will aid in keeping the path tidy, as well as providing guests with a safe area to observe our birds.
    - Note: The main walkway outside of the enclosures should be blown daily as needed to prevent excess leaves, branches, sticks, etc.

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Sanitization and Biosecurity:

- To prevent the spread of germs and zoonotic diseases, all staff should wash their hands frequently.
- If a pathogenic disease is suspected, biosecurity measures must be always followed.
- Tools and equipment used during cleaning should be thoroughly cleaned and then sanitized after use. Tools used during this process should be dedicated solely for the task of enclosure cleaning and not cross contaminate with other items.
- Enclosures must be sanitized thoroughly before a new bird is brought in. If there is evidence of an infectious disease, all materials that cannot be disinfected must be removed from enclosure.
- *For more information refer to the Biosecurity SOP in the SHBP Program of Veterinary Care.*

SHBP

Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Sylvan Heights Bird Park
Capture and Restraint SOP

Introduction:
The purpose of this SOP is to provide standard capture and restraint techniques to ensure physical safety to the bird and/or staff involved while also mitigating undo stress to the bird at Sylvan Heights Bird Park (SHBP). At times, manually restraining a bird may be necessary to ensure its health and well-being. These procedures limit some or all the animal's normal voluntary movement. There are times when animals are restrained for reasons that may include examination, collection of samples, drug administration, physical therapy, coping, medical emergencies, or to apply ID equipment.

Purpose:
The majority of SHBP's collection birds can be restrained using physical restraint, without the need for chemical immobilization. Understanding species' natural history and their methods of defense is key to safely handling wild birds. Instinctively, birds will use their defense systems for self-preservation. Procedures, equipment used, and safety precautions are based around the knowledge of the natural history of each species.

SHBP houses two adult cassowaries that cannot be restrained using physical restraint and can only be chemically restrained if necessary.

Responsibility:
- It is the responsibility of bird care personnel to ensure the proper capture and restraint are used to ensure physical safety to both human and bird.
- It is the responsibility of supervisory personnel to ensure compliance with this procedure and for personnel training

Definitions:
- Physical restraint- purposely limiting the bodily movement of the bird by using hands, gloved hands, traps, nets etc.
- Chemical restraint- intentional use of medications to subdue or sedate a bird to restrict the freedom of movement.

Materials:
Equipment is used to assist the restraint of most species. The type of equipment used will vary in accordance with the size, species, and condition of the bird.

Hands and Gloves
- Hands are a very effective form of restraint; your hands are sensitive to the amount of pressure that is being exerted on the bird and can be quickly modified to the situation.
- SHBP staff use various gloves depending on the species and size of the animal. The thickness of the glove should be chosen based on the species

and size of the bird. Loose fitting gloves make it more difficult to feel how well the bird is restrained, while tightly fitting gloves may compromise handler safety. A slightly loose fit is preferred to prevent the bird from grasping fingers during the procedure.

Towels

- Small, lightweight towels are used as a head covers to decrease the bird's visual arousal. Large towels can be a very useful tool in capturing birds.

Hoop Nets

- Nets are the primary tool used to capture birds. Effective use of nets requires training and practice. SHBP uses a variety of nets that are species appropriate.

Carrier box

- Plastic carrier boxes are used to transport birds. While this is the preferred method to transport most birds, there may be some individuals that do better when hand carried. The decision is based on the species, size of the bird, feather conditions, age of the bird and the staffs experience level.

Procedure:

Natural History and Self Protection

The natural history of the bird must be considered to allow for safe restraint.

Foot

Most raptors seize their prey and defend themselves using sharp talons and strong grip strength. Raptor feet must be firmly secured for the duration of the procedure to ensure human safety. Most raptors use their beak as a secondary method of defense and the handler must remain aware of the potential risk.

Beak/Bill

Depending on the natural history, the beak, as opposed to the feet may be the primary method of defense. Staff must keep the beak firmly secured during the duration of the restraint. Birds that require this type of restraint include parrots, eagles, kookaburras, corvids, herons, storks, hornbills, etc.

Kick

Some species, such as seriema or ratites will attempt to kick when stressed. Staff must be aware of this and make sure they take appropriate measures. Cassowaries and Emus should not be restrained unless under the direction supervision of the Director of Aviculture and Area Supervisor.

Wing slap

Many species of pigeons and swan will attempt to defend themselves by hitting staff with a wing. For larger species this can be painful for a staff member if they do not take appropriate measures.

SHBP

Skill and Practice

Restraining birds takes skill and practice. All staff must be trained by an experienced staff member. Experience level, observed skills, hand strength, and coordination are necessary and will be evaluated on an individual basis. Hesitation and/or inexperience can impair the ability to safely restrain a bird.

Mitigating Stress

Restraint is a traumatic experience for the bird and involves risk to both staff and bird. Restraint should be limited to only procedures that are necessary. If possible, birds should be trained to voluntarily participate in their own husbandry care. The duration of time a bird is restrained should be minimized as much as possible. Procedures should be planned, and equipment prepared before restraining the bird to ensure efficiency. Procedures should also be grouped together as much as possible to minimize the number of times an animal needs to be restrained. When possible, the birds head should remain covered with a lightweight towel to limit visual arousal.

Capture and Restraint Techniques

Teamwork

Most procedures require at least two people. Bird restraint is the most affective when two people are working together as a team. This type of teamwork is used during movements, physical exams, administering medications, or performing a medical procedure. The "lead" is the person whose job it is to direct team so the procedure can be accomplished quickly and efficiently to minimize stress and injury to both the bird and the staff. The amount of restraint used to control the bird is an important consideration for the safety of the staff and comfort for the bird.

Capture in a Large Enclosure

Two people should enter enclosure together and effectively communicate as a team. Most birds can be "herded" into a corner or captured with a net. Most birds do not want to be surrounded from multiple directions by staff.

Foot Capture/Restraint

This is a common technique when restraining adult raptors (i.e. fish eagles or eagle owls). Both legs/feet are seized and restrained as quickly as possible. Firmly grip the legs directly above the feet with one index finger between both feet. The wings are then folded against the body, holding the wings high on the wrists. Restraining the wings too low results in an unrestrained bird. The bird can be carried upright with legs and wings restrained.

Body Capture/Restraint

This is the best and most common technique when capturing small birds such as parrots, dove, waterfowl, etc. or birds with long legs that could be injured. Two hands are used to firmly hug both wings against the bird's body. Once the bird is restrained by the wings and body, it is then usually safe to restrain both legs directly above the feet with one index finger both feet.

SIRP

Dorsal Recumbent Position

- This is the most used technique for examinations and medical procedures.
- The bird is restrained on its back on an exam table. The staff firmly grips the legs directly above the feet with one index finger between both feet.
- The wings should be folded and symmetrically underneath the bird.
- One hand is placed across the chest to prevent the bird from sitting up or flapping its wings. The hand across the chest should be a gentle/firm restraint. There should be enough pressure to restrain the bird while still allowing for expansion of the chest during respirations.

Upright Position

- This is commonly used to administer oral medication, oral fluids, or any other procedure that requires the bird to be in an upright position.
- Firmly grip the legs directly above the feet with one index finger between both feet. The wings are then folded against the body, holding the wings high on the wrists.
- The alternative to restraining the wings with a hand, is folding the wings symmetrically against the handler's body. This is a secure position when longer duration of restraint is required.

SHBP

We are in receipt of your application, CS10543003, for a permit to import 10 live Brazilian mergansers (*Mergus octosetaceus*) under the U.S. Endangered Species Act (ESA). The processing of your application cannot be completed because we require additional information.

Based on your submission, it appears that your responses were to an expired version of application form 3-200-37a. Our current application form (see attached) expires on 12/31/2026 as shown in the top right corner, and has additional questions not included on the previous form as well as additional details requested for some of the questions included on the previous form. I have highlighted those questions but specifically they include 10.c., 10.d., 12, 13, 19, and 21-28. We note that questions 10.d., 19, and 28 were previously included but a little more detail is requested on the current application form.

Attachments included

1. Brazilian_Merganser_Protocol
2. Cleaning_SOP
3. Diet_SOP
4. Enrichment_SOP
5. Routine_Health_SOP
6. Capture_SOP
7. Transportation_SOP
8. Part_E_Original
9. Program_Vet_Care
10. USDA_Report
11. Studbook_Letter_Robert

10. If captive propagation for the conservation and survival of the species, provide:

10c. A copy of your breeding protocol including information regarding separation of mother and young, use of cameras, etc.

Since the Brazilian Merganser is monogamous and territorial, with both parents involved in rearing chicks, SHBP will follow the protocols in "Protocol for the Maintenance and Management of the Brazilian Merganser (*Mergus octosetaceus*) under Human Care". This protocol has sections dedicated to Parent Rearing (page 17) and Hand Rearing (page 18). In addition, we have detailed below on how both Parent Rearing and Hand Rearing is done at SHBP, with considerations for mergansers.

The primary method of rearing juvenile mergansers will be parent rearing, i.e. allowing the pair to incubate and rear the ducklings naturally. Hand rearing, i.e. taking the eggs prior to hatch and rearing them away from the parents, will only be performed when necessary. Necessary scenarios include, failing health of a parent, death of a parent, and weather events that would affect the viability of the eggs/offpsring. Both parent rearing and hand rearing have been done successfully

at Zooparque Itatiba, with individuals from each cohort going on to successfully breed. Due to their territorial behavior, its fundamental to keep only one pair of mergansers in each aviary. All Brazilian Mergansers will be kept fully winged.

When parent rearing, staff will supplement the pelleted diet with small live fish (2-3cm in length) 5x a day for the first 30 days. After 30 days, larger fish (~5cm) will be used, and the supplemental feedings will be reduced as the ducklings wean on to the pelleted diet. After 6 months of age, the adolescent birds can be removed from the parents as it would naturally occur in the wild. As with all parent rearing at SHBP, pairs will be set up for success and monitored closely for any signs of concern.

For hand rearing protocols, the following paragraphs have been adapted from SHBP's avian husbandry manual. In addition, relative parts especially related to mergansers have been expanded.

If a decision is made to hand-raise the young, cleanliness of the rearing room (or duckery) is an important aspect of maintaining a healthy group of hatchlings. All brooders (rearing units) are cleaned daily. Every third day, brooders are disinfected with Tetrol. To combat potential disease, such as aspergillosis (*Aspergillus fumigatus*), all interior surfaces are made of an imperviable material (high-density polyethylene and epoxy). Steel sinks and a hot water supply are used for cleaning food pans.

At SHBP, during the first week of duckling's life, a brood of hatchlings are dried in a warm air fan unit (referred to at SHBP as the "fluffer-upper") and then taken from the incubator room to the SHBP's Little Duckery, where they are first presented to water in a small "dry" brooder. This small rearing unit (approximately 2 feet wide x 3 feet long) has a wire floor (1/2-inch mesh or "hardware cloth") leading to the back of the unit which uses indoor/outdoor carpeting as a mat measuring 6 inches wide x 2 feet long and is changed daily. This type of matting can be machine-washed or sprayed with a power hose and dripped dried. The food and water are on the wire mesh in the front, while the lamp hangs over the matting in the back (which prevents the food and water from getting too hot). A running (trickling) water supply is piped to each unit; this encourages birds to feed (ducklings won't eat unless they can also drink) and ensures continuous fresh water. There is a small bowl filled with marbles to which the water slowly drips in from above on a constant basis, allowing the hatchlings to drink without getting overly wet.

The temperature of the rearing unit (under the heat bulb) is 29º- 32ºC (84 - 89ºF) for the first few days. Warmth, in addition to fresh water, palatable food and a clean environment are all important to hatchling survival during the first weeks.

Offering water directly after hatching is particularly vital. Food is not as important the first 24 hours, but SHBP does give food right away. For the first week, SHBP uses a starter crumble (Chick Starter/Grower from Mazuri containing 18% protein). Diced hard-boiled sprinkled on top is given twice per day in a small, shallow dish. The hard-boiled egg (with the shell) is ground up with a hand grinder and is added for the first few days.

After a week to ten days, the dry brooder is transformed into a wet brooder by removing the wire grid floor, allowing a small pond to form in the front of the unit. The floor of the unit is constructed with a 22º slope, allowing the young birds to easily access water.

A standpipe controls the water level. Initially a small standpipe is inserted, so they are exposed to very shallow water. After a few days, SHBP increases the pond depth by inserting a larger standpipe (so that the floor of the unit is about half filled with water) allowing the birds to swim and become waterproof. The birds continue to receive starter crumble containing 18% protein. The birds remain in this situation for about another week or so–until they are growing well and don't require much heat. At that point, they are moved to SHBP's Big Duckery.

The Big Duckery is a combination of indoor and outdoor rearing units. Indoor (medium-sized) ponds are connected to outdoor (large-sized) ponds. A connector door can be closed or opened to allow the birds access to the outside pond when they are physically ready to get their first taste of weather, sounds and other sensations of the outside world. Making sure the birds receive adequate sunshine is very important in the rearing process. The indoor ponds have a maximum slope of 33 degrees and a heat lamp is available within each unit.

At this stage the birds receive a lower protein crumble (Mazuri Chick Grower containing 16% protein). The Big Duckery is cleaned daily, and every third day is disinfected with Tetrol.

Birds stay in the Big Duckery until they are well-feathered into adolescence.

10d. How your breeding stock is managed to maintain genetic vitality, including:

i. Avoidance of inbreeding and considerations of average kinship

Since the first wild collections in Brazil in 2014, the studbook has been managed as a pedigree using PMx software. Using this software, average kinship can be assumed for each bird based on its relationship to each founder. Founders from the same wild pair are treated as siblings, even if eggs have been collected across multiple years (it is important to note that only 1-2 eggs are removed from a nest during wild collections and this activity is heavily managed by ICMbio. Pairs are set up based on average kinship. SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship. The ten birds we are requesting to import have the following pair recommendations through the studbook:

Pair 1: Male 74 and Female 90
Pair 2: Male 67 and Female 58
Pair 3: Male 91 and Female 77
Pair 4: Male 94 and Female 80
Pair 5: Male 95 and Female 46

ii. Differences in paternal and maternal average blood relationships/relatedness

Since pairs will be set up separately, with no chance of extra pair copulation, there is no differences in paternal and maternal average blood relatedness. The only exception would be differences in the sex chromosomes and mitochondrial DNA; however, this is true for all birds. In avian sex chromosomes, males are ZZ and females are ZW. This means the W sex chromosome and mitochondrial DNA would only be maternally inherited, and the Z chromosome would only be inherited paternally by daughters. This difference would not influence any current management decisions for Brazilian Mergansers.

To date, there has been no issues with inbreeding on reproductive success at ZooParque Itatiba. Since the wild population is extremely small, deleterious affects from inbreeding is a concern that must be monitored. SHBP will communicate any concerns such as hatch abnormalities, small clutch size, reduced fertility, short lifespan, etc. to the International Studbook so that inbreeding affects can be monitored.

iii. Carrying capacity of your facility

SHBP has a target adult population of 20 mergansers, which includes 5 breeding pairs (5.5.0) and 5 reserve pairs (5.5.0). In addition, SHBP can hold 0.0.20 adolescent mergansers in four groups for a total carrying capacity of 40 individuals (10.10.20).

