OMB Control No. 1018-0093
Expires 08/31/2023

CAPTIVE-BRED WILDLIFE REGISTRATION (U.S. Endangered Species Act)

☐New ■Reissue/Renew ☐Amendment

Complete Sections **A or B**, and C, D, and E of this application. U.S. address may be required in Section C.**

A. Complete if applying as an individual

1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix

2 Date of birth (mm/dd/yyyy)	5.a. Telephone number	5.b. Alternate telephone number	6. E-mail address

B. Complete if applying on behalf of a business, corporation, public agency, Tribe, or institution

1.a. Name of business, agency, Tribe, or institution	1.b. Doing business as (dba)
Pinola Conservancy	

2. Tax identification no.	3.a. Description of business, agency, Tribe, or institution	3.b. Website URL (if applicable)
47-2938744	Accredited Zoological Facility	www.pinola.net

4.a. Principal officer (P.O.) last name	4.b. P.O. first name	4.c. P.O. middle initial	4.b. P.O. Title
Dickson	Paul	M	Chairman

5. Primary contact name	6. Primary e-mail address
Jacob Kraemer	jkraemer@pinola.net

7.a. Business telephone number	7.b. Alternate phone no.	8.a. Primary contact telephone no.
318-415-8168		318-415-8168

C. All applicants complete address information

1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)
10451 Ellerbe Road

1.b. City	1.c. State	1.d. Zip code/Postal code	1.e. County/Province	1.f. Country
Shreveport	LA	71106	Caddo	USA

2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)

2.b. City	2.c. State	2.d. Zip code/Postal code	2.e. County/Province	2.f. Country

D. All applicants MUST complete

1. Include a check or money order, payable to the U.S. FISH AND WILDLIFE SERVICE, **a nonrefundable processing fee [50 CFR 13.11(d)(4)]**. 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))

2. If you are requesting a reissue/renew/amendment, what is your permit/file number? 78121C

3. 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.

Paul M Dickson — 9 January 2024

The individual/principal officer of the business must print and sign the application. (No photocopied or stamped signatures) Date (mm/dd/yyyy)

** Further instructions for the above application may be found on our ePermits website. See the last page for information on the Privacy Act, Paperwork Reduction Act, Estimated Burden, and Freedom of Information Act aspects of this application form.

Mail your application(s) to Division of Management Authority, Branch of Permits, MS:IA 5275 Leesburg Pike, Falls Church, VA 22041-3803.

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E. CAPTIVE-BRED WILDLIFE REGISTRATION (U.S. Endangered Species Act)

Please use the following application for all CBW requests. The CBW registration was designed to facilitate export, re-import, and interstate and foreign commerce of exotic species that are captive born in the U.S. Obtaining a registration under the permitting regulations found at 50 CFR 17.21(g) means that otherwise prohibited activities are allowed for the purpose of enhancing the propagation or survival of the species (conservation breeding). Therefore, your application must show how your activities will either enhance organized breeding programs or *in situ* projects to enhance the survival of the species in the wild. Loans and donations are not prohibited by the Act.

All applicants must complete Part 1 of the application. A CBW Registration remains valid for five years and may be renewed once for a total validity of ten years, after which the CBW Registration number will be retired and you must apply for a new CBW Registration. If a renewal application is submitted thirty days or more prior to the CBW Registration expiring, the applicant may continue to conduct previously authorized activities during the renewal process. However, if the application is submitted fewer than thirty days prior to expiration, activities must cease at the time the registration expires until the renewal process is completed.

- **For New applications and amendments**, complete Part 2 of the application. You may renew your CBW once after 5 years, but after a CBW registration has been valid for 10 years, you must submit a complete new application responding to all questions.

***** Please note:** *If you have a change of mailing address, you must notify the Service within 10 days. If your facilities move, you will need to apply for an amendment.*

- **To renew your CBW** (it has been less than 10 years since you submitted a completely new application), complete Part 3 of this application.

- **If you maintain exotic wildlife in a natural setting, such as a ranch,** complete Part 1 and Part 4 only of the application.

Electronic submission of inventories, photographs, and receipts/invoices: For hard copy applications, if you wish to provide information electronically, please include a flash drive containing this information with your physical application.

Part 1: All Applicants Must Complete

1. Name and address where you wish the permit to be mailed, if different from physical address. If you would like expedited shipping, 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.

   Pinola Conservancy 10451 Ellerbe Road Shreveport, LA 71106

2. Who should we contact if we have questions about the application (name, phone number, and e-mail)?

   Jacob Kraemer, Aviary Director, 318-415-8168, jkraemer@pinola.net

3. 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” to Question 3, 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.

4. Provide copies of any license or registration under the Animal Welfare Act regulations of the U.S. Department of Agriculture (9 CFR 2) (if required) and/or any State license or registration required to maintain or breed the species requested in Part 2 or Part 3 below. If available, provide a copy of your last two (2) USDA AWA inspection reports.

5. The exact location(s), including address(es), where the wildlife requested in this application will be maintained. If more than one location exists, list all that apply. NOTE: You must report any change in address or location of facilities to the Division of Management Authority within 10 days of such change taking place.