SHBP plans on initially maintaining the 5 breeding pairs in aviaries constructed in 2024 specifically for large mergansers and based on the designs of Zooparque Itatiba's merganser aviaries and with the guidance of the Protocol for the Maintenance and Management of the Brazilian Merganser Under Human Care.

iv. Disposition of progeny

Once SHBP successfully breeds Brazilian Mergansers and with the guidance of the Brazilian Merganser Conservation Program and Studbook, SHBP plans to send out birds to other suitable facilities such as the Fort Worth Zoo, Pinola Conservancy, and Dry Creek Waterfowl. SHBP will only send out mergansers to facilities that have been approved by the international studbook and follow the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol). In addition to the three facilities identified, SHBP will work with other facilities (AZA, ZAA, and qualified private) to grow the population within North America. Any facility that receives birds from SHBP will have to complete the same application through the Brazilian Merganser Studbook. Since the 10 birds we are requesting to import are to serve as the foundation of a contingency population for the program, it will be important to maintain the vitality of the North American population.

12. Provide copies of or cite any species-specific care/husbandry manuals, protocols, or guidelines that are used at the facility.

In addition to the Protocol for Management and Maintenance of the Brazilian Merganser Under Human Care (Brazilian_Merganser_Protocol), SHBP has a number of standard operating procedures (SOPs) that all staff are trained on. The SOPs that are relevant to the 10 mergansers we are requesting to import are:

Enclosure Cleaning (Cleaning_SOP):

> Clean habitats are necessary for good avian welfare. By keeping enclosures cleaned and disinfected regularly, we can provide birds with an environment that is free of debris, bacteria, and illnesses.

Diet and Nutrition (Diet_SOP):

> A diet is considered nutritionally balanced when it provides appropriate levels of known dietary essential nutrients based on current knowledge and information. Nutritional status, natural feeding ecology, and nutrients in the diet of free-ranging individuals are taken into consideration.

Enrichment and Wellness Program (Enrichment_SOP):

> The goal of the Enrichment Program at SHBP is to improve and enhance the overall life experience for the birds in our care by better replicating a naturalistic environment and providing opportunities for the birds to exhibit species-typical behaviors. Enrichment opportunities are based on both species-specific ecology and individual history. SHBP recognizes that a successful enrichment program is only one part of providing a successful welfare and husbandry program for the birds in our care. The enrichment program is subject to regular internal review and modification based on relevant information, current research, and industry standards.

Routine Health Care (Routine_Health_SOP):

> The purpose of this SOP is to outline the procedures used to monitor health and wellbeing of collection birds at SHBP. SHBP is dedicated to providing exceptional welfare to all birds. All aspects of bird health are integrated into the overall management including visual observations, behavior and training strategies, routine husbandry, nutrition, exhibit design, preventative care, and treating emergencies, illness, and injuries.

Capture and Restraint (Capture_SOP):

The purpose of this SOP is to provide standard capture and restraint techniques to ensure physical safety to the bird and/or staff involved while also mitigating undo stress to the bird at SHBP. At times, manually restraining a bird may be necessary to ensure its health and well-being. These procedures limit some or all the animal's normal voluntary movement. There are times when animals are restrained for reasons that may include examination, collection of samples, drug administration, physical therapy, coping, medical emergencies, or to apply ID equipment.

Transportation (Transportation_SOP):

This SOP provides the procedures and standards to ensure birds' safety and comfort while being transported. Transportation of birds can occur when transferring birds to a new facility, receiving birds from another facility, traveling for a program, heading to and from a veterinarian's office, or being moved between enclosures.

13. Describe the facility's record keeping.

SHBP uses the animal management software Species360 Zoological Information Management System (ZIMS). Through this system, SHBP staff can track individual and flock health, movements, reproduction, etc. while integrating enrichment, exhibit/aviary maintenance, and daily husbandry/cleaning. SHBP employs a part time registrar (16hrs/week) who is the primary individual responsible for maintaining records. Husbandry staff are required to log their observations, husbandry, health concerns, etc. in a digital daily log that is then transferred to ZIMS via SHBP's registrar. Senior staff can also transfer/edit the digital daily log into ZIMS, but for the purpose of data integrity, only senior staff and the registrar can make edits into ZIMS. The daily digital log also serves as a backup for ZIMS. Using ZIMS, SHBP can quickly record and access information for any bird within the collection including hatch date, medical history, current medical issues, current aviary location, aviary movements within SHBP, reproductive history, exhibit maintenance, husbandry routine changes, and enrichment notes.

15. Current inventory of species or similar species at the facility (males.females.unknown).

In 2019, SHBP made the decision to reduce working with the northern large members of Mergus (*Mergus merganser, Mergus squamatus, and Mergus serrator*). This decision was made primarily due to difficulty these species had during the summer months in eastern North Carolina. Despite well water at 55 Fahrenheit and shade cloth, these species had difficulty during North Carolina summers, especially if they molt early while temperatures are still high (July-August). Molt was particularly hard for males as they have more complex plumage than females. This will not be the case for the tropical Brazilian Merganser since the species are used to a climate very similar to

eastern North Carolina. In addition, Brazilian Mergansers are monotypic, with males and females having the same plumage, meaning the males do not have a complex plumage to molt during the summer months.

Current inventory of similar species:

Chinese Merganser (*Mergus squamatus*) 2.0.0

Hooded Merganser (*Lophodytes cucullatus*) 21.26.1

Smew (*Mergellus albellus*) 8.8.0

Bufflehead (*Bucephala albeola*) 3.4.0

Harlequin (*Histrionicus histrionicus*) 10.6.0

16. Number of years the species or similar species has been maintained at the facility.

American Merganser (*Mergus Merganser)*1986 – 2023, 37 years

Chinese Merganser (*Mergus squamatus*) 2010 – 2025, 15 years

Red-breasted Merganser (*Mergus serrator*) 2005 – 2019, 14 years

Hooded Merganser (*Lophodytes cucullatus*) 1985 – 2025, 38 years

Smew (*Mergellus albellus*) 1986 – 2025, 37 years

Bufflehead (*Bucephala albeola*) 1986 – 2025, 37 years

Harlequin (*Histrionicus histrionicus*) 1991 – 2025, 34 years

17. Number of hatches by species or similar species per year over the last 5 years.

Hooded Merganser (*Lophodytes cucullatus*) 127

Smew (*Mergellus albellus*) 27

Bufflehead (*Bucephala albeola*) 8

Harlequin (*Histrionicus histrionicus*) 12

18. Number of mortalities by species or similar species per year over the last 5 years and steps taken to avoid, decrease, or mitigate such mortalities.

The following numbers includes juveniles, breeding age adults, and geriatric birds. The responses to avoid, decrease, or mitigate mortalities are focused on breeding age adults where attrition is unexpected. Juvenile losses are noted if there was more than expected loss (occasional loss due to failure to thrive is typical in rearing birds).

American Merganser (*Mergus Merganser)* 3.3.0

> As mentioned in the first part of question 15, SHBP made the decision to reduce working with this species due to the issues they had with molt during the summer. These birds were older adults.

Chinese Merganser (*Mergus squamatus*) 5.6.0

> As mentioned in the first part of question 15, SHBP made the decision to reduce working with this species due to the issues they had with molt during the summer. Avian TB infections in several adults also caused SHBP to no longer keep this species in its larger, mixed species, natural pond aviaries.

Hooded Merganser (*Lophodytes cucullatus*) 14.15.0

> Due to the larger number of Hooded Mergansers bred at SHBP, we attribute some of the mortalities to younger birds failing to thrive. Attrition in adults typically is attributed to Avian TB infections. SHBP no longer keeps Hooded Mergansers in several of the facilities larger, mixed species, natural pond aviaries due to increased Avian TB infections for Hooded Mergansers in these spaces.

Smew (*Mergellus albellus*) 7.16.0

> SHBP has modified its rearing for Smew to include a double brooder with only 3-4 individuals. Smew seem particularly susceptible to stress during the first few months of life. In addition, breeding adults are no longer kept in groups during the breeding season. If kept in groups of 2.2.0 or 3.3.0, males would focus breeding attention on females who were not incubating. This would result in attrition of females if they were not incubating at the same time as the other females in the aviary (i.e. 3 males focusing on 1 female if 2 females were incubating).

Bufflehead (*Bucephala albeola*) 7.4.0

> Bufflehead are one of the smallest waterfowl species and do not do well in larger, mixed species aviaries until fully mature. Juveniles are kept in SHBP Big Duckery considerably longer than other species before moving to modified adolescent pens that are specific to less dominant birds. Males on occasion become extremely aggressive towards other males during the breeding season. These males are now pulled from breeding aviaries and given a “timeout” in a non-breeding aviary for several days. This time out is enough to break them out of their hyper aggressive behavior and be productive members of a breeding

group again. Generally, only one timeout is needed per season, for only a few of the more dominant males. SHBP staff are very careful to watch for this behavior and remove males prior to causing issues.

Harlequin (*Histrionicus histrionicus*) 2.1.0

Two birds succumbed to crop impactions due to white proso-millet (an enrichment food item). SHBP discontinued feeding its Harlequins millet for enrichment.

19. A detailed description, diagrams, and photos clearly depicting the existing facilities where the specimens will be maintained, including dimensions, type of construction materials, structures for the provision of food and water, climate conditions, and protective measures from the elements (e.g. direct sun, rain, snow).

SHBP is located in eastern North Carolina due to its abundance of water and warm climate. Even during our coldest months of January and February, staff very rarely have to provide heat sources to tropical species of waterfowl. The warm well water, planted windbreaks, and straw mats are more than enough to allow birds to thrive during our winters. For some species, SHBP provides short lean-tos with a heat lamp next to the water that are readily used. On occasion, during severe winter weather, SHBP converts its larger rearing aviaries ("Big Duckery") into wintering areas for some of the more delicate species of waterfowl (this is usually the small or long-legged species i.e. pygmy geese or tree ducks).

The five breeding aviaries at SHBP are 20ft wide by 36ft long by 9ft tall. There is a complete visual barrier between the aviaries so pairs cannot interact. SHBP uses well water on a continual flow through system and stays at 50 degrees Fahrenheit in both winter and summer. The aviaries are made from chain-link with a heavy nylon netted top. Each merganser aviary has a large pool that is 3ft deep with a sloped entry.

The aviculturists at ZooParque Itatiba believe that the Brazilian mergansers will not have an issue with eastern NC winters in the breeding aviaries, however the birds could be moved indoors during January and February if needed. Please see the photos in the original attached application (Part_E_Original).

21. Describe any plans for ongoing staff training with regard to safety, security, record keeping, or animal management.

All staff must annually review SHBP's Emergency Response Plan, SHBP's Program of Vet Care, SHBP's Husbandry Manual SOPs, and SHBP's Enrichment Program (lead staff update these documents as needed (~1x month) and they are located in the main office for staff to reference when needed). All new staff are required to review these documents with the Director of Aviculture.

Every 2 years, SHBP sponsors a First Aid and CPR training for all staff.

SHBP has monthly staff development seminars, with topics ranging from avian propagation, avian healthcare, horticulture, avian husbandry, etc. These typically last 1hr and include presentations from senior staff and guest speakers.

All husbandry staff are encouraged to become members of a professional organization of their choosing (SHBP covers one membership per staff per year), current organizations include Association of Zoos and Aquariums, Zoological Registrars Association, American Association of Zookeepers, the International Association of Avian Trainers and Educators, and the International Wild Waterfowl Association.

SHBP is home to the International Wild Waterfowl Association and initiated the Waterfowl Conservation Workshop in 2016 and 2018. Since then, workshops have been held in 2020 in the Netherlands, and 2024 in Seattle Washington, with the next workshop planned for 2026 in England. These workshops bring waterfowl professionals together to present on husbandry, breeding, veterinary care of waterfowl and SHBP always sends several staff members to participate.

22. Describe any plans for ongoing animal training with regard to husbandry behaviors (e.g crate or chute acclimation) or veterinary procedures (health exam or blood collection).

As with all animals in a captive breeding program, staff must balance the potential benefits of training verse the harm it could have on breeding efforts.

At SHBP, during daily husbandry staff use enrichment items (millet, mealworms, soldier fly larvae, fish, duckweed, etc.) to encourage birds on the water during the feed routine. This allows staff to view individuals up close while foraging and identify any abnormal behavior. Most waterfowl quickly become to expect these enrichment items and will meet husbandry staff near food stations each morning.

Once acclimated to this morning enrichment “roll call”, staff will work on the mergansers taking small fish that could contain medication. This has worked well with other species that have been kept in pairs at SHBP. Once staff know the routine and/or favorite food items of the pair, it is easy to include oral medication for one or both of the birds. This allows staff to provide certain medications without the stress of catching birds to administer them.

Staff are also interested in working on scale training mergansers and are working on wireless scales that would be permanent fixtures in the exhibit and incorporated into the feed station area.

Our training for veterinary procedures will be targeted at staff so that efficiency and safety is assured. Staff have already begun practice health checks on similar species (i.e. Hooded Mergansers, Harlequins, Chinese Mergansers) so that we can be efficient during future health checks or procedures involving the mergansers. This is targeted at reducing the amount of time mergansers are restrained, crated, under anesthesia, or outside their aviary. All of SHBPs veterinary care is outlined in its Program of Veterinary Care (Program_Vet_Care).

23. Describe how the dietary needs of the species will be met.

Most of the diet (~90%) for the 10 individuals we are requesting to import will be Mazuri Sea Duck Diet, which is an extruded, floating pellet formulated for growing, breeding, and adult sea ducks and diving duck species and contains fish meal. This is a nutritionally balanced complete diet that has been fed to the captive Brazilian Merganser at ZooParque Itatiba (due to shipping costs, the facility now uses a similar brand (Reino das Aves)). Live fish will be fed as enrichment and to promote feeding behavior in adolescent birds. Fish commercially available eastern North Carolina include Fathead Minnows (*Pimephales promelas*) and Shiners (*Notropis hudsonius*).

24. Describe how the facility addresses the social well-being and behavior of the species such as social grouping, methods of integrations, and appropriate social and behavioral enrichment.

Brazilian Mergansers are extremely territorial as adults, and do not tolerate other birds once a pair has established a territory. Pairs will tolerate their offspring for up to 5 months before it would be necessary to remove the juveniles from an adult pair. During the first 24 months, juveniles can be kept in small groups (2-10 individuals) provided they are given enough space.

The 5.5.0 birds we are requesting to import will be kept initially in two same sex groups through quarantine (5.0.0 and 0.5.0), as it was successfully done when ZooParque Itatiba sent 5.5.0 mergansers to Prague Zoo.

Once separated into pairs, the mergansers will be kept separately from other pairs.

Introductions will be supervised and only occur in the early morning so that staff have a full day to view the interactions between a male and a female. If there is any negative behavior (i.e. chasing), birds will be separated. If there are no positive behaviors observed in the first few days (i.e. lounging side by side), birds will be separated at night when staff are not present.

Enrichment for mergansers include mist nozzles, live fish, insects, ice, plants, and encouraging natural breeding behaviors.

25. Will this import affect the current specimens at the facility? Are there any planned transfers of specimens currently at facility? If so, provide detailed information regarding the transfer plans.

No Brazilian Merganser are at SHBP. None of the 10 individuals we are requesting to import will be transferred.

26. If accredited by a regional or national animal care organization, please identify the organization and provide proof of accreditation.

While SHBP does work with numerous Species Survival Programs and is a Conservation Sustainability Partner for the Association of Zoos and Aquariums (AZA), SHBP is not accredited.