   Pinola Conservancy 10451 Ellerbe Road Shreveport, LA 71106

6. Provide a current inventory, including those out on loan, for each of the exotic ESA-listed species you are requesting to include or have already been approved to hold (if currently holding a valid CBW registration) on your CBW registration. 3 Japanese Crane *Crus japonensis*

7. Attach a brief resume for all senior animal care staff or personnel that will be working with or maintaining each species, including the number of years' experience with this species or similar species.

Part 2: New Application, Amendment, or Renewal of CBW which are older than 10 years:

FOR <u>EACH SPECIES BEING REQUESTED</u> for inclusion in a registration, whether a new application or amendment, complete each of the following questions. Signify that you have read each question by writing "N/A" if non-applicable. If submitting hard copy pages, please indicate the species and the application question number you are addressing.

8. The scientific name (genus, species and, if applicable, subspecies) and common name of each species for which you wish to be registered.

9. Provide the name, address, and CBW registration number of the person(s) or institution(s) from whom you plan to acquire the wildlife, including the sale or loan agreements for the specimens. If currently unknown, describe your efforts, including documentation, to acquire appropriate specimens for your breeding efforts.

10. Indicate if there is an organized breeding program that you are currently involved with or if you have communicated with other breeding organizations regarding your potential participation in those programs. Provide documents to show you are currently involved with a breeding program or include any communication you have had with breeding organizations that you wish to be involved.

11. Provide a description of how your proposed activities are going to facilitate captive breeding for conservation purposes of this species, **including your long-term goals for your breeding program and intended disposition of any progeny. Be specific.**

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12. Provide a detailed description and documentation showing how your captive population is being managed to maintain its genetic vitality. If you do not currently maintain a sufficient number of specimens for each species being requested to successfully maintain the genetic viability of the species, you must participate in an organized breeding program. Please identify this program and provide documentation describing the objectives and goals of the program, and confirmation that you are a participant in this program.

13. If your activities include the holding of surplus animals (i.e., not currently needed in and not being bred) for an organized breeding program, document how your acquisition of such wildlife will relieve crowding at the locations from which the wildlife will be obtained, and thereby assist the breeding program for the species involved. Provide documentation that you are a participant in an organized breeding program where the holding of surplus wildlife has been identified as a necessary objective of the breeding program. Provide a description of how you will restrict/control breeding at your facility.

14. For each requested species, provide a description of your experience in maintaining and propagating the requested species or similar species, including:

    a. The number of years you or the facility has/have maintained the requested species or similar species.

    b. During the past five years, how many (by species, by year) successful births/hatchings of each requested species or similar species have occurred at your facility? How many survived beyond 30 days?

    c. How many mortalities of requested species or similar species have occurred at your facility during the past five years? What were the causes? What measures have you taken to prevent future mortality?

15. Provide a detailed description, including size, construction materials, and protection from the elements, as well as photographs and detailed diagrams (no blueprints) clearly depicting your existing facilities, including space for future progeny, where the wildlife will be maintained.

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Part 3: Applications to Renew CBW registrations that are 5 years old or less:

All CBW registrants are required to submit an annual report on activities conducted at the facility over the previous year, as well as a current inventory of all species covered under the registration. If you have already responded to the following questions in your annual report, please note that in your answer to the question.

16. Have there been any changes to your operation such as reconstruction or new construction, new facilities, or other physical changes? If yes, please describe them.

    No.

17. Have there been any changes to senior staff or personnel changes that would affect how your operation handles the species included in the registration? If yes, please describe these changes.

    No.

18. Have there been any changes to your inventory that have not been reflected in your annual reports or the current inventory list provided to the Service? If yes, please describe these changes.

    No.

19. Is there any additional information that you believe the Service should be aware of in regards to your operation, facilities, inventory, or business model?

    No.

Part 4: Applications for wildlife that is maintained in a natural setting:

20. Provide a specific description of how your proposed activities are going to facilitate captive breeding for conservation purposes of this species **including your long-term goals for your breeding program and intended disposition of any progeny. Be specific.**

21. How often do you conduct surveys of your wildlife?

22. How do you determine and identify which specimens are surplus to your operation?

23. What is the approximate maximum number of specimens of each species your facility can support?

24. What are you doing to prevent predation of stock?

25. Provide a detailed description as well as photographs clearly depicting your existing facilities, including space for future progeny, where the wildlife will be maintained.

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Captive-Bred Wildlife Registration (CBW) Annual Report

Due: March 31st of the following year

Email to: managementauthority@fws.gov referencing "CBW Annual Report YYYY for CBW # MA#####" in subject line.

Permittee Name: Pinola Conservancy **Reporting Year:** 2019 **CBW Permit #:** MA78121C-0

Complete this form (all three tables) for **ALL live, non-native, ESA-listed species, captive-bred in the U.S., covered under your current CBW registration for the above reporting year** (including individuals you have on loan with another facility, or on loan with you). Do not include non-native ESA-listed species that were not covered on your CBW permit during this year.

Year-end Inventory

Scientific Name (Genus, species, and *if applicable*, subspecies)	**Common Name**	**Quantity**	**Sex/Age Ratio** (male.female.unknown sex, 10.5.2)	**# Births over the reporting year**	**# Deaths over the reporting year**	**Approx Death Date(s) and Cause of Death(s)** (attach necropsy report, as needed)
EXAMPLE: *Loxodonta Africana*	African Elephant	17	10.5.2.	2	1	Aug 2019, old age
Tragopan caboti	Cabot' Tragopan	4	2.2	2	0	
Grus japonensis	Red-crowned Crane4	2	1.1	0	0	

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

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Activities Conducted

CBW holder is required to disclose **ALL interstate and intrastate purchases, sales, trades, and/or exports** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (Interstate or intrastate purchases, sales, and/or exports)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction** (include country if an export)	**CBW # of Registrant Involved in Activity**	**Identification Information** (e.g., studbook #'s, microchip #'s, band #s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	Interstate purchase	04/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	MA#####	Studbook #: 152

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Loans/Gifts/Donations Conducted

CBW holder is required it disclose **ALL loans, donations, and gifts** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (loans, donations, and gifts)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction**	**Information on transferred Animal(s)** (studbook #'s, microchip #'s, band #'s, tattoo #'s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	loan	4/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	Studbook # 305 Tattoo yellow 6
Tragopan Caboti	Cabot's Tragopan	Donation		0.1	St. Augustine Alligator Farm	Band PC 071 Studbook AZA/255
Tragopan Caboti	Cabot's Tragopan	Donation		1.0	San Diego Zoo Global	Band 1061 Studbook AZA/245

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OMB Control No. 1018-0093
Expires 08/31/2023

Loans/Gifts/Donations Conducted

CBW holder is required it disclose **ALL loans, donations, and gifts** involving species listed under their CBW that occurred during the reporting year.

Scientific Name	**Common Name**	**Activity** (loans, donations, and gifts)	**Date of Activity** (mm/dd/yyyy)	**Quantity & Sex/Age** (males.females.unknown sex, 10.8.3)	**Name and Address of the other party Involved in the transaction**	**Information on transferred Animal(s)** (studbook #'s, microchip #'s, band #'s, tattoo #'s, etc.)
EXAMPLE: *Loxodonta Africana*	African elephant	loan	4/12/2019	1.0.0	Sunland Zoo and Park, 300 Leopard Way, Miami, FL	Studbook # 305 Tattoo yellow 6
Tragopan Caboti	Cabot's Tragopan	Donation		0.1	St. Augustine Alligator Farm	Band PC 071 Studbook AZA/255
Tragopan Caboti	Cabot's Tragopan	Donation		1.0	San Diego Zoo Global	Band 1061 Studbook AZA/245

Use of this form is not mandatory. *If using an alternate form, ensure it encompasses the same information. Additional information may be attached to the report.*

Pinola Conservancy

Pinola Conservancy (PC) is an Association of Zoos & Aquariums (AZA) accredited aviary dedicated to the preservation of bird species, with a core focus on waterfowl, through conservation and educational programs, ecological research, and propagation. PC has amassed a reputation amongst AZA facilities for providing the highest quality of care to the birds maintained in the collection and for being a leader in avian reproduction. Through well-constructed and carefully curated facilities and enclosure design, our team focuses on evaluating bird species interactions to offer optimal captive care. As AZA facilities have progressively moved towards identifying regional leaders in species, the PC is recognized as a pioneer for creating a reliable source of unique educational displays seldom seen at other accredited zoological institutions. The PC has had tremendous success in acquiring genetically valuable avian species that have invigorated blood lines throughout North America, thus creating healthier and more robust flocks .

As mentioned, our core focus is waterfowl. Waterfowl, when examining the clade as a whole, are one of the most underrepresented of all bird families in zoological institutions. Waterfowl should be an integral part in properly displaying most zoological habitats, as they are an important indicator species for a healthy environment. Being able to provide sustainable populations of waterfowl to other AZA and approved private facilities is an important goal for PC. We maintain 130 of the world's 150 waterfowl species within our collection. From the most common, like the Mandarin, to the most rare and endangered, like the Baer's Pochard, we strive to tell the ecological story of each species within an enriching habitat and display a representation of these habitats within our institution.

Many waterfowl species that we keep, both native and nonnative, were once in peril and have made a strong recovery (Trumpeter Swan; Wood Duck) or are currently in danger and their future may lie in the hands of private and zoological facilities. This particularly holds true for many of Asia's waterfowl, of which we place strong emphasis on within the facility, where habitat loss and degradation is rapid and chances for reintroduction are becoming smaller by the day (Scaly-sided Merganser; White-winged Wood Duck). Some species, such as the Hartlaub's Duck of Africa, may not currently be considered threatened but the dual threat of a lack of ability to properly census the wild population and the possibility of a future (perhaps current) population decline certainly looms due to the volatile parts of the world in which they reside. We have made tremendous efforts in creating a sustainable captive population of this species and are now beginning to implement them into other collections worldwide; helping to create an awareness for a species that little is known about and has only been worked with sparingly in captivity over the years.