27. Please provide copies of any State or Federal licenses to display, exhibit, or hold the species, as well as a copy of the most recent USDA APHIS inspection report.

SHBP would add Brazilian Mergansers to its endangered species license if we received permission from USFWS to import them. Most recent USDA inspection report is attached (USDA_Report).

Transport/Shipment of Animals

28. Transport conditions for live animals must comply with the CITES Guidelines for Transport of Live Animals. Please provide:

28a. Duration of the trip (including airline flights and ground transport).

Delta Flight 226 (DAL226/DL226)

GRU (Sao Paulo, Brazil) to JFK (New York, NY), flight time 9hr 43m

28b. The type, size, and construction of any shipping container

Per IATA regulations, Brazilian Mergansers are Type B Container 18. The containers will be constructed of wood and be 50cm long x 30cm high x 30cm (19.6in x 11.8in x 11.8in) wide per the Protocol for the Maintenance and Management of the Brazilian Merganser (Brazilian_Merganser_Protocol). Sides will be made with perforated hardboard, with a solid wood roof. Bedding will be wood shavings. Separate food and water containers will be inside the container and will be accessible for refilling. The water containers for ducks will be flanged to prevent spillage and will not be large enough to immerse their heads.

28c. The arrangements for watering or otherwise caring for the wildlife during transport

Per IATA regulations, the mergansers will not require additional feeding or watering since their anticipated trip is well under 24 hours however additional diet will be attached to each container.

28d. Will a veterinarian or animal keeper accompany the specimen and be able to provide any necessary care?

Since this is a direct flight from Sao Paulo, Brazil to New York, New York, SHBP does not plan on sending a staff member to accompany the shipment. Once the birds arrive at JFK, Mersant International will collect the birds and transport them through the APHIS inspection and delivery to the USDA quarantine facility outside JFK.

SHBP has an agreement from Chuck Cerbini, Curator of Ornithology at the Bronx Zoo to be available to inspect or assist the mergansers and Mersant if needed. Mr. Cerbini is located approximately 30 minutes from the quarantine station. Once the birds are released from their

USDA 30-day quarantine, SHBP staff (Dr. Dustin Foote) will be the one transporting the birds back to North Carolina via car.

If required, SHBP would send a staff member (Dr. Dustin Foote) to accompany the shipment, however we believe this is not necessary.

28e. CV or Resume of the individual arranging and/or conducting the transport of the specimens.

SHBP is using Mersant International, LTD to arrange the transport of the 10 mergansers from Sao Paulo to New York and through the JFK quarantine station. Mersant has over 30 years of experience moving exotic animals around the world and came highly recommended by the Bronx Zoo, San Diego Zoo, and Riverbanks Zoo. They are professional members of the Association of Zoos and Aquariums (AZA) and International Air Transport Association (IATA). While Mersant has agreed to arrange the transportation of the 10 mergansers we are requesting to import, they will not know which specific employee will be transporting the birds until closer to the importation (the date will only be determined once SHBP receives permission from USFWS to import the birds).

Regarding the responses you have provided, we have a few clarifying questions:

1. Although you have provided a letter from the Brazilian merganser studbook keeper, as the breeder's statement, it did not include the name and address of the facility where the parental stock is located. The studbook included some records of the parental stock but not all. Per question 5 of the application, please either provide a breeder's statement with the name and address of the facility where the parental stock is located or documentation such as records that provides this information.

Please see the attached letter (Studbook_Letter_Robert) that includes a breeder statement that the parental stock are also located onsite.

2. The letter confirms the intent to include your facility in the breeding program but also states the following: "To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Mendes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation."

3. Can you provide the signed documentation and any documentation you may have received in return confirming your participation in this breeding program? Is there a breeding loan agreement?

Please see the attached letter (Studbook_Letter_Robert) that confirms we have been accepted into the studbook and that the birds will be on loan from the Brazilian government and will remain their property.

4. In response to how your breeding stock is managed to maintain genetic vitality, you stated "SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship." We recognize that this question is included under 10.d. of the current application form so presumably, you will provide additional information in your response. However, we do want to note that the current response does not fully address our question. When you respond to question 10.d., please clarify how average kinship is determined (i.e., methods). Moreover, is there an evaluation of the genetic make-up of the current population and can you provide the breeding recommendations for the ten animals you will be receiving?

Please see the attached letter (Studbook_Letter_Robert) that includes the PMX software recommendations for the 10 birds we are requesting to import.

Please provide the information and documentation indicated. Any response must be in written form (this includes email).

PROTOCOL FOR THE MAINTENANCE AND MANAGEMENT OF THE BRAZILIAN MERGANSER (*Mergus octosetaceus*) UNDER HUMAN CARE

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July de 2022

Chapter I - Introduction

Introduction

Taxonomic classification

Phylum: Chordata
Class: Aves
Order: Anseriformes
Family: Anatidae
Genus and Species: *Mergus octosetaceus* Vieillot, 1817
Conservation Status: Critically Endangered (MMA, 2014);
Critially Endangered C2a(i) (IUCN, 2019).

General Information

There are seven species of mergansers found in the world, belonging to the family Anatidae. The Brazilian Merganser, *Mergus octosetaceus,* is among the rarest species of waterfowl in the world (Todd 1996). The species was even considered extinct after not been seen for almost 20 years and was rediscovered in 1948 (del Hoyo *et al*. 1992). It was native to Brazil, Paraguay and Argentina, but now it's believed that they are extinct in these last two countries, considering that the last report of individuals in Argentina was in 2002 and in Paraguay was in 1984 (Birdlife International 2018). Today there are records of its occurrence in regions nearby the State of Goias, at the Chapada dos Veadeiros National Park, at Minas Gerais inside the Serra da Canastra National Park, at Rio Novo, at Tocantins State in Jalapão State Park (Silveira *et al*. 2018).

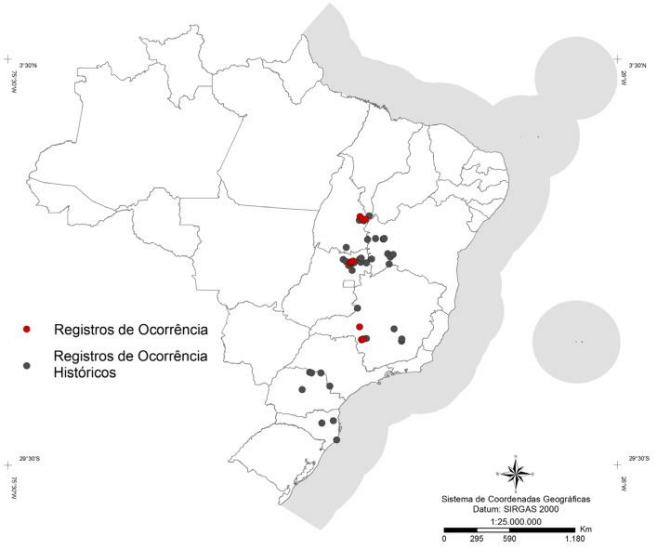

Image: Brazil Red Book of Threatened Species of Fauna – ICMBio.

The total estimated population in 1992 was thought to be 250 individuals, and current data support that the number of mature birds are still around the same, but further confirmation is necessary (Birdlife International 2018).

The Brazilian Merganser (*Mergus octosetaceus*) is the only surviving species of Mergini (Order Anseriformes) in the Southern Hemisphere. It is a locally and globally endangered species (Birdlife International 2018) and one of the most endangered waterfowl and it inhabits fast flowing and clean water rivers and streams, crossing subtropical and closed forest, surrounded by cerrado (tropical savanna) (del Hoyo *et al*. 1992; Birdlife International 2018). To feed, it usually scans the underwater surroundings from the surface and then it dives in to catch fish and aquatic macro invertebrates (Todd 1996). It is an extremely territorial bird and it's most believed that it remains on the same stretch of river once it's paired (Silveira *et al*. 2018). The size of the territory can be influenced by the amount of fish available, the number of rapids found along the river and by riparian vegetation (Birdlife International 2018).

The reproduction period starts before the raining season, and nests are made during June to October, in tree holes and in holes of riverbanks. The offspring may vary up from 6 to 8 ducklings, unlike other mergansers; the male provides extensive parental care. The young, on the first days of life, are fed by the parents. It is unknown where the ducklings go after leaving the parents (Todd 1996).

The species is very selective with its habitat, and that's because they need fast-flowing rivers with extremely clean water, with forests surrounding them. Gathering these factors with deforestation, mining, pollution, silting and ecotourism, such as the rafting and buoy-cross, leads to the decline of Brazilian merganser population (Silveira *et al*. 2018).

Ex situ history of the species

The Brazilian Merganser project began in 2006 on the initiative of Dr. Luís Fábio Silveira, who initiated negotiations with IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources). In 2011, after the creation of ICMBio (Chico Mendes Institute for Biodiversity Conservation), the project began to gain greater structure. After restructuring its objectives and actions, the Brazilian Merganser PAN (National Action Plan) was created, in partnership with the NGOs Terra Brasilis, Naturatins and CerVivo, and the Museum of Zoology of the University of São Paulo. The Poços de Caldas Scientific and Conservation Breeding Center also joined the project and, later, so did the Piracema Conservation Reserve. The main objective of the project is to permanently ensure the maintenance of *ex situ* Brazilian Merganser populations in the medium and long term, stimulate population growth.

The *ex situ* maintenance of the Brazilian Merganser is essential for the conservation of the species. Maintenance under human care allows the compilation of new data and information, enabling the creation of management models aimed at the *ex sit*u conservation of the species and helping in the recovery of its conservation status. The maintenance of *ex situ* populations serves as genetic backup and these populations are of fundamental importance to work as re-stocking for future releases and reintroductions.

The maintenance of *Mergus octosetaceus* in captivity began in 2011 with the first collection of eggs in the Serra da Canastra National Park, in the State of Minas Gerais. The eggs were sent to the Scientific and Cultural Breeding Center of Poços de Caldas-MG, where they hatched and the first ducklings were kept. New collections in nature were

carried out to continue the project, all of them following the Egg Collection Protocol developed by PAN. The eggs from these collections were sent to Zooparque Itatiba and, in 2016, the zoo became the headquarters of the *ex situ* program.

The first reproduction of *Mergus octosetaceus* in captivity took place at Zooparque Itatiba in 2017, with the birth of 4 ducklings through artificial breeding, being the first Brazilian Mergansers born in captivity in history. In 2018, 4 more ducklings were born in Zooparque. However, this time the eggs were incubated by the mother and the ducklings were raised by the parents themselves. This reproduction was extremely important for the project, as it shows that birds, even born in captivity, maintain the innate ability to care for their young, indicating a promising future for the reintroduction project.

The *ex situ* Brazilian Merganser conservation program is extremely important for maintaining a population that will serve as genetic backup and re-stocking for future releases and reintroductions. In this way, it was necessary to develop this document, the Protocol for Management and Maintenance of the Brazilian Merganser (*Mergus octosetaceus*) Under Human Care, so that all institutions that participate in the project have access to information on the proper way to care for the species.

Objectives

This Protocol was prepared with the following objectives:

• Guide the institutions that will receive this species about the appropriate conditions for its maintenance and handling under human care;

• Standardize all care techniques for these animals;

• Establish techniques that will provide an adequate and safe environment for the birds, contributing to the well-being of the species;

• Enable appropriate techniques for reproductive management;

• Enable the maintenance of an *ex situ* Brazilian Merganser population as part of the *ex situ* Program enabling future reintroductions.

Training and evaluation

Institutions that show interest in participating in the *ex situ* project for the conservation of the Brazilian Merganser and in the *Studbook* must adapt to the structural conditions and follow the staff training mentioned in the Protocol, complying with the items in this document.

The *Studbook* is part of a technical cooperation agreement established between the Association of Zoos and Aquariums of Brazil (AZAB), Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Ministry of the Environment (MMA) aimed at the conservation of 25 Brazilian native species. The *studbook keeper* and person

responsible for the *Studbook* is Robert Frank Kooij, partner-director of Zooparque Itatiba, assisted by Camila Piovani, biologist responsible for the *ex situ* program at Zooparque Itatiba.

Before a new institution receives this species under its care, it is important that it has an employee available especially for the care of Brazilian Mergansers. It is essential and of extreme importance that this professional already has experience with the management of waterfowl and, mainly, in the maintenance and reproduction of Anatidae.

This professional must go through a special training in Zooparque Itatiba for a period of one month. During this month it will be possible to learn the routine of handling the animals and also about the behavior of the species. Therefore, it is preferable that training takes place during the reproductive period of mergansers.

To ensure that all institutions are following all the items mentioned in this document and are capable of handling the species, it will be necessary that each one receives a visit from a representative of Zooparque Itatiba, the only institution in the world that keeps the Brazilian Merganser under its care and who developed the *ex situ* management strategies. Such training is essential to ensure that the new institution is fully capable of handling the species.

If, during the training, it is assessed that the institution does not yet have the physical structure or adequate trained staff to receive the animals, the transfer cannot be carried out. Only after complying with the appropriate measures of adequacy and proving them, the institution will be able to receive the animals.

Animal exhibition

As the *Ex situ* Reproduction Program is part of the Merganser PAN, all birds of this species must be housed in aviaries outside the public exhibition area. In accordance with the PAN, some individuals were authorized to be in exhibition at Zooparque Itatiba with the goal of working with the institution's environmental education department. However, it is only possible to work with the exposure of individuals that are not breeding pairs and are not part of the group capable of reproduction (according to the guidelines of the *studbook*). Therefore, to date, Zooparque Itatiba does not have any individuals on display. If a new institution starts working with the species, it must meet the same parameters as above, and it is not possible to have animals on display at the first moment.

Chapter II - Maintenance of adult birds

Reproduction aviaries

The Brazilian merganser is a monogamous bird and for that reason they are extremly territorial once they have paired up. The breeding pair doesn´t accept any other Brazilian mergansers or even other species of waterfowl in the same aviary. If so, it will get aggressive, attack the other bird and will fight until death. Because of this type of territorial behaviour it´s fundamental to keep only one pair of mergansers in each aviary.

The birds need be kept fully winged so for that reason it needs to be kept in an aviary, an aviary strong enough designed against any kind of extrem weather forcast and predators (Images 1,2,3 and 4).

Image 1 – Overview of the *ex situ* Reproduction Sector at Zooparque Itatiba

Image 2 – Side view of the *ex situ* Reproduction Sector at Zooparque Itatiba

Image 3 – Side view of the aviaries

Image 4 – Detail on the electric fence to protect the ducks in the aviary

The ideal design for a reproduction aviary is a long shaped one with at least 90m2, for example: 15 m long x 6 m wide x 4 m high, with all sides built on a 0.8 m high masonry wall, 50 above ground level and 30cm below, with galvanized welded mesh to complete it. To achieve a higher safety level against pest animals, it needs to be a closed aviary with the use of galvanized welded mesh all around and on top of the aviary with a 10 mm x 10 mm mesh (Image 5). It´s important that there is a complete visual berrier between the aviaries, avoiding that one breeding pair would see the other. At Zooparque Itatiba, a thick canvas is attached to the screen that divides the enclosures, as can be seen in Images 6 and 7. For security measures, the aviaries must have a security aisle, which will give access to the enclosure through a side door. Through this aisle, the staff will have access both to the aviary and to the holding area, which will allow them to monitor the animals and preventing the animals from escaping when opening the door. Removable visual barriers made of a natural brazilian product called 'Piaçava' are also used between the enclosures and the security aisle. It´s used to make sure that the birds will feel secure and won´t feel disturbt by whoever passes by the aisle. Other materials can be used, such as camouflage nets (Image 8).