CERTIFIED BY THE ASSOCIATION OF ZOOS & AQUARIUMS

Beyond the facility wide goal of population management and reproduction of all waterfowl, PC is dedicated to the scientific advancement to benefit the care of sea ducks in captivity with direct implication for wild populations impacted by climate change. Wild populations of sea ducks persist throughout the arctic region with climate change related declines reported in the scientific literature. The effects of climate change on wildlife has been well described including shifts in resource availability, interspecies competition,

disease persistence, etc. The goal of the captive sea duck program is multifaceted related to the subtropical climate of Louisiana including (1) identify captive settings to allow for optimal health and reproduction, (2) evaluate the diseases the birds are typically susceptible to, and (3) implement methods for disease prevention. The PC is dedicated to researching these goals in as many disparate species of sea ducks as possible to ensure differences and similarities are identified, and findings are shared to the global research community to help identify direct causes of wild population declines as they relate to climate change. Parameters studied include (but not limited to) daily temperature fluctuation, UVA/UVB levels, vector (arthropod, gastropod, vertebrate) density and exposure, behavior, appetite, and physical condition. The PC maintains the highest standard of quality and care, ensuring daily visual welfare checks, and consistent veterinary evaluations. All sea ducks receive preventative veterinary care based on known disease susceptibility in sea ducks. PC currently maintains several species of sea ducks including 4 species of eider, long-tailed ducks, harlequin ducks, 2 species of scoter, both species of goldeneyes, bufflehead, and 5 species of mergansers. Following 13 years of captive care, our team has identified typical diseases of sea ducks in a captive setting and have implemented methods of prevention. Morbidity and mortality data have been collected for analysis alongside protocols prepared for disease treatment and prevention. PC sends majority of its samples between Louisiana Animal Diagnostics & Disease Laboratory and Texas Veterinary Medical Diagnostic Laboratory.

PC is proud to offer our flocks and facilities for ongoing research in collaboration with outside conservation entities and universities:

- US Fish and Wildlife Service
- Alaska Sea Life Center
- Louisiana State University
- Forbes Biological Station
- Mississippi State University
- Cornell Lab of Ornithology
- Western Illinois University

In addition to waterfowl, PC works with a variety of other bird families, with 262 different species of birds maintained in our aviaries. We carefully select species based on a number of criteria, with the breeding of each species always as our desired result. We believe that to properly enrich the lives of captive birds, we must include many of the other species that you would typically find within their natural ranges and habitats. If not the exact species, then another congener species, which would properly fill the niche we seek to recreate. We strongly believe the positive effects of housing a diverse and multi-species habitat, as close to natural as one can get. We have found this to be one of the very best examples of natural enrichment and the benefits, both psychological and physical, to the species involved we feel are many. A small, albeit very important, example of this would be the churning of water and mud by the feeding of waterfowl, shorebirds, and cranes in the bog area of our Free Flight Aviary. The sediments exposed by this feeding behavior allow the various shorebirds, such as the pied avocets, ample foraging opportunities and they have learned to anticipate these opportunities, created by waterfowl co-inhabitants, on a daily basis. This comfort and reassurance of a secure and fruitful environment leads to better overall success in breeding and overall welfare of the birds.

We strive to keep continentally specific themes within most of our aviaries; Eurasia being the most prominent and represented. An alarming amount Asian species are threatened and captive populations play a vital role to the continued survival of many in this collection. This particularly holds true for many pheasant species and Southeast Asian songbirds, who are in peril throughout their natural ranges. Working with and conserving those species here, species such as the Cabot's Tragopan and Bali Myna, helps to maintain a sustainable captive population and a hope for future survival. European species are highly underrepresented in zoological institutions. From the common pochard, which is now considered vulnerable throughout its range, to the white-headed duck, whose population has dwindled significantly over the past 10 years that it is now considered endangered, our goal is to maintain a diverse collection of European species and create a better awareness for those species that are little known here but deserve our attention. With these species, we often house many other common, but still little known in this country, species of European waterfowl and other birds. This helps to create the aforementioned enriching effect and overall natural well-being of these species. The European theme is often used to compare and contrast with North American congener species, one example of many being the Garganey of Eurasia and the Blue-winged Teal of North America. Our Walk Through aviary keeps many examples of congener species of different continents side by side, allowing comparative behavioral analysis to be done while watching these species simultaneously. One of many examples being the Ruddy Duck of North America and the Lake Duck of South America.

Building successful avian communities and illustrating niche adaptation is another important goal. Careful consideration is made when choosing inhabitants. Extensive research is done on potential species. As mentioned, we seek appropriate species to fill every ecological niche provided within the enclosures. If a species that fits the theme and ecological niche of a certain aviary cannot be obtained, we seek to fill that niche with a similar species thus giving us many examples of adaptive radiation and convergent evolution (Pink-eared Duck and the blue-winged duck clade) within the collection. We study wild behavior, both through in person experience or reading documented accounts, as well as captive history and behavioral notes from aviculturists and keepers before us.

We keep many rare species. Species underrepresented in this country, ones that are rare in the wild but not captivity, vice versa, or both. We give special consideration to all Species Survival Program and studbook program animals, even those who do not necessarily match our overall theme, and fit them within the collection if the appropriate situation presents itself. A prime example being the North Island brown kiwi. While not necessarily fitting the overall theme of PC, the chance to keep such a culturally significant and important species was presented to us upon achieving AZA accreditation. Through immense research on captive husbandry of the kiwi, with the aviary director visiting several zoos stateside and abroad to observe successful captive habitats, we created aviaries built specifically to their needs and were able to acquire our first kiwi that same year from the Frankfurt Zoo in Germany. Since then, we have hatched two eggs, donated to us from the Smithsonian Breeding and Conservation Institute, and now have 3 fully grown, genetically important North Island brown kiwi here at PC. We currently participate in 47 SSP/studbook/candidate programs with many of our birds as founders within their respective programs. We also actively work with approved members of the private avicultural sector as they play a vital role in the continued captive propagation of many species; particularly waterfowl and pheasants.