Image 5 – Detail of the screen with a 10mm x 10mm mesh.

Image 6 – Division between enclosures with complete visual barrier.

Image 7 – Division between enclosures with complete visual barrier.

Image 8 – Security corridor with visual barrier.

Nests

Most *in situ* nests are in tree trunks and high riverbanks. Two wooden nests should be used in each enclosure, one lower and the other higher of the ground. Always close to the water (Images 9 to 14). Remembering that all nests must have an inspection door, always on the opposite side to the bird's entrance, so that we can monitor and collect eggs. The nests are standardized and follow the model found in Image 15. Even if waterfowl present the behavior of plucking down to line the nest, substrate should be placed inside it. It is best to use woodchips as a substrate.

Image 9 – Arrangement of the artificial nests in the aviary, one placed on lower ground and close to the water and the other higher up.

Image 10 – Higher nest, with access perch to the entrance.

Image 11 – Higher nest

Image 12 – Lower nest, on the edge of the pond.

Image 12 – Lower nest, on the edge of the pond.

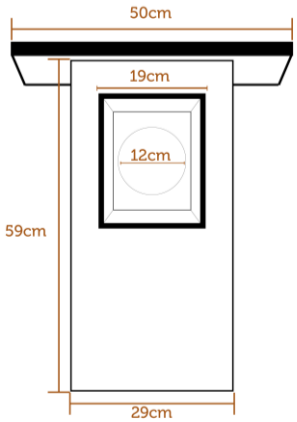

Image 14 – Nest box model with measurements – front view.

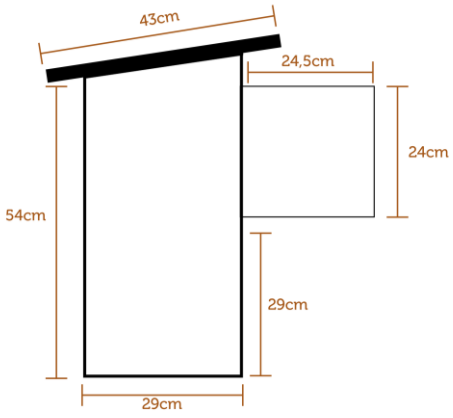

Image 15 – Nest box model with measurements – side view.

Ponds, vegetation and natural decoration

It is suggested that the enclosure includes a 10 m² pond with rocks and logs on the edges and a source of running water. The pond is important for the ducks to be able to maintain the natural behavior of aquatic species and fishing behavior. The water needs to come from a clean, pollutant-free source, such as an artesian well.

Considering that in nature mergansers spend a lot of time resting on riverbanks during the day, it is important to place rocks on the banks of the ponds and logs of various diameters, positioned close to the water, to mimic the natural habitat. The arrangement of thick trunks as high perches is interesting and can be used, however they should not be positioned close to the side screens of the enclosures (Images 16 to 19).

The vegetation in the aviary should preferably be low, considering that the bird needs an open area for flying. Therefore, the ideal is to use bushes, low plants and small trees. This vegetation is very important as it will also serve as a vanishing point and natural shading for the animals (Images 20 to 23).

Image 16 – Example of a trunk

Image 17 – Example of vegetation in the enclosure.

Image 18 – Example of the decoration and possitions of the nests

Image 19 – Example of the position of the trunk in the enclosure.

Image 20 – Example of vegetation in the enclosure.

Image 21 – Example of vegetation in the enclosure.

Image 22 – Example of vegetation in the enclosure.

Image 23 – Example of vegetation in the enclosure.

It is necessary to check the direction and intensity of the wind in order to protect the aviary, if necessary. The luminosity needs to be similar to that of the natural environment of the species, for this natural shading is used with natural trees and artificial shading with double strips of shadow net, offering points of shadows. To adapt to the local climate, the use of artificial irrigation is suggested, if necessary. In places with a cold climate, it is recommended to cover the side screens with thermal protection (transparent plastic) during winter. The floor must be grass, with good drainage so that water does not accumulate with mud (Image 24).

Imagem 24 – Example of vegetation in the enclosure

Control and monitoring

All enclosures must be monitored by security cameras 24 hours a day. This remote monitoring is essential so that the team that cares for the animals can observe the birds without their presence interfering with the natural behavior of the species. The cameras are essential to monitor the behavior of the birds and ensure the safety of the bird (Images 24 and 25).

It is recommended the use of identification plates in the enclosures with the number of the aviary, the number of the bands of the individuals and the sex. Thus, whenever someone is in the security aisle, they will know which birds are in the enclosure, without having to access them. In addition, if the animals are transferred to another enclosure, the identification plates can be taken with the birds, for better population control.

It is important to highlight that it is always necessary to have an empty enclosure for immediate use to separate the bird. It is common for birds to fight, often even between individuals that have been paired for a long time. In these cases, the animals need to be separated immediately and housed in another enclosure until they can be brought together again. Therefore, if the institution houses more than one pair, it will be necessary to have more enclosures available to house the birds in an emergency situation.

Image 24 – Security camera

Image 25 – Remote monitoring of the mergansers.

Handling and transport

Mergus sp., when handled improperly, can present several problems such as reduced egg laying, increased rate of infertile eggs, injuries and even death. Therefore, it needs to be handled correctly.

The transfer of the animals (change of enclosure) should always be done in the coolest period of the day. In this way, it is recommended that the transfer be made in the morning, as in addition to the favorable climate, there will be more time to observe the animals throughout the day, avoiding the eve of holidays and weekends in places that receive visitation from the public. After transfering, perform intensive observation for the first few days to ensure that the animals have adapted well to the new enclosure.

Birds, must be transported in individual in closed boxes. It is recommended that the boxes have the following dimensions: 50 cm long x 30 cm high x 30 cm wide (Figure 26). It is important that the box has ventilation, but that it blocks the bird's view of the surroundings.

On long trips and in cases of air transport, boxes with a satisfactory size must be used to allow the movement of the bird. The ceiling must be lined internally with a foam, well fixed, to avoid injuries to the bird's head. The bottom can be lined with grass or woodchips, remembering never to use boxes with a smooth floor. It is preferable that the birds be transported at night or during hours with mild temperatures, always protected from the sun and wind (closed/air-conditioned vehicle), avoiding exposing the box to the sun, which can cause death due to excessive heat.

The travel schedule must be well planned, observing the recommendations of this protocol and the transport must be done in the shortest possible time. Before transportation, it is necessary to request specific licenses from IBAMA or the state environmental agency in advance.

Figure 26 – Transport box model.

Catching and handling

When physical restraining of the animal, it is recommended to catch the merganser with a catcher net of a size compatible with the size of the bird, made with resistant material (canvas, cloth, parachute nylon, rip-stop nylon) so that it does not get damaged during the operation and the animal is doesn´t get harmed.

Once in the net, the bird must be restrained, with two hands (image 27), keep it as short as possible and excessive force should not be applied when restraining the bird to avoid fractures, especially in the legs and wings. During restraint, the thoracic-abdominal region must be left free, as birds do not have a diaphragm, having a single coelomic cavity, they need to expand the thoracic-abdominal region to breathe and, if there is excessive compression, it may have a respiratory arrest (Image 27). In addition, birds that share the same enclosure must be released into the enclosure at the same time, avoiding fights between individuals due to hierarchy in the enclosure.

The entire procedure should be as brief as possible, reducing stress and avoiding respiratory and circulatory collapse. For this, it is recommended that handling the merganser should be carried out by an experienced person.

Image 27 – Holding the merganser

Food

Even without any previous experience with *ex situ* feeding of the species, all brazilian mergansers ducklings raised under human care were born well and it was possible to keep them in good conditions with a diet based on Brazilian Merganser pellets, from the brand Reino das Aves. After becaming adults, these individuals continued to receive the same feed and showed excellent development.

Due to the fact that this species has never been kept in an *ex situ* environment before, there is still no literature on its feeding in captivity. However, with this history of maintaining the first 10 individuals, it appears that it is possible to raise, maintain, reproduce the species with extruded pellets for Brazilian Mergansers. The protein in this pellets comes from fish, a factor that meets the nutritional requirements of the species.

The diet is offered in a stainless steel feeder, coated internally with cement, preventing the birds from turning over the bowls, preventing accidents and food waste. This material is easy to clean and does not add pathogenic agents to its material (Image 28). The bowl needs to be placed near the pond.

Lambari (*Astyanax* sp.) fingerlings up to 5 cm long are offered daily as supplement and environmental enrichment to stimulate fishing behavior, but it does not replace extruded feed.

Image 28 – Feeder

Pairs already separated in breeding aiviaries will receive a different diet during the breeding season. This variation, or nutritional shock, is a technique used to mimic the variation in food supply in nature, which directly impacts animal reproduction.

Through nutritional shock, it´s possible to cause variations in the basic elements of the diet, which will form, for example, fatty acids that are the basis of reproduction hormones, which triggers the hormonal cascade that induces the behavior and physiology of reproduction (Chart 1).

Every diet change must go through a transition period of at least one week. The bird is offered half of the portion of new food mixed with the old portion. As the days go by, the amount of the old food is gradually reduced, until 100% of the new feed is used.

UMIDADE (MÁX)	130,00 g/kg	VITAMINA B2 (MÍN)	11,25 mg/kg
PROTEÍNA BRUTA (MÍN)	320,00 g/kg	VITAMINA B6 (MÍN)	7,50 mg/kg
LISINA (MÍN)	21,00 g/kg	VITAMINA B12 (MÍN)	36,00 mcg/kg
METIONINA (MÍN)	8.000,00 mg/kg	NIACINA (MÍN)	50,00 mg/kg
EXTRATO ETÉREO (MÍN)	70,00 g/kg	ÁCIDO PANTOTÊNICO (MÍN)	13,50 mg/kg
FIBRA BRUTA (MÁX)	25,00 g/kg	ÁCIDO FÓLICO (MÍN)	1,00 mg/kg
MATÉRIA MINERAL (MÁX)	90,00 g/kg	BIOTINA (MÍN)	0,50 mg/kg
CÁLCIO (MÍN)	15,00 g/kg	COLINA (MÍN)	500,00 mg/kg
CALCIO (MÁX)	20,00 g/kg	VITAMINA C (MÍN)	50,00 mg/kg
FÓSFORO (MÍN)	10,00 g/kg	FERRO (MÍN)	50,00 mg/kg
VITAMINA A (MÍN)	30.000,00 UI/kg	COBRE (MÍN)	20,00 mg/kg
VITAMINA D (MÍN)	3.000,00 UI/kg	ZINCO (MÍN)	70,00 mg/kg
VITAMINA E (MÍN)	150,00 UI/kg	MANGANÊS (MÍN)	100,00 mg/kg
VITAMINA K (MÍN)	3,75 mg/kg	IODO (MÍN)	2,00 mg/kg
VITAMINA B1 (MÍN)	3,75 mg/kg	SELÊNIO (MÍN)	0,20 mg/kg

Table 1 – Table with nutritional values of the pellets for breeding Brazilian Mergansers from the brand Reino das Aves.

Individual marking

Animals that newly arrived from the wild will receive open rings with 11 mm diameter. On the other hand, birds born under human care will receive a 11 mm diameter closed rings between 25-30 days of life, following the dimensions already known and tested at the Zooparque. Below is a demonstrative drawing of the procedure for placing the closed ring (Image 29).

If the use of microchips is necessary, they must be implanted intramuscularly, respecting the manufacturer's standards, and will always be implanted in the pectoral muscles.

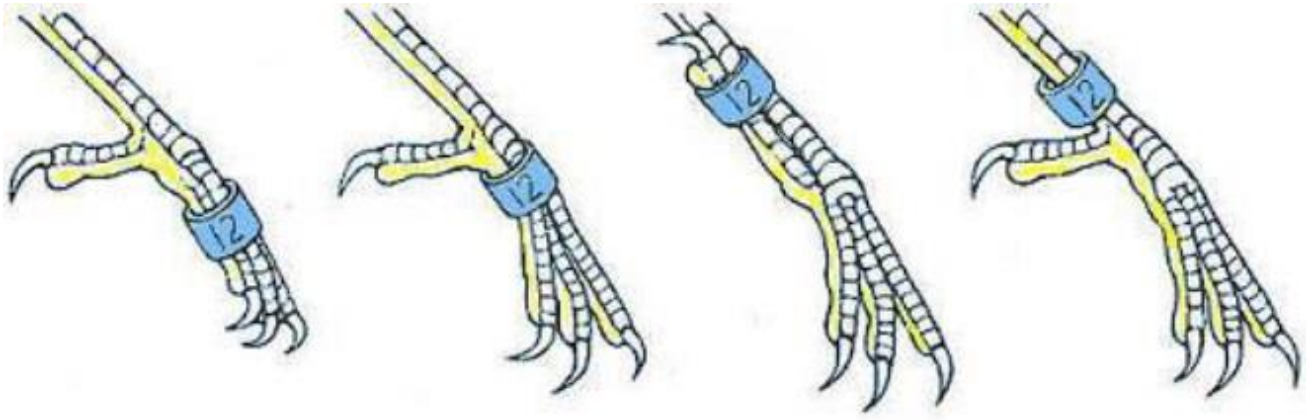

Image 29 – Demonstration of how the banding is done

Chapter III - Reproduction

Reproductive period

The *ex situ* Brazilian Merganser breeding season occurs annually from May to August.

The breeding group should already be formed about 60 to 90 days before the start of the breeding season. During this period observation must be carried out daily to assess the formation of the pairs and to separate them due to possible fights.

Parent rearing

Parental rearing is the most recommended technique for *ex situ* Brazilian Merganser reproduction. In this scenario, the female will be responsible for incubating of the eggs and, after hatching, the pair will be responsible for parente rearing.

The experience with the *ex situ* creation of Brazilian Merganser at Zooparque Itatiba has already shown that parental rearing is effective and highly advisable, even for pairs formed by adults who were created through artificial incubation (Images 30 to 32).

The ducklings of this species have great difficulties in eating by themselves in the first days of life, which is why parental care is so important. In this way, it is essential to pay attention if the parents are teaching the ducklings to feed properly and if they are well nourished. In this phase, lambari (*Astyanax* sp.) fingerlings of 2-4 cm in length must be offered every day so that the young can learn to fish and have a complete nutrition.

Figure 30 – Ducklings born in the nest with the parent.

Figure 31 – Ducklings in the pond.

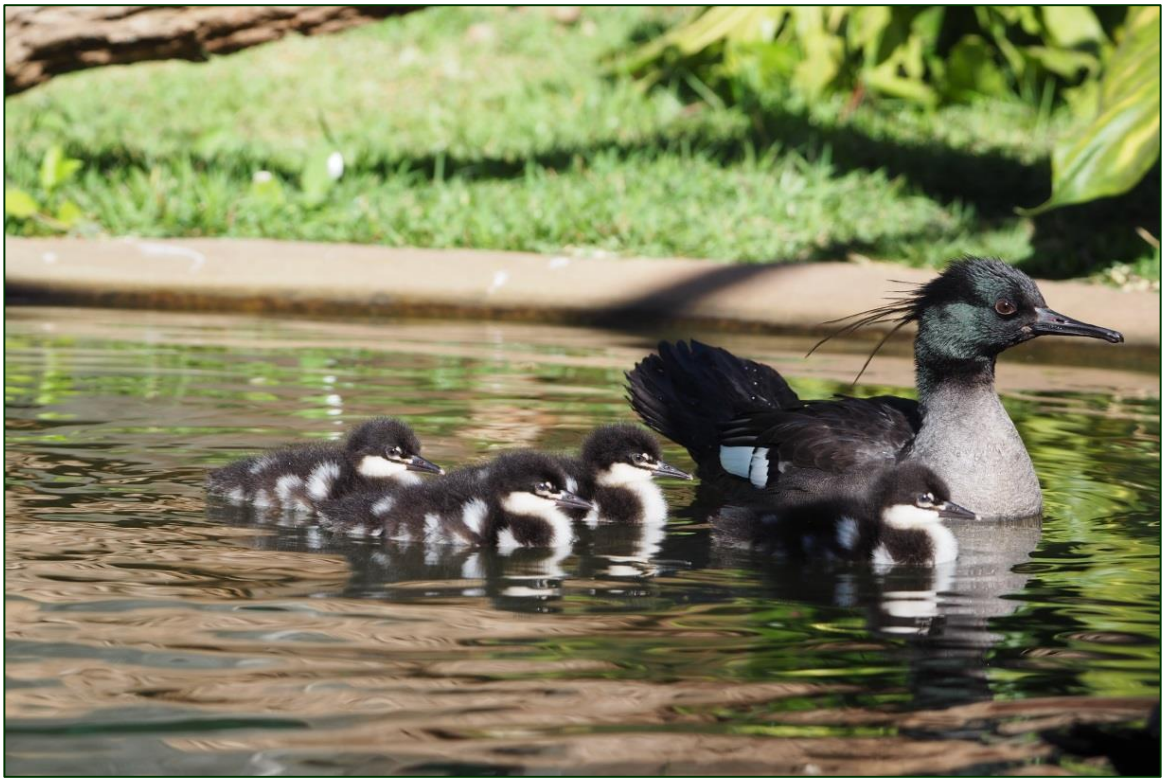

Figure 32 – Ducklings swimming in the water with their mother.

Hand rearing

The natural incubation of the eggs by the female is always recommended. Artificial incubation requires the presence of a trained team to carry out the work and should only be used when the adult female Merganser is not in a position to carry out the incubation, being highly discouraged for hatchlings born from pairs already kept in captivity. In situations where the female has laid eggs in different parts of the enclosure or is not incubating the eggs properly, artificial incubation may be necessary as a way to avoid the loss of possible fertile eggs.

In the case of eggs collected *in situ* and transferred to captivity, artificial incubation is necessary. This technique consists of incubating the eggs in an artificial incubator until hatching. The ideal incubation temperature used for the merganser Family is around 37.2°C, with a maximum humidity of 50%. Automatic rotation is maintained. The incubator used for the artificial incubation of the eggs is a HEKA, and must remain in a dark environment with the equipment´s light off (Image 33).

Ovoscopy should be performed almost every day during the incubation period to inspect all eggs (Image 34). This regularity in performing the procedure allows monitoring of embryonic development at all stages. Eggs that are not fertile and eggs that have suffered embryonic death must be removed from the incubator, avoiding contamination of other healthy eggs.

Image 33 – HEKA artificial incubator model

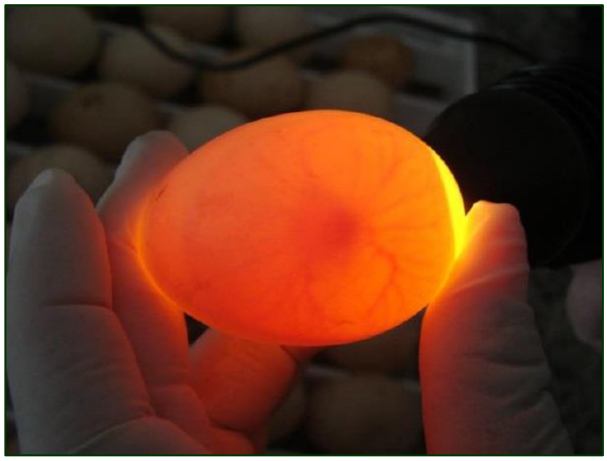

Image 34 – Embryonic development observed during ovoscopy.

Rearing box

After the hatching of the eggs in the incubator, the ducklings are transferred to an ICU to dry (Image 35), where they remain for 24 hours without feeding and water, a standard procedure for the bird to fully collect the yolk sac, avoiding infections. The ICU must be in a dark and silent environment, simulating the environment inside the nest, and preventing the ducklings to become agitated. It is also important to remember that, even if ducklings are raised by hand, the ideal is that they suffer as little as possible from imprinting. Therefore, the dark and silent place prevents them from being stimulated by people and sounds in the environment.

The next day they will be transferred to the “Rearing Box”, where they will remain for at least another 10 days. During this period, they are weighed daily for clinical control and daily weight gain control.

Image 35 – ICU

The great difficulty of hand rearing waterfowl ducklings is hypothermia. Ducklings have a natural behavior of looking for water sources to swim in the first days of life; however, at this age, the internal temperature regulatory system of birds is not yet able to ideally control the body temperature of these animals at 42ºC. Thus, in a closed

environment, the ducklings are not able to dry completely after getting wet and could get into a hypothermia, which leads the duckling to death quickly. On the first day in the rearing box, an artificial grass mat can be used below the heating, where the ducklings will settle, which will also avoid heat loss. It is important that the artificial grass is tall and soft. At this time, it is also important to provide the duckling with a shallow water reservoir, with constant water dripping, to encourage the animals to look for water for consumption. After the second day in the box, it is no longer necessary to use the mat.

The “Rearing Box” was developed precisely so that waterfowl ducklings could swim and dry themselves quickly (Images 36 to 38). When the duckling comes out of the water, it will look for warmth under the artificial mother (heating lamp), where there is a metal grid that dosen´t have contact with the water, allowing a quick drying.

The Rearing Box has the following measurements: Height: 52 cm, Width: 80 cm, Height: 60 cm, Length: 130 cm, Weight: 13 kg, Weight of the metal grid: 10 kg.

The Box for Artificial Breeding of Waterfowl consists of:

• 01 fiberglass box with two drains; (1).

• 01 support grid made of welded galvanized mesh; (2).

• 01 artificial brooder, which is a large hood with ceramic mouthpiece (3)

• 01 Ceramic resistance lamp 100 W, 22 v (4).

The brooder must be placed at a certain height that doesen´t allow the ducklings to have any physical contact with the lamp, which can cause burns due to the high temperature generated by the lamp. It is necessary to check that the ducklings are comfortable with the temperature, if the birds are cold, it is necessary to lower the height of the hood, and if they are hot, increase the height of the hood (Image 39).

The side of the box chosen to be used as a pool must receive constant water so that it can be changed, avoiding the accumulation of dirt such as food and feces. When the pool is completely filled, excess water will pass under the support grid, going to the drain. With this, the birds that are on the support grid do not have contact with the water (Images 40 and 41).

From 24 to 30 hours after the hatch, the ducklings will be allowed access to the pool area. However, although the ducklings have the choice between the dry and wet area, you will have to observe if the ducklings are drying themselves correctly. If they are continually getting wet or not drying off enough, it is necessary to cut the access to the water for some hours untill they are completely dry. Otherwise, they may suffer from a drop in body temperature, therefore, it is extremely important that the professional responsible for the care of the ducklings already has experience in raising Anatidae.

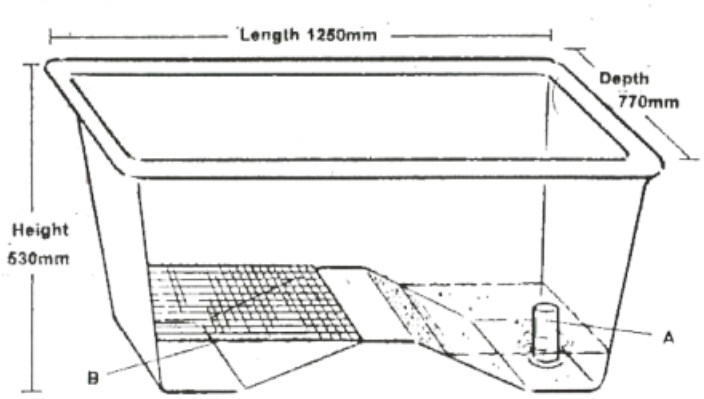

Image 36 – Illustrative drawing of the "Rearing Box" with measurements.

Image 37 – "Rearing Box".

Image 38 – "Rearing Box". 1 – Fiberglass Rearing Box; 2 – Wire mess support; 3 – Artificial brooder; 4 - Heating lamp.

Image 39 – Merganser duckling under the artificial mother in the rearing box.

Image 40 – Merganser ducklings swimming and feeding in the "Rearing Box".

Image 41 – Merganser ducklings

The ducklings are being fed after the first 24 hours of hatching. Feeding can be done either with the use of breeding pellets for Brazilian Merganser, or with the use of live fish fingerlings, up to 3 cm in length. Although rearing with both food sources is possible, fish-based feeding is highly recommended. In addition to faster development, the young fish dry easily due to the absence of fat present in the pellets, in addition to stimulating the natural behavior of the species, which tends to fish with its parents from the first day of life.

Ideally, the rearing box should be monitored by a 24-hour security camera. Remote monitoring is essential for controlling ducklings with as little human interference as possible. It is possible to control the behavior and feeding of the ducklings through the equipment.

Aviary for ducklings - “Nursery”

Ducklings around 10 days old should be transferred from the “Rearing Box” to larger outside enclosures. This change of environment is extremely important, as ducklings need sunlight for healthy development. Mergansers are territorial since they were young, so ducklings of similar ages should be placed together as soon as possible, and always with close observation to avoid fights. The “Nursery” should offer shelter with a heat source throughout the day. During the first 20 days in this environment, the ducklings must remain in the environment between 9:00 am and 3:00 pm, only on sunny days; and need to return to the “Rearing Box” for the overnight stay. After the first 20 days, all the ducklings can sleep closed in the aviary´s holding area (Image 42), always with adequate heating and covering on the floor for temperature control. It is necessary that the aviaries are connected by a security aisle, and through it is possible to access the holding area, using an observation window (Images 43 and 44).

The “Nursery” must have a security aisle, like any enclosure, and the following dimensions: 7 m long x 4 m wide x 2.5 m high. Masonry wall along the entire side, 0.5 m high and holding área of 2 m long x 1.5 m wide x 1.6 m high. It must have a pond, of around 2x2m and around 0.40m deep (Image 45). Enclosures with similar measures can be used, but only if they meet the needs of the animals and are accepted after inspection.

Image 42 – Nursery enclosure.

Image 43 – pond and setting of the “Nursery” enclosure.

Image 44 - Security aisle access window into the holding area

Image 45 – Security aisle

During the first 10 days that the ducklings are in the “nursery”, it is necessary to limit their access to the entire enclosure. As the area is large, you will need to force them to stay close to the water, preventing them from staying in places far from the pond and, consequently, not eating properly and not enough swimming, which is extremely importanty for their development. For this, a temporary barrier must be built and placed in the enclosure, with four walls of approximately 4 m wide X 0.4 m high, forming a square that will be maintained around the lake (Images 46 and 47). After 30 days, the barrier can be removed, allowing the ducklings to have access to the entire enclosure area.

Picture 46 – Barriers inside the nursery grounds.

Picture 47 – Merganser ducklings inside the enclosure.

The ducklings will remain in this enclosure until they are fully grown, becoming young adults, between 4 to 5 months old. Some visual characteristics that help to determine this moment are the total loss of the down feathers, the total growth of the crest and the darkening of the feathers in the pectoral region. After this period, the birds must be transferred to the pairing enclosure.

Enclosure for adolescent birds

When the young birds already have good feathering, which usually occurs between 4 and 5 months, they should be transferred to a larger enclosure for natural pairing. However, to be able to add several Brazilian Mergansers in the same aviary, it is necessary to have a large enclosure with two or more ponds of water, so that there will be formation of hierarchical groups according to the selection made by the birds themselves and, consequently, the formation of pairs.

The size of this aviary will depend on the number of birds that will be placed together; however, we indicate that the larger the space, the better the result. In Zooparque, an aviary measuring 20 m long x 12 m wide x 3 m high is used, but enclosures with an approximate size of this can be used after approval during the inspection. The pond needs to be 25 m² in size and 0.6 m deep (Image 48). The size can vary, but the essential thing is that they have a large area for the animals. The enclosure is completely closed on the sides with galvanized mesh and sombrite on top and natural logs and rocks should be placed along the edge of the pond.

It is necessary to follow the guidelines in the *studbook* to pair the birds, in this way it is possible to be sure that the pairs will be formed by individuals from different regions.

Image 48 – Adolescent aviary for pairing the birds.

Chapter IV - Sanitary measures

Preventive medicine

As preventive measures, the following procedures must be adopted:

- Knowledge about the biology and management of the species;
- Daily observations, usually performed while cleaning and feeding;
- Perform clinical examinations on birds annually;
- Quarantine for receiving new birds;
- Performing coproparasitological exams every six months;
- Conducting periodic health examinations (every six months or annually);
- Avoid rearing birds of different species in the same enclosure;
- Carry out periodic cleaning and disinfection of the enclosures;
- Adequate cleaning and disinfection of equipment and fomites used in the breeding site;
- Adequate nutrition for each stage of life and potable water available;
- Training of people involved in maintenence of the birds;
- Constant veterinary medical assistance;
- Pest and vector control.

Quarantine

The institution must have a quarantine, which consists of a physical structure for the isolation of animals that have recently arrived at the site. Therefore, any animal that enters the establishment, whether young or adult, must be immediately isolated in this structure, both to prevent the spread of potential pathogens and to allow closer/accurate examination and treatment of individuals, as necessary.

During admission to quarantine, animals undergo a complete physical examination. At this time, the collection of suitable biological samples is carried out to run specific tests of sanitary importance, as shown below.

The suggested quarantine period is 30 days, unless symptoms are observed, which may require an extension of this period.

After checking the results, the appropriate measures will be taken and, after possible treatments, the tests are repeated. After verifying that there are no infectious agents or parasites present, the animals are ready to be released in their proper aviaries.

Isolation

The institution must have a physical structure that allows the isolation of mergansers, when they need to be removed for treatments. Usually the area used is an isolation room found in the institution's veterinary sector.

Methodology adopted for carrying out tests on birds as part of the preventive medicine program

All animals must undergo a complete anamnesis and physical examination, performed by a competent professional and all will have biological samples collected for standard examinations established below; if there is any specific suspicion, the veterinarian will request additional tests.

1- Exam: Bacteriological culture
Biological material to be collected: excreta.
Methodology: bacterial culture for bacteria isolation in selective broth medium.
If there is growth of pathogenic bacteria, an antibiogram will be performed to choose the most appropriate antibiotic.
Time interval: Every 6 months, or whenever there is suspicion.

2- Coproparasitological evaluation
Methodology: direct fresh microscopy examination and examination of fluctuation in saturated sodium chloride solution in optical microscopy at 100x and 400x.
Time interval: Every 6 months, or whenever endoparasitosis is suspected.