We are constantly seeking to further the avicultural knowledge of not only our staff, but of our professional colleagues and the general public. Examples include:

- cross diet experience and usage
- nest site preferences

- mate selection
- photo-period manipulation to entice breeding of Northern, high-altitude waterfowl in a Southern climate
- the application of different species groupings in a variety of aviary settings
- annual attendance at both national AZA conferences and of other relevant organizations
- speaking engagements
- staff training opportunities and relevant workshop attendance
- a robust internship program offered to curatorial and keeper staff within AZA here at Pinola Conservancy, free of charge
- website design offering thousands of images of birds in a variety of environments and stages of plumage, 6 live stream cameras within our enclosures that stream 24 hours per day, regular blog postings

Re: [EXTERNAL] Re: Inquiry Regarding CSTASK1744474 - 3-200-41: Renewal of CBW - MA78121C-0

Jacob Kraemer <jkraemer@pinola.net>
Mon 3/11/2024 7:09 PM
To:Ketram, Natchanon N <natchanon_ketram@fws.gov>

Good afternoon, Natchanon,

Yes, and I apologize for the oversight yet again. We do currently have:

1.2 Cabot's Tragopan
1.2 Red-crowned crane

Great to hear that I can use ePermits for CBW moving forward as I like the system for all of our other FWS permits.

Thank you again.

Jacob Kraemer, Aviary Director
Pinola Conservancy
www.pinola.net

From: Ketram, Natchanon N <natchanon_ketram@fws.gov>
Sent: Monday, March 11, 2024 2:43:18 PM
To: Jacob Kraemer
Subject: Re: [EXTERNAL] Re: Inquiry Regarding CSTASK1744474 - 3-200-41: Renewal of CBW - MA78121C-0

Good afternoon,

I apologize for immediate circling back with you despite saying I have no follow-up questions. So for confirmation on your current inventory, is your current inventory as of today:

3 Cabot tragopan (1.2)
3 Red-crowned crane (1.2)

I am confirming because on the CBW renewal form, you had only included the red-crowned crane and you mention the discrepancy in your previous email so I wanted to confirm if the current inventory number is the same as the AR2023 report.

Thank you,

Natchanon Ketram
Permit Biologist
Branch of Permits
Division of Management Authority
International Affairs Program
U.S. Fish and Wildlife Service
Falls Church, VA, USA

From: Ketram, Natchanon N <natchanon_ketram@fws.gov>
Sent: Monday, March 11, 2024 3:19 PM
To: Jacob Kraemer <jkraemer@pinola.net>
Subject: Re: [EXTERNAL] Re: Inquiry Regarding CSTASK1744474 - 3-200-41: Renewal of CBW - MA78121C-0

Good afternoon Jacob,

Thank you for providing the new information. After reviewing the new information you provided, I do not have any follow up questions for you at the moment. We may have new questions for you down the line and I will be sure to forward those to you if any arises.

Anyway, the reason I want to respond to your email was regarding your question about the annual report. So one change our branch undertook (I can't recall when exactly but it was before my time) was we migrated our general email to managementauthority@fws.gov. While we still do have access permits@fws.gov, it is no longer our primary email. If we do issue you a renewal on this CBW, for the annual reports, you will see the new email as the address you can send the annual reports.

Another option available to you is you can upload your report directly through e-permit. This might not be the case with your recently expired CBW but going forward, e-permit recently implemented a notification system where e-permit will notify you 60 days and 30 days prior to a report is due. You can then either click on the link provided in the email or navigate to the "My Report" tab in e-permit and directly upload the annual reports. Each report notification will be identified by the letter and number REP#XXXX (e.g. REP0104516). Clicking on this report notification will allow you to upload the report requirement for that year.

Thank you,

Natchanon Ketram
Permit Biologist
Branch of Permits
Division of Management Authority
International Affairs Program
U.S. Fish and Wildlife Service
Falls Church, VA, USA

From: Jacob Kraemer <jkraemer@pinola.net>
Sent: Monday, March 11, 2024 8:37 AM
To: Ketram, Natchanon N <natchanon_ketram@fws.gov>
Subject: [EXTERNAL] Re: Inquiry Regarding CSTASK1744474 - 3-200-41: Renewal of CBW - MA78121C-0

Good morning, Natchanon,

Thank you for this email. I apologize for the service not receiving our annual reports. I always assumed you have. For future yearly reports, can these now be uploaded electronically via the ePermits system?

We do have both Japanese (red-crowned) crane and Cabot's tragopan here. I apologize again for the discrepancy. I have attached all relevant documentation.

Please let me know if you require anything further. Thank you for your help!

Jacob Kraemer, Aviary Director
Pinola Conservancy
www.pinola.net

From: Ketram, Natchanon N <natchanon_ketram@fws.gov>
Sent: Friday, February 9, 2024 3:36:21 PM
To: Jacob Kraemer
Subject: Inquiry Regarding CSTASK1744474 - 3-200-41: Renewal of CBW - MA78121C-0

Good afternoon,

The USFWS has a few questions regarding the renewal of your CBW. I will provide these questions below.

1. Can you provide the latest version of your Louisiana state license?
2. Reviewing your registration back in 2018/2019, I saw that you included the breeding and transfer plans for your registered species. Can you provide the latest version of the executive summary of the breeding and transfer plans and the page that identify your institution continuing participation? If the breeding and transfer plan does not have an executive summary, then you can just send over the full document.
3. Your registration includes both the Japanese (red-crowned) crane and Cabot's tragopan pheasant. However, in your latest inventory, you stated that you currently only have 3 Japanese crane. Do you currently not have any Cabot's tragopan pheasant at your facility? Are you planning to acquire more in the future? If not, we can remove this species from your CBW if you would like.
4. Lastly, you may have already provided these annual reports to us and it got lost in the emails. Can you provide the annual reports for these reporting years?
    a. 3/31/2020 - covering year 2019
    b. 3/31/2021 - covering year 2020
    c. 3/31/2022 - covering year 2021
    d. 3/31/2023 - covering year 2022

In accordance with 50 CFR 13.11(e), if the requested information is not received by this office by **March 25, 2024**, 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. Please refer to permit application number CSTASK1744474 in your correspondence.

Thank you,

Natchanon Ketram
Permit Biologist
Branch of Permits
Division of Management Authority
International Affairs Program
U.S. Fish and Wildlife Service
Falls Church, VA, USA
(703) 358-2499

Draft for Institutional Representative Review – Please Respond by 1 March 2024

Population Analysis & Breeding and Transfer Plan

Red-crowned Crane (*Grus japonensis*) AZA Species Survival Plan® Provisional Program

AZA Species Survival Plan® Coordinator and Studbook Keeper
Taylor Keddie, Fort Wayne Children's Zoo
(Taylor.Keddie@kidszoo.org)

AZA Species Survival Plan® Vice Coordinator
Kimberly Boardman, International Crane Foundation
(kboardman@savingcranes.org)

AZA Population Advisor
Lillian Moore, Saint Louis Zoo
(lmoore@stlzoo.org)

Amanda Lawless, AZA Population Management Center at Lincoln Park Zoo
(alawless@lpzoo.org)

30 January 2024

PMC Population Management Center

LINCOLN PARK ZOO.

ASSOCIATION OF ZOOS & AQUARIUMS

Table of Contents

Acknowledgments

The Red-crowned Crane SSP planning meeting was held via online conferencing on 12 December 2023 attended by the following:

Taylor Keddie, Fort Wayne Children's Zoo
Kimberly Boardman, International Crane Foundation
Adam Eyres, Fossil Rim Wildlife Center
Lillian Moore, Saint Louis Zoo
Amanda Lawless, AZA Population Management Center at Lincoln Park Zoo

Cover photo courtesy of Rene Serafino, Fort Worth Zoo

This plan was prepared and distributed with the assistance of the
Planning Coordinator and Program Assistant at the
AZA Population Management Center (pmc@lpzoo.org).

Description of Population Status

Species Survival Plan® for the Red-crowned Crane (*Grus japonensis*)

Introduction: Red-crowned cranes, which are one of the largest species of cranes, received their name by the red skin which creates a 'cap' on the top of their head. These cold hardy cranes live in flocks, but create strong pair bonds. Breeding ranges of red-crowned cranes includes south-east Russia, north-east China, Mongolia and Hokkaido, Japan. According to the IUCN Red List, this species is at a high risk of extinction due to multiple threats affecting the small, declining continental Asian population and the dependence of the population in Japan on active conservation. The current global AZA SSP population consists of 103 animals (46 males, 54 females, and 3 unknown sex) distributed among 29 AZA facilities. The North American portion of the AZA population consists of 60 (27.33) animals distributed among 26 facilities and an additional 43 (19.21.3) animals located at three international AZA facilities (SEOUL, TEMAIKEN, YONG IN). Three new AZA facilities will be joining the SSP. The Gruiformes, Eurypygiformes, Cariamiformes & Otidiformes Taxon Advisory Group (TAG) had set the target population size for red-crowned cranes to be 75 animals (2020 Regional Collection Plan (RCP)). In agreement with the SSP Coordinator and Tag Chair, the target population size was increased to 118 animals, to account for the AZA population outside of North America since at the time of the creation of the RCP, the target population size only accounted for the North American population. Under AZA's new sustainability designations, as of 06 February 2023, this Animal Program is designated as a Provisional SSP. This is the seventh Breeding and Transfer Plan for this Program.

Analytical Assumptions and Exclusions: The pedigree of this population is 89.4% known before assumptions and exclusions. Pedigree assumptions were created and incorporated into an analytical studbook to address some of the unknownness in the population (Appendix A). Twelve (4.6.2) animals have been excluded from the potentially breeding population, with the majority being excluded for unknown pedigree (Appendix C). The potentially breeding population consists of 91 (42.48.1) individuals with 58 (26.32.0) residing in North America. Following assumptions and exclusions, the pedigree of the population is 100% known and 98.4% certain.