3- PCR test for: Mycoplasmosis (*Mycoplasma* spp. and *Mycoplasma gallisepticum*)
Methodology: molecular biology technique described by the OIE (2021).
Material: Oropharyngeal swab.
Methodology: molecular biology technique described by Meulemans et al. (2001).
Time interval: Every 6 months, or whenever there is suspicion.

4- PCR test for Avian Adenovirus (Adenoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Time interval: Every 6 months, or whenever there is suspicion.

5- PCR test or bacterial culture for Salmonellosis (*Salmonella* spp.)
Material: Serum, organs, excreta, cloacal swabs
Methodology: molecular biology technique, or bacterial culture for isolation of bacteria in selective broth described by OIE (2022).
Time interval: Every 6 months, or whenever there is suspicion.

6- PCR test or bacterial culture for Pasteurellosis or Avian Cholera (*Pasteurella multocida*)
Material: Blood, organs, excreta, cloacal swabs.

Methodology: molecular biology technique, or bacterial cultivation for bacterial isolation in selective broth described by OIE (2021).
Time interval: Every 6 months, or whenever there is suspicion.

Protocol of exams to be carried out during quarantine

The exams will be the same as those listed in item 10.4 plus the exams listed below:

PCR test for: Newcastle Disease (Paramyxoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Methodology: molecular biology technique described by the OIE (2021).

PCR test for: Avian Influenza (Orthomyxoviridae)
Material: Excreta, cloacal and oropharyngeal swabs.
Methodology: molecular biology technique described by the OIE (2021).

Percentages of birds to be examined in the Prophylactic Sanitary Protocol for the Maintenance of *Mergus octosetaceus*

In order to validate the protocol with a minimum number of reliable samples, which really represent the health condition of the flock, the following will be evaluated:

• Flock with 1 to 5 specimens: all specimens will be tested;

• Flock with 6 to 20 specimens: exams must be carried out in at least 50% of the population;

• Flock with 21 to 100 specimens: exams must be carried out in at least 30% of the population;

• Flock with more than 101 animals: tests must be carried out in at least 20% of the population.

Chapter V - Allocation of genetic material

Necropsy and disposal of carcasses

Necropsy consists of a careful post-mortem examination that assists in the clinical diagnosis and consists of the external and internal analysis of the body cavities and organs of a cadaver, in order to elucidate the cause of death or verify the extent and nature of the injuries caused by illnesses. It must be performed as soon as possible or within 24 hours with the carcass kept under refrigeration (4°C to 8°C), to ensure the feasibility of complementary exams. During the examination samples may be collected for cytology, microbiology, serology, toxicology, parasitology and molecular biology.

Organs and tissues with lesions should be collected in 10% buffered formalin, and after three days of fixation in formalin, this should be replaced with 70º GL alcohol for feasibility of histology and immunohistochemistry exams. Necropsy and sample collection must be performed following the protocol described by Teixeira (2011), cosmetically as described by Goncalves and Salgado (2011) in order not to damage the carcasses.

Chapter V - Expense control

Maintenance costs

Like all species kept under human care, the Brazilian Merganser generates expenses for its maintenance and handling. However, this species has different life habits that need to be considered by the institution that will keep it under its care.

The feeding of the Brazilian Merganser in a captive environment is based on feed and live fish fingerlings. Because of this, in addition to the cost of purchasing these two dietary sources, a special structure is needed to keep the fish alive until the moment of consumption. Therefore, the institution needs to have a maintenance structure for these fingelings, forming a system with tanks, water pumps, water oxygenation and feeding of the fish. To keep this system operating, it is necessary to use additional water and energy, which will vary from institution to institution, according to the population of mergansers housed there.

The species also needs a running flow of clean water, so it is important that the institution has a plan for expenses with water consumption and filtering, if it is reused.

In addition, there is the cost of specialized labor. Hiring a person with experience in the care of anatids is essential for the care of Brazilian Mergansers, as the professional's experience will make all the difference to the success in handling the species.

Case study: Zooparque Itatiba

Zooparque Itatiba can serve as an example for new institutions that are interested in knowing the expenses with the maintenance of the species. For this, a survey was carried out considering the expenses that Zooparque had with the care of the Brazilian Merganser in the year 2021.

For this, we considered the number of 50 individuals, among ducklings, juveniles and adults. It is noteworthy that consumption in this institution is very high due to the large number of animals and that food consumption throughout the different stages of growth will vary from one individual to the other, therefore, average values will be presented to facilitate understanding.

As the main source of the diet, Brazilian Merganser pallets is used, produced by the company Reino das Aves. Each adult merganser consumes an average of 75g of feed per day. The bag contains 25kg of feed and costs approximately R$ 270.00 for breeding feed and R$ 180.00 for maintenance feed (the costs are subject to company readjustments). Considering the variation of the diet throughout the year, it is possible to consider that the approximate consumption of pellets for reproduction is used during six months of the year and maintenance is used in the other six months. In 2021, Zooparque Itatiba had a cost of approximately R$ 10.500,00 with food for the Brazilian Merganser.

The consumption of live fish varies throughout the year, being higher during the reproductive period. This is due to the fact that the pairs consume more fish to help with reproduction and also because the young consume a very high number of fingerlings, wich is their main food source in the first months, until the diet is adjusted for feed consumption. Each adult individual consumes an average of 20 fish per day, while the young have varied consumption, and in the growth phase they reach consumption of approximately 130 fish per day. This value will decrease as the animal stabilizes its weight and the feed is added to the diet. In 2021, Zooparque Itatiba had a cost of approximately R$ 100.000,00 in fingerlings, including costs to feed the hatchlings, juveniles and adults.

In addition to costs on electricity to maintain the water pumping system and raise fish, in 2021 Zooparque purchased a water filtration system to avoid wasting this resource. The filtering system cost R$ 60.000,00 and can filter the water of the 17 aviaries in the institution's *ex situ* Reproduction Sector.

Other costs such as labor, energy, water and enclosure construction were not accounted for in this summary and will vary according to the plantel present in each institution.

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United States Department of Agriculture
Animal and Plant Health Inspection Service

Inspection Report

[redacted]

No non-compliant items were identified during this inspection.

This inspection and exit interview were conducted with the the Director of Aviculture and the Attending Veterinarian.

[redacted]

United States Department of Agriculture
Animal and Plant Health Inspection Servic

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

Count	Scientific Name	Common Name
000000	*Eudromia elegans*	ELEGANT CRESTED-TINAMOU
000001	*Casuarius casuarius*	SOUTHERN CASSOWARY / DOUBLE-WATTLED CASSOWARY
000001	*Dromaius novaehollandiae*	EMU
000001	*Alectura lathami*	AUSTRALIAN BRUSHTURKEY
000004	*Callipepla gambelii*	GAMBEL'S QUAIL
000009	*Rollulus rouloul*	CRESTED PARTRIDGE
000005	*Lophophorus impejanus*	HIMALAYAN MONAL
000002	*Lophura nycthemera*	SILVER PHEASANT
000001	*Lophura edwardsi*	EDWARDS'S PHEASANT / VIETNAM PHEASANT
000002	*Crossoptilon auritum*	BLUE EARED-PHEASANT
000002	*Phasianus colchicus*	RING-NECKED PHEASANT / COMMON PHEASANT
000002	*Chrysolophus amherstiae*	LADY AMHERST'S PHEASANT
000002	*Polyplectron bicalcaratum*	GRAY PEACOCK-PHEASANT
000001	*Chrysolophus pictus*	GOLDEN PHEASANT
000001	*Polyplectron inopinatum*	MOUNTAIN PEACOCK-PHEASANT / ROTHSCHILD'S PEACOCK-PHEASANT
000004	*Argusianus argus*	GREAT ARGUS
000004	*Pavo muticus*	GREEN PEAFOWL / INDONESIAN PEAFOWL / PEAHEN / PEACOCK
000004	*Chauna torquata*	SOUTHERN SCREAMER / CRESTED SCREAMER
000008	*Branta canadensis*	CANADA GOOSE
000008	*Dendrocygna arborea*	WEST INDIAN WHISTLING-DUCK
000048	*Dendrocygna autumnalis*	BLACK-BELLIED WHISTLING-DUCK
000015	*Dendrocygna arcuata*	WANDERING WHISTLING-DUCK
000038	*Dendrocygna bicolor*	FULVOUS WHISTLING-DUCK
000060	*Dendrocygna viduata*	WHITE-FACED WHISTLING-DUCK
000007	*Anser anser*	GRAYLAG GOOSE
000016	*Dendrocygna eytoni*	PLUMED WHISTLING-DUCK
000026	*Dendrocygna javanica*	LESSER WHISTLING-DUCK
000005	*Thalassornis leuconotus*	WHITE-BACKED DUCK
000017	*Anser caerulescens*	SNOW GOOSE
000002	*Anser canagicus*	EMPEROR GOOSE
000017	*Anser indicus*	BAR-HEADED GOOSE
000009	*Anser rossii*	ROSS'S GOOSE
000011	*Branta leucopsis*	BARNACLE GOOSE
000001	*Branta bernicla*	BRANT / BRANT GOOSE
000017	*Branta ruficollis*	RED-BREASTED GOOSE
000013	*Branta sandvicensis*	HAWAIIAN GOOSE / NE-NE
000010	*Cereopsis novaehollandiae*	CAPE BARREN GOOSE
000009	*Cygnus atratus*	BLACK SWAN
000010	*Cygnus melancoryphus*	BLACK-NECKED SWAN
000009	*Cygnus olor*	MUTE SWAN
000004	*Cygnus buccinator*	TRUMPETER SWAN
000024	*Stictonetta naevosa*	FRECKLED DUCK
000082	*Aix galericulata*	MANDARIN DUCK
000127	*Aix sponsa*	WOOD DUCK / CAROLINA DUCK
000013	*Amazonetta brasiliensis*	BRAZILIAN TEAL
000052	*Anas acuta*	NORTHERN PINTAIL
000021	*Anas luzonica*	PHILIPPINE DUCK

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

000058	*Anas bahamensis*	WHITE-CHEEKED PINTAIL
000024	*Anas flavirostris*	YELLOW-BILLED TEAL
000021	*Bucephala clangula*	COMMON GOLDENEYE
000030	*Callonetta leucophrys*	RINGED TEAL
000009	*Chenonetta jubata*	MANED DUCK / AUSTRALIAN WOOD DUCK
000041	*Anas bernieri*	BERNIER'S TEAL / MADAGASCAR TEAL
000015	*Anas capensis*	CAPE TEAL
000022	*Marmaronetta angustirostris*	MARBLED TEAL
000018	*Anas castanea*	CHESTNUT TEAL
000026	*Anas crecca*	GREEN-WINGED TEAL / COMMON TEAL
000037	*Anas georgica*	YELLOW-BILLED PINTAIL
000022	*Anas poecilorhyncha*	INDIAN SPOT-BILLED DUCK
000009	*Anas melleri*	MELLER'S DUCK
000006	*Anas platyrhynchos*	MALLARD
000031	*Anas rubripes*	AMERICAN BLACK DUCK
000021	*Histrionicus histrionicus*	HARLEQUIN DUCK
000006	*Anas undulata*	YELLOW-BILLED DUCK
000012	*Anas fulvigula*	MOTTLED DUCK
000036	*Aythya nyroca*	FERRUGINOUS DUCK
000017	*Anas laysanensis*	LAYSAN DUCK
000010	*Anas zonorhyncha*	EASTERN SPOT-BILLED DUCK
000022	*Aythya affinis*	LESSER SCAUP
000006	*Bucephala albeola*	BUFFLEHEAD
000014	*Chloephaga rubidiceps*	RUDDY-HEADED GOOSE
000030	*Aythya americana*	REDHEAD
000016	*Aythya australis*	HARDHEAD / WHITE-EYE
000013	*Aythya valisineria*	CANVASBACK
000011	*Aythya ferina*	COMMON POCHARD
000023	*Aythya fuligula*	TUFTED DUCK
000001	*Aythya marila*	GREATER SCAUP
000016	*Aythya novaeseelandiae*	NEW ZEALAND SCAUP
000008	*Cairina moschata*	MUSCOVY DUCK
000018	*Cyanochen cyanoptera*	BLUE-WINGED GOOSE
000012	*Oressochen melanopterus*	ANDEAN GOOSE
000000	*Mergus merganser*	COMMON MERGANSER
000010	*Malacorhynchus membranaceus*	PINK-EARED DUCK
000007	*Oressochen jubatus*	ORINOCO GOOSE
000013	*Netta erythrophthalma*	SOUTHERN POCHARD
000047	*Netta peposaca*	ROSY-BILLED POCHARD
000043	*Netta rufina*	RED-CRESTED POCHARD
000010	*Anseranas semipalmata*	MAGPIE GOOSE
000056	*Phoenicopterus ruber*	AMERICAN FLAMINGO
000004	*Chalcophaps indica*	ASIAN EMERALD DOVE / GREY-CAPPED EMERALD DOVE
000002	*Scopus umbretta*	HAMERKOP
000019	*Nettapus auritus*	AFRICAN PYGMY-GOOSE
000017	*Plectropterus gambensis*	SPUR-WINGED GOOSE
000010	*Tadorna variegata*	PARADISE SHELDUCK
000005	*Nettapus coromandelianus*	COTTON PYGMY-GOOSE / INDIAN PYGMY GOOSE
000013	*Tadorna tadorna*	COMMON SHELDUCK
000013	*Columba guinea*	SPECKLED PIGEON
000012	*Vanellus miles*	MASKED LAPWING

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

000001	*Pluvianus aegyptius*	EGYPTIAN PLOVER / CROCODILE-BIRD
000013	*Nettapus pulchellus*	GREEN PYGMY-GOOSE
000001	*Recurvirostra americana*	AMERICAN AVOCET
000034	*Calidris pugnax*	RUFF
000068	*Oxyura jamaicensis*	RUDDY DUCK
000002	*Asarcornis scutulata*	WHITE-WINGED DUCK
000008	*Oxyura maccoa*	MACCOA DUCK
000009	*Oxyura vittata*	LAKE DUCK
000007	*Pteronetta hartlaubii*	HARTLAUB'S DUCK
000015	*Mareca strepera*	GADWALL
000005	*Vanellus vanellus*	NORTHERN LAPWING
000009	*Polytelis anthopeplus*	REGENT PARROT
000004	*Copsychus malabaricus*	WHITE-RUMPED SHAMA
000010	*Sarkidiornis melanotos*	KNOB-BILLED DUCK / AFRICAN COMB DUCK
000004	*Anthropoides paradiseus*	BLUE CRANE / STANLEY CRANE
000003	*Himantopus himantopus*	BLACK-WINGED STILT
000001	*Rhyticeros undulatus*	WREATHED HORNBILL
000002	*Somateria mollissima*	COMMON EIDER
000019	*Otidiphaps nobilis*	PHEASANT PIGEON
000001	*Porphyrio alleni*	ALLEN'S GALLINULE
000011	*Tachyeres patachonicus*	FLYING STEAMER-DUCK
000019	*Mareca sibilatrix*	CHILOE WIGEON
000010	*Spatula platalea*	RED SHOVELER
000034	*Caloenas nicobarica*	NICOBAR PIGEON
000029	*Mareca americana*	AMERICAN WIGEON
000001	*Claravis pretiosa*	BLUE GROUND DOVE
000006	*Balearica regulorum*	GRAY CROWNED-CRANE / AFRICAN CROWNED-CRANE / GOLDEN CROWNED-CRANE
000043	*Eudocimus ruber*	SCARLET IBIS
000020	*Mareca penelope*	EURASIAN WIGEON
000015	*Spatula clypeata*	NORTHERN SHOVELER
000012	*Spatula discors*	BLUE-WINGED TEAL
000047	*Spatula cyanoptera*	CINNAMON TEAL
000001	*Tauraco erythrolophus*	RED-CRESTED TURACO
000001	*Ciconia abdimii*	ABDIM'S STORK
000043	*Spatula hottentota*	BLUE-BILLED TEAL / HOTTENTOT TEAL
000039	*Phoeniconaias minor*	LESSER FLAMINGO
000023	*Columba livia*	ROCK PIGEON
000001	*Pteroglossus viridis*	GREEN ARACARI
000034	*Spatula querquedula*	GARGANEY
000014	*Goura cristata*	WESTERN CROWNED-PIGEON / BLUE CROWNED-PIGEON
000002	*Oena capensis*	NAMAQUA DOVE
000004	*Spatula smithii*	CAPE SHOVELER
000054	*Phoenicopterus chilensis*	CHILEAN FLAMINGO
000001	*Musophaga violacea*	VIOLET TURACO
000003	*Antigone canadensis*	SANDHILL CRANE
000006	*Threskiornis aethiopicus*	AFRICAN SACRED IBIS
000007	*Spatula rhynchotis*	AUSTRALASIAN SHOVELER
000021	*Spatula versicolor*	SILVER TEAL
000018	*Sibirionetta formosa*	BAIKAL TEAL
000005	*Cariama cristata*	RED-LEGGED SERIEMA