Demography: Red-crowned cranes first appeared in AZA facilities in 1935 at the Honolulu Zoo, which also recorded the first hatch in 1953. Hatches in human care began in the 1950's but this species was not held in significant numbers until the 1980s. Zoo hatches became consistent in the mid-1970s and have been the main driver of growth in the population. The population size grew steadily through 2013 through successful reproduction; however, since this time both the North American and global SSP populations have been in decline (Fig. 1). The total SSP population declined on average over the last five years by 3.6% (λ=0.964) with the North American population declining by 1.3% (λ=0.987). During that time, hatches (mean = 2.8) were not able to compensate for deaths (mean = 4.6) and exports out of the AZA population have been higher than imports. Managers have indicated higher breeding rates should be achievable for this population, but space constraints have limited recent breeding.

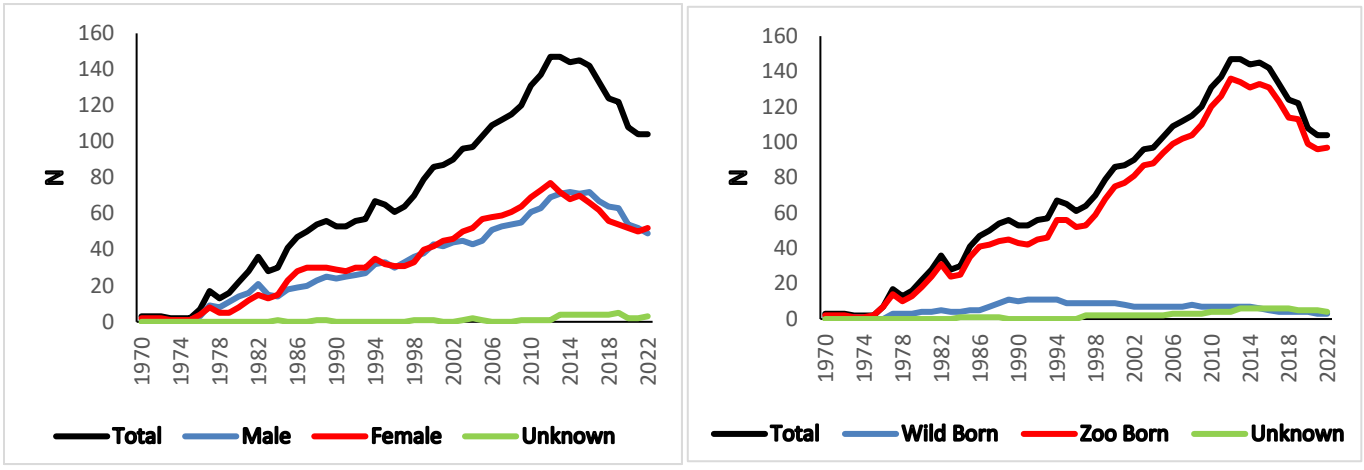


Figure 1. *Census of Red-crowned Crane SSP from 1970 to 2022 by sex (left) and hatch type (right)*

The age structure of the Red-crowned Crane SSP population is columnar (Fig. 2), reflecting the long-life expectancy and reproductive span but relatively slow reproductive rate (1-2 eggs per clutch) of these birds (Table 1). However, the age structure deviates from stable due to gaps and small age classes throughout the structure and a slight female sex skew. Hatches have been somewhat sporadic over the last ten years ranging from zero to six. There are currently only three birds between the ages of three to seven. A lack of available young birds could limit the population growth and the ability to offset aging birds as they become post-reproductive and are eventually lost naturally to attrition. Although the species is long-lived, facilities should focus on consistent breeding in order to produce a broader base of individuals and promote demographic stability.

Red-crowned cranes are seasonal breeders, with the majority of hatches occurring between April and July, with a peak in May and June. A single female can lay one to two eggs per clutch, but can re-clutch within a year. This species forms strong pair bonds and can be difficult to re-pair in the event of a death or poor genetic matches for breeding. Forming new bonds is possible, though some may take several years. For genetically mismatched pairs, this could create demographic problems by further limiting the number of birds available for breeding. Red-crowned cranes should not be housed singly.

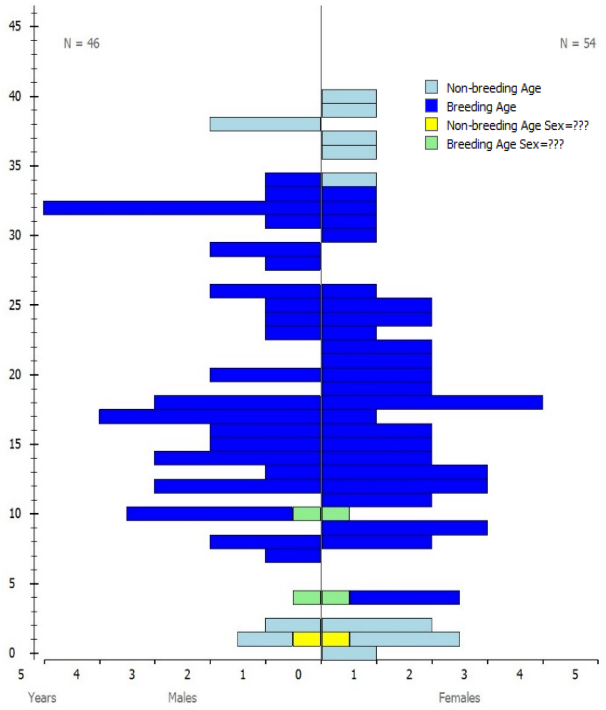


Figure 2. *Age distribution of the total population, N = 103 (46.54.3) in the Red-crowned Crane SSP*