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

000002	*Haliaeetus vocifer*	AFRICAN FISH-EAGLE
000017	*Spatula puna*	PUNA TEAL
000002	*Streptopelia hypopyrrha*	ADAMAWA TURTLE-DOVE
000001	*Antigone antigone*	SARUS CRANE
000002	*Tockus erythrorhynchus*	NORTHERN RED-BILLED HORNBILL
000004	*Dacelo novaeguineae*	LAUGHING KOOKABURRA
000075	*Lophodytes cucullatus*	HOODED MERGANSER
000003	*Haematopus palliatus*	AMERICAN OYSTERCATCHER
000032	*Recurvirostra avosetta*	PIED AVOCET
000002	*Charadrius vociferus*	KILLDEER
000003	*Columba oenas*	STOCK DOVE
000020	*Gallicolumba luzonica*	LUZON BLEEDING-HEART
000002	*Grus americana*	WHOOPING CRANE
000001	*Gallicolumba tristigmata*	SULAWESI GROUND DOVE
000001	*Musophaga rossae*	ROSS'S TURACO
000003	*Geotrygon versicolor*	CRESTED QUAIL-DOVE
000002	*Anthropoides virgo*	DEMOISELLE CRANE
000002	*Buceros rhinoceros*	RHINOCEROS HORNBILL
000338	*Melopsittacus undulatus*	BUDGERIGAR / BUDGIE / COMMON PARAKEET / SHELL PARAKEET
000026	*Taeniopygia guttata*	ZEBRA FINCH / TIMOR ZEBRA FINCH
000007	*Goura victoria*	VICTORIA CROWNED-PIGEON
000002	*Coracias cyanogaster*	BLUE-BELLIED ROLLER
000001	*Ara glaucogularis*	BLUE-THROATED MACAW
000003	*Ocyphaps lophotes*	CRESTED PIGEON
000000	*Coragyps atratus*	BLACK VULTURE / MEXICAN VULTURE
000088	*Psittacula cyanocephala*	PLUM-HEADED PARAKEET
000004	*Aratinga solstitialis*	SUN PARAKEET
000001	*Turtur brehmeri*	BLUE-HEADED WOOD-DOVE
000004	*Nesoenas picturatus*	MALAGASY TURTLE-DOVE / MADAGASCAR TURTLE-DOVE
000007	*Gallinula chloropus*	EURASIAN MOORHEN / COMMON MOORHEN
000004	*Vanellus chilensis*	SOUTHERN LAPWING
000003	*Tauraco persa*	GUINEA TURACO
000001	*Actophilornis africanus*	AFRICAN JACANA
000001	*Eurypyga helias*	SUNBITTERN
000001	*Cyanopica cyanus*	AZURE-WINGED MAGPIE
000004	*Psophia crepitans*	GRAY-WINGED TRUMPETER
000002	*Ephippiorhynchus senegalensis*	SADDLE-BILLED STORK
000005	*Platalea ajaja*	ROSEATE SPOONBILL
000013	*Vanellus spinosus*	SPUR-WINGED LAPWING
000002	*Burhinus senegalensis*	SENEGAL THICK-KNEE
000003	*Lamprotornis superbus*	SUPERB STARLING
000003	*Vanellus senegallus*	WATTLED LAPWING
000001	*Psephotus haematonotus*	RED-RUMPED PARROT
000002	*Cyanocorax yncas*	GREEN JAY
000016	*Ploceus castaneiceps*	TAVETA GOLDEN-WEAVER
000003	*Tringa semipalmata*	WILLET
000001	*Sarcoramphus papa*	KING VULTURE
000002	*Paradisaea raggiana*	RAGGIANA BIRD-OF-PARADISE
000002	*Parabuteo unicinctus*	HARRIS'S HAWK
000005	*Estrilda astrild*	COMMON WAXBILL

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

000002	*Bucorvus abyssinicus*	ABYSSINIAN GROUND-HORNBILL
000003	*Ramphastos toco*	TOCO TOUCAN
000004	*Molothrus ater*	BROWN-HEADED COWBIRD
000002	*Trichoglossus moluccanus*	RAINBOW LORIKEET
000005	*Psephotus dissimilis*	HOODED PARROT
000003	*Platycercus eximius*	EASTERN ROSELLA
000001	*Psittacula derbiana*	DERBYAN PARAKEET
000004	*Neophema splendida*	SCARLET-CHESTED PARROT
000002	*Cyanocorax chrysops*	PLUSH-CRESTED JAY
000002	*Ara macao*	SCARLET MACAW
000002	*Cacatua alba*	WHITE COCKATOO / UMBRELLA COCKATOO
000001	*Euplectes orix*	SOUTHERN RED BISHOP
000003	*Turdus merula*	EURASIAN BLACKBIRD
000001	*Ara militaris*	MILITARY MACAW
000002	*Urocissa erythroryncha*	RED-BILLED BLUE-MAGPIE
000009	*Psephotus varius*	MULGA PARROT
000001	*Cacatua galerita*	SULPHUR-CRESTED COCKATOO / GREATER SULPHUR-CRESTED COCKATOO
000003	*Artamus leucorynchus*	WHITE-BREASTED WOODSWALLOW
000002	*Lophochroa leadbeateri*	PINK COCKATOO / LEADBEATER'S COCKATOO / MAJOR MITCHELL'S COCKATOO
000001	*Chlamydera cerviniventris*	FAWN-BREASTED BOWERBIRD
000001	*Calocitta formosa*	WHITE-THROATED MAGPIE-JAY
000001	*Paroaria coronata*	RED-CRESTED CARDINAL
000003	*Lamprotornis iris*	EMERALD STARLING
000002	*Patagioenas fasciata*	BAND-TAILED PIGEON
000001	*Cyrtonyx montezumae*	MONTEZUMA QUAIL
000014	*Radjah radjah*	RADJAH SHELDUCK
000001	*Larosterna inca*	INCA TERN
000003	*Bubo bubo*	EURASIAN EAGLE-OWL
000005	*Guttera pucherani*	EASTERN CRESTED GUINEAFOWL
000010	*Numida meleagris*	DOMESTIC GUINEAFOWL / HELMETED GUINEAFOWL / PEARL HEN
000002	*Acryllium vulturinum*	VULTURINE GUINEAFOWL
000056	*Gallus gallus domesticus*	DOMESTIC CHICKEN (INCLUDING ALL DOMESTIC BREEDS / TURKIN / COCK / HEN / ROOSTER)
000000	*Pavo cristatus*	INDIAN PEAFOWL / COMMON PEAFOWL / PEAHEN / PEACOCK
000011	*Dendrocygna guttata*	SPOTTED WHISTLING-DUCK
000010	*Anser albifrons*	GREATER WHITE-FRONTED GOOSE
000006	*Anser erythropus*	LESSER WHITE-FRONTED GOOSE
000005	*Anser cygnoides*	SWAN GOOSE
000004	*Coscoroba coscoroba*	COSCOROBA SWAN
000002	*Anser brachyrhynchus*	PINK-FOOTED GOOSE
000000	*Anser anser domesticus*	DOMESTIC GOOSE
000009	*Branta hutchinsii*	CACKLING GOOSE
000008	*Chloephaga picta*	UPLAND GOOSE
000002	*Speculanas specularis*	SPECTACLED DUCK
000004	*Cygnus cygnus*	WHOOPER SWAN
000008	*Anas wyvilliana*	HAWAIIAN DUCK
000009	*Anas superciliosa*	PACIFIC BLACK DUCK

[redacted]

[redacted]

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
6020168	55-C-0333	001	Sylvan Heights Waterfowl Park and Eco Center	10-OCT-2024

000002	*Anas gibberifrons*	SUNDA TEAL
000010	*Anas sparsa*	AFRICAN BLACK DUCK
000002	*Anas erythrorhyncha*	RED-BILLED DUCK
000006	*Aythya baeri*	BAER'S POCHARD
000010	*Aythya collaris*	RING-NECKED DUCK
000016	*Mareca falcata*	FALCATED DUCK
000005	*Bucephala islandica*	BARROW'S GOLDENEYE
000001	*Alopochen aegyptiaca*	EGYPTIAN GOOSE
000005	*Chloephaga poliocephala*	ASHY-HEADED GOOSE
000009	*Oxyura leucocephala*	WHITE-HEADED DUCK
000004	*Sarkidiornis sylvicola*	COMB DUCK / AMERICAN COMB DUCK
000009	*Tadorna tadornoides*	AUSTRALIAN SHELDUCK
000010	*Tadorna cana*	SOUTH AFRICAN SHELDUCK
000006	*Tadorna ferruginea*	RUDDY SHELDUCK
000017	*Mergellus albellus*	SMEW
000003	*Mergus squamatus*	SCALY-SIDED MERGANSER
000024	*Himantopus mexicanus*	BLACK-NECKED STILT
000009	*Anas platyrhynchos domesticus*	DOMESTIC DUCK INCLUDING ALL DOMESTIC BREEDS
000001	*Lophonetta specularioides*	CRESTED DUCK
000001	*Psittacus timneh*	TIMNEH PARROT / TIMNEH AFRICAN GREY PARROT
000001	*Psittacus erithacus*	CONGO AFRICAN GREY PARROT / GRAY PARROT

003517 **Total**

[redacted]

[redacted]

Revised and Approved June 6th, 2024, by Dustin Foote, PhD

Sylvan Heights Bird Park
Transportation SOP

Introduction:
This SOP provides the procedures and standards to ensure birds' safety and comfort while being transported. Transportation of birds can occur when transferring birds to a new facility, receiving birds from another facility, traveling for a program, heading to and from a veterinarian's office, or being moved between enclosures.

Responsibility:
- It is the responsibility of bird care personnel to ensure that birds are safe and comfortable when being transported.
- It is the responsibility of supervisory personnel to ensure compliance with this procedure and for personnel training

Definitions:
- Carrier- dog crates or kennels with built in perches or turfing that are different sizes for specific species of birds. Carriers have openings on the sides and front to promote air flow and ventilation and are industry standard.
- Transport container- lightweight, sturdy boxes with holes on sides for ventilation and a towel on the bottom that close from the top.

Procedures:

<u>Transporting Birds to and from new facilities</u>
Birds may sometimes be moved to and from facilities in a transfer process. In these travel situations, documents, including special permits and certificates are required for transportation.
- Carriers should be chosen based on the size of the bird and its natural history.
- Birds should be offered food and water as needed.
- Carriers may include soft padding material per industry standard for transport.
- If holes of crate are darkened with fabric material, make sure that it allows airflow and ventilation that will help keep birds calm.
- Carriers for vehicle transportation will be covered by a towel or other fabric material that allows airflow and ventilation to help keep birds calm.
- All state and federal permits must be approved prior to transit.
- A Certificate of Health is required per state and federal regulations.

<u>Certification Requirements for Transfer</u>
- Consignor's name, address, phone number, and email address
- Number of birds in carrier
- Species of bird(s)
- Time and date the bird was last fed and watered and specific instructions for the next feeding and watering for a 24-hour period.

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- Consignor's signature and date and time certification was signed.

Transporting Birds to Vet Clinic

There are times when transporting a bird to a veterinarian clinic may be necessary for the overall wellbeing of the bird. Various methods may be used to transport birds, including dog carriers and box carriers. If the bird is too large for carrier, or the emergency prohibits from bird going in carrier safely, bird staff will transport bird by following safe bird handling procedures.

Birds and staff should use company vehicles to get to a veterinary clinic. Company vehicles are kept at temperatures and air humidity levels regulated and appropriate to the bird species housed therein and according to current professionally accepted standards. Temperatures will be set at levels that prevent discomfort and stress and provide for the overall health and wellbeing of a bird. Personal vehicles that are in good working order may be approved by the Director of Aviculture if they meet the above criteria.

Only staff that are on SHBP's company vehicle insurance policy are authorized to use company vehicles.

Transporting Young Birds

Young birds will be transported to and/or from SHBP by vehicle in an incubator or brooder that fits the size and temperature guidelines appropriate for the species.

- During transport, the temperature of the incubator and the behavior of the bird is monitored to ensure there are no signs of stress, discomfort, and that the temperatures are acceptable for the overall wellbeing of the bird.
- Young birds will be fed as recommended by husbandry protocol. Water is added to food or brooder to ensure proper hydration.
- If the age of young bird does not require being in an incubator, but mobility is still limited, young birds will be transported by carrier.
- Young birds with limited mobility may also be transported in other secure receptacles such as laundry baskets.

Transporting to Offsite Educational Programs

- Carriers are used to and from educational programs that are off site. The carriers are covered with crate covers or towels to create a dark space to promote a stress-free trip while still allowing ventilation and air flow.
- Carriers are loaded in the back of the company van and secured to prevent shifting during the trip.
- Once at the program, carriers are loaded on a cart, or hand carried individually to create a smooth trip to the program area.
- Birds always remain in carriers during program until it is their turn to come out for their portion and put back in to get ready to go back home.
- Bird behavior is consistently monitored to ensure there are no signs of stress or discomfort. If birds exhibit stress or discomfort during a program, they are quickly put away into their carrier.
- Vans are kept at temperatures and air humidity levels regulated and appropriate to the bird species housed therein and according to current professionally accepted standards.

SHBP

Temperature and humidity will prevent discomfort and distress and provide for the overall health and wellbeing of an animal.
- In the instance that a vehicle breaks down during transportation of birds the staff member will call SHBP and another staff member will come and get the birds, so they are not exposed to heat and stress.
- If keys get locked in the van with the birds trapped inside, the staff member will call AAA and notify them that there are live birds stuck in the vehicle or call SHBP to bring extra set of keys depending on distance. The staff member will also inform the Director of Aviculture of this occurrence and may also contact local law enforcement to assist if necessary.

Transporting to Onsite Education Programs

- Birds are loaded into carriers using proper bird handling and safety protocols.
- Carriers are in a secure area that provides protection from the elements.
- Birds remain in the carriers until it is their time to come out during a program.
- After the program, using the carrier, birds are walked back to their enclosures and released using proper bird handling and safety protocols.

Transporting Birds for Onsite Medical Instances

- Transport containers are used to transport birds for onsite movement purposes or temporary relocation.
- Some birds are transported by being held by staff using proper bird handling procedures.
- Light weight towels may be placed over a bird's head during transport to limit stress.
- In a medical emergency, birds are transported by hand in the safest, most efficient way. If a Kubota is needed, there should be a designated driver while the other staff members have the bird secure in their arms.
- These procedures will also be used for inclement weather scenarios if we need to relocate birds in a timely manner.

Transporting Birds for Onsite Routine Movements

- Transport containers are used to transport birds for routine bird movements
- Some birds are transported by being held by staff using proper bird handling procedures.
- Light weight towels may be placed over a bird's head during transport to limit stress.
- In a routine movement, birds are transported by hand in the safest, most efficient way. If a Kubota is needed, there should be a designated driver while the other staff members have the bird secure in their arms.

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ZOOPARQUE ITATIBA

Dustin Foote
Sylvan Heights Bird Park

Itatiba, April 03th, 2025.

Dear Mr. Foote,

I'm writing to you regarding the letter of intent that Sylvan Heights sent to the Brazilian Merganser National Action Plan in 2022.

Considering that your institution has already sent all the documents requested by AZAB (Brazilian Association of Zoos and Aquariums) and ICMBio (Chico Mendes Institute for Biodiversity Conservation) to integrate the Population´s Management Plan (PMP) and *studbook*, Sylvan Heights is officialy participating in the conservation program of the species. Therefore, the *studbook* would like to send 10 specimens of Brazilian merganser (*Mergus octosetaceus*) to you as part of the breeding program for the species. It´s important to highlight that the animals and their future offspring are part of the species *studbook* and therefore property of the Brazilian government.

Currently in Brazilian the *ex situ* population is kept only at Zooparque Itatiba and there are no other institutions in the country that have structure and availability to manage the birds at the moment. For safety reasons, it´s important to manage the captive population in more than one location. In addition, the program aims to reproduce the birds in captivity and later on start the reintroduction program but first it´s necessary to breed more birds, which is very difficult to do now considering the number of institutions participating. With more active members, we will have better reproduction numbers to expand the program and avoid a genetic bottleneck in the captive population.

All the Brazilian Mergansers that your institution would receive, will participate in the *studbook* for analysis and recommendations and were born at Zooparque Itatiba – located at Zooparque de Itatiba Avenue, Itatiba/SP, Brazil, 13254-762 – through *ex situ* reproduction program. The parental stock is also located at Zooparque Itatiba (same address) and all the individuals in their offsprings were bred onsite. The identification of these birds are as follows:

Studbook Number	ID (leg band)	Sex	Date of Birth (dd/mm/yyyy)
67	SP 11.0 AAA 002016	Male	14/07/2022
74	SP 11.0 AAA 002962	Male	13/08/2022
91	SP 11.0 AAA 002977	Male	03/09/2023
94	SP 11.0 AAA 002980	Male	03/09/2023
95	SP 11.0 AAA 002981	Male	03/09/2023
46	SP 11.0 AAA 001732	Female	04/08/2020
58	SP 11.0 AAA 002021	Female	09/08/2021
77	SP 11.0 AAA 002965	Female	13/08/2022
80	SP 11.0 AAA 002968	Female	13/08/2022
90	SP 11.0 AAA 002976	Female	26/08/2023

For the *studbook* analysis, reccords are organized using the ZIMs platform for *sutdbooks* and analyzed using PMX software. Keeping in mind the importance of Sylvan Heights receiveing young individuals that would be able to integrate their *ex situ* population as long as possible, the selection of birds also considered their age and the availability of animals that were not yet paired and integrating the inical breeding population. Considering that the ex situ population of brazilian mergansers is still small in numbers, we try to maintain the best kinship results as possible to reduce the inbreeding rate.

The reccomendation would be to pair the animals as follows:

Pair	Male (*Studbook* number)	Female (*Studbook* number)
1	74	90
2	67	58
3	91	77
4	94	80
5	95	46

It´s important to begin the documentation process as soon as possible because the bureaucratic work involved of importing and exporting birds in Brazil usually takes a long time to be concluded.

I look foward to your reply and hope we can work closer together in the future.

Best regards,

ZOOPARQUE ITATIBA

Robert Frank Kooij
231.810.138-89
Sócio Gerente

Robert Frank Kooij
Director of Zooparque Itatiba
Brazilian merganser *studbook keeper*

Galarreta, Angela A

From: Dustin Foote <dustin@shwpark.com>
Sent: Saturday, April 5, 2025 9:04 AM
To: [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)
Attachments: Statement_Brazilian Merganser.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Hello [redacted]

I have attached the statement from ICMbio confirming our acceptance into the program. Let me know if you have any questions or if the multiple emails yesterday were too confusing!

Best,

Dust

--

Dustin Foote, Ph.D.
Director of Aviculture
Sylvan Heights Bird Park
PO Drawer 368 Scotland Neck, NC 27874
ph: (252) 826-3186 x224 • fax: (252) 826-3273
www.shwpark.com

From: Galarreta, Angela A <angela_galarreta@fws.gov>
Date: Thursday, March 6, 2025 at 4:22 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email. I will do my best to answer your questions.

These transport questions are new and I believe they are based on concerns for the transport of more sensitive animals. Therefore, I think the most important CVs/resumes to provide are for those personnel directly overseeing the transport. In this case, that seems to be the broker, Mersant International LTD. If you there is no CV or resume that can be provided from the broker, please provide a summary of their qualifications. Additionally, if no veterinarian or animal care staff will be attending, then we do recommend providing an explanation and if possible, a plan for care in the event of an emergency.

Please let me know if you have any additional questions.

Thank you,

[redacted]

Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs
https://fwsepermits.servicenowservices.com/fws/

From: Dustin Foote <dustin@shwpark.com>
Sent: Thursday, March 6, 2025 2:29 PM
To [redacted]
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Angela,

Apologies for the delay, it is taking us longer than expected to pull together some of the details.

I had two questions however:

We are contracting a broker, Mersant International LTD who have a lot of experience shipping animals and are based at JFK where the mergansers would enter USDA quarantine. I've spoken with them about question 28e, (CV of individual conducting the transport of specimens) and they said to reach out to USFWS since it was a new question for them. I am the one coordinating the shipment; however, they will be the ones picking the birds up from the airport, taking them through the inspection process, and then transporting them to the quarantine facility. The quarantine facility is setting up the spaces based on our recommendations, and I have a colleague (Curator of

Birds at Bronx Zoo) who will stop by to inspect the setup and birds once they arrive. When the birds are released from quarantine, I will be the one picking them up and transporting them back to NC.

1. Based on that description, whose CV do you need to satisfy question 28e?

28d (will a vet or animal keeper accompany the specimen and be able to provide care). Since this would be a direct flight from Sao Paulo to JFK, we had not planned on sending a staff member. However, I do not want this to be a reason our application is denied.

2. Is providing our reasoning as to why a keeper is not accompanying the shipment followed by the caveat that if required, we would send a staff member along with the shipment considered an acceptable answer?

Thank you again for your time.

Best,

Dust

--

Sylvan Heights BIRDPARK

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

PO Drawer 368 Scotland Neck, NC 27874

ph: (252) 826-3186 x224 • fax: (252) 826-3273

www.shwpark.com

From [redacted]
Date: Monday, February 24, 2025 at 4:04 PM
To: Dustin Foote <dustin@shwpark.com>
Subject: Re: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello Dustin,

Thank you for your email.

There is no preference on our end, so long as all the requested information is provided. Considering how much has been provided to date, I would suggest just providing the additional information to make a cleaner record.

Please let me know if you have any other questions.

Thank you,

[redacted]

Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs

https://fwsepermits.servicenowservices.com/fws/

From: Dustin Foote <dustin@shwpark.com>
Sent: Monday, February 24, 2025 3:49 PM
To: [redacted]
Subject: [EXTERNAL] Re: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

[redacted]

Thank you for your feedback and we will put together the missing information over the next week.

I wanted to confirm that you wanted us to fill out just the requested information below on the updated application and answer the clarifying questions and not provide an updated application that has been completely filled out? Either is fine, just wanted to make sure.

Thank you for your time,

Dust

--

Dustin Foote, Ph.D.

Director of Aviculture

Sylvan Heights Bird Park

PO Drawer 368 Scotland Neck, NC 27874

ph: (252) 826-3186 x224 • fax: (252) 826-3273

www.shwpark.com

Fro [redacted]
Date: Wednesday, February 19, 2025 at 5:04 PM
To: Dustin Foote <dustin@shwpark.com>
Cc: Ali Lubbock <ali@shwpark.com>
Subject: CS10543003 - 3-200-37a: Import/Export/Re-export of live animals (CITES/ESA)

Hello,

We are in receipt of your application, CS10543003, for a permit to import 10 live Brazilian mergansers (*Mergus octosetaceus*) under the U.S. Endangered Species Act (ESA). The processing of your application cannot be completed because we require additional information.

Based on your submission, it appears that your responses were to an expired version of application form 3-200-37a. Our current application form (see attached) expires on 12/31/2026 as shown in the top right corner, and has additional questions not included on the previous form as well as additional details requested for some of the questions included on the previous form. I have highlighted those questions but specifically they include 10.c., 10.d., 12, 13, 19, and 21-28. We note that questions 10.d., 19, and 28 were previously included but a little more detail is requested on the current application form.

Additionally, for questions 15-18, please provide responses for similar species. We understand that you do not currently hold the requested species but you have indicated caring for similar species (e.g., *Mergus squamatus*, *Mergus merganser*).

Regarding the responses you have provided, we have a few clarifying questions:

- Although you have provided a letter from the Brazilian merganser studbook keeper, as the breeder's statement, it did not include the name and address of the facility where the parental stock is located. The studbook included some records of the parental stock but not all. Per question 5 of the application, please either provide a breeder's statement with the name and address of the facility where the parental stock is located or documentation such as records that provides this information.
- The letter confirms the intent to include your facility in the breeding program but also states the following:
  "To officiate this commitment of your institution you will need to sign the documentation provided by ICMBio (Chico Mendes Institute for Biodiversity Conservation) and AZAB (Brazilian Association of Zoos and Aquariums) to affiliate to the studbook and officially confirm the intention to work towards the species conservation."

  Can you provide the signed documentation and any documentation you may have received in return confirming your participation in this breeding program? Is there a breeding loan agreement?

- In response to how your breeding stock is managed to maintain genetic vitality, you stated "SHBP will follow the recommendations of the Brazilian Merganser Studbook that makes breeding recommendations based on average kinship." We recognize that this question is included under 10.d. of the current application form so presumably, you will provide additional information in your response. However, we do want to note that the current response does not fully address our question. When you respond to question 10.d., please clarify how average kinship is determined (i.e., methods). Moreover, is there an evaluation of the genetic make-up of the current population and can you provide the breeding recommendations for the ten animals you will be receiving?

Please provide the information and documentation indicated. Any response must be in written form (this includes email).

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office within 45 calendar days of the date of this email, ***April 5, 2025****, your application will be abandoned and administratively closed. Once a file is closed, you will need to submit a new application, and all required fees, for the Service to consider your proposed activity.*

Thank you,

[redacted]

Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, Virginia, 22041-3803, USA

https://www.fws.gov/program/international-affairs

https://fwsepermits.servicenowservices.com/fws/

INTEGRA+
Programa de Integridade do ICMBio

MINISTÉRIO DO MEIO AMBIENTE E MUDANÇA DO CLIMA

INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE

CENTRO NACIONAL DE PESQUISA E CONSERVAÇÃO DE AVES SILVESTRES - CEMAVE

BR 230, KM 10, Floresta Nacional da Restinga de Cabedelo, - Cabedelo - CEP 58108-012

Telefone: (83) 3245 5001

DECLARAÇÃO

Cabedelo, na data da assinatura eletrônica.

[*in English below*]

1. Declaro, para os devidos fins, que o Centro Nacioanal de Pesquisa e Conservação de Aves Silvestres - CEMAVE, setor do Instituto Chico Mendes de Conservação da Biodiversidade, autarquia federal ambiental do Brasil, responsável pelo estabelecimento e acompanhamento de Programas de Manejo Populacional de espécies brasileiras ameaçadas de extinção, recebeu da instituição norte-americana Sylvan Heigths Bird Park todos os documentos necessários para adesão ao Programa de Manejo Populacional do Pato-Mergulhão (*Mergus octosetaceus*) e que estes documentos foram conferidos e encontram-se aprovados por este Centro.

2. Declaro ainda que Sylvan Heigths Bird Park demonstrou interesse e capacidade de participar do programa de conservação do pato-mergulhão e que o Brasil pretende transferir indivíduos da espécie para essa instituição, restando apenas ao CEMAVE realizar uma consulta às autoridades ambientais dos Estados Unidos da América, a fim de verificar se há alguma ressalva quanto à adesão desta instituição ao programa.

3. A participação de Sylvan Heigths Bird Park no Programa de Manejo Populacional do Pato-Mergulhão é considerada de grande relevância e interesse público, tendo em vista esta espécie estar categorizada como Criticamente em Perigo (CR) na lista mundial e na lista nacional de fauna ameaçada de extinção e o planejamento para sua conservação incluir ações de manejo populacional integrado *in situ* e *ex situ*, sendo necessário, para tanto, obtermos uma população *ex situ* numerosa, com boas

condições genéticas e sanitárias e disponível para projetos de translocação.

4. Maiores esclarecimentos podem ser obtidos pelo endereço *cemave.sede@icmbio.gov.br*.

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1. I hereby declare, for all due purposes, that the National Center for Bird Research and Conservation - CEMAVE, a department of the Chico Mendes Institute for Biodiversity Conservation, a federal environmental agency in Brazil, responsible for establishing and monitoring Population Management Programs for Brazilian endangered species, has received from the North American institution Sylvan Heights Bird Park all the documents necessary to join the Brazilian Merganser (Mergus octosetaceus) Population Management Program and that these documents have been checked and approved by this Center.

2. I further declare that Sylvan Heights Bird Park has shown interest and capacity to participate in the Brazilian Merganser conservation program and that Brazil intends to transfer individuals of the species to this institution, with CEMAVE only having to consult the environmental authorities of the United States of America in order to verify whether there are any reservations regarding this institution's membership in the program.

3. The participation of Sylvan Heights Bird Park in the Brazilian Merganser Population Management Program is considered to be of great relevance and public interest, given that this species is categorized as Critically Endangered (CR) on the world list and the national list of endangered fauna and that conservation planning includes integrated in situ and ex situ population management actions, and for this purpose it is necessary to obtain a large ex situ population, with good genetic and health conditions and available for translocation projects.

4. Further information can be obtained at cemave.sede@icmbio.gov.br.

Documento assinado eletronicamente por **Priscilla Prudente Do Amaral**, **Coordenador(a)**, em 05/04/2025, às 06:41, conforme art. 1º, III, "b", da Lei 11.419/2006.

A autenticidade do documento pode ser conferida no site https://sei.icmbio.gov.br/autenticidade informando o código verificador **021224915** e o código CRC **A57A2AC1**.