Table 1: *Demographic status of Red-crowned Crane SSP population, according to studbook.*

Demography Summary		
Current size of SSP population (N) – Total (Males.Females.Unknown Sex)	103 (46.54.3)	
Number of individuals excluded from genetic analyses	12 (4.6.2)	
Population size following exclusions	91 (42.48.1)	
Target population size (Kt) from Gruiformes, Eurypygiformes, Cariamiformes & Otidiformes TAG *(updated 2023)*	118	
Mean generation time (T, years)	14.4	
Population growth rates (λ; lambda)*: Life Table / 5-year / Projected	1.026 / 0.952 / 1.003<>1.017<>1.029	
Percentage (%) of living population hatched ex situ	93.2	
Survival/Mortality	**Males**	**Females**
Observed first year mortality rate (Q_x)	0.254	0.276
Median life expectancy (MLE), excluding first year mortalities (years) (from PopLink Survival Statistics Report (https://www.aza.org/species-survival-statistics))	29.5	
Observed maximum longevity (L_x)	44	44 (wild caught)
Reproduction		
Observed reproductive age range	3–35	3–33
Incubation time	29-36 days	
Median clutch size hatched (clutch mates defined as those hatched within 3 days of each other)	1 - 2	

* Life table (AZA; 1970-present); 5-year (2018-2022) from studbook census; Projected from PMx stochastic 20-year projections (includes 95% confidence intervals)

Genetics: Based on pedigree assumptions and exclusions, the studbook pedigree indicates that this SSP is descended from 55 founders with zero potential founders remaining (Table 2). The gene diversity of the global SSP population is 96.85%, which is equivalent to that found in approximately 16 founders (FGE = 15.89). Founder representation in the population is slightly skewed (Fig. 3). Equalizing founder contributions through breeding under-represented founders will increase gene diversity within the SSP. Typical AZA program goals include thresholds for tolerance of gene diversity loss over time; 90% gene diversity retention for 100 years is a common population management goal. Decreases in gene diversity below 90% of that in the founding population have been associated with reproduction increasingly compromised by, among other factors, lower hatch weights, smaller clutch sizes, and greater neonatal mortality in some species. Based on current population parameters and recent growth rate trends, global SSP gene diversity is projected to decline to 89% over the next 100 years if the current population grows to the modified target size of 118 at its projected growth rate of 2.6%.

Potential gene diversity is 98.11% and can be exploited by careful breeding aimed at equalizing founder representation (by breeding animals with low and well-matched mean kinships, Appendix E), maintaining the high effective population size ratio (Ne/N = the proportion of animals contributing genetically to the next generation) and maintaining/increasing the population size. This high effective population size ratio can be maintained by continuing to rotate reproduction across breeding pairs, while maintaining the population within its holding capacity. Breeding recommendations are based on the genetic and demographic needs of the population and are meant to increase gene diversity and maintain demographic stability.

Another method to increase gene diversity is through the use of artificial insemination. Artificial insemination would allow highly valuable genetic pairings to be made without having to repair birds. Protocols for artificial insemination and semen collection have been established (See Management Strategy) and will allow for valuable genetic pairings to produce offspring and help to increase long-term gene retention that otherwise may have been impossible.

Table 2: *Genetic status and projections for the Red-crowned Crane SSP population*

Genetics Summary*						
	2012	*2018*	*2021*	**2023** (North America SSP)	**2023** (Global SSP)	**Potential**
Founders	*36*	*44*	*49*	49	55	0
Founder genome equivalents (FGE)	*14.72*	*13.92*	*14.54*	12.95	15.89	26.48
Gene diversity (GD %)	*96.60*	*96.41*	*96.56*	96.14	96.85	98.11
Population mean kinship (MK)	*0.0340*	*0.0359*	*0.0344*	0.0386	0.0315	--
Mean inbreeding (F)	*0.0025*	*0.0009*	*0.0096*	0.0031	0.0070	--
Effective population size relative to population size (N_e/N)	*0.3300*	*0.4271*	*0.3587*	0.4922	0.3585	--
Percentage of pedigree known before / after assumptions and exclusions	*100/ 100*	*97.8 / 100*	*85 / 100*	89.3 / 100	89.4 / 100	--
Percentage pedigree certain after assumptions and exclusions	--	*98.6*	*96*	98.3	98.4	--
Projections						
Years to 90% gene diversity	*44*	*50*	*55*	61	87	--
Years to 10% loss of gene diversity	*82*	*81*	*90*	103	129	--
Gene diversity at 100 Years (%)	--	*84.2*	*85*	86.4	89	--
	Assuming λ = 1.02, Target size = 70	*Assuming λ = 1, Target size =69,*	*Assuming λ = 0.947, Target size = 75, Starting population size = 105*	Assuming λ = 1.0254, Target size =75, Generation length= 13.0 Starting population size = 58	Assuming λ = 1.026, Target size =118, Generation length= 14.4 Starting population size = 91	

*Genetic statistics may not be comparable across years due to changes in software and parameters used for projections from year to year.
**Pedigree assumptions were created for this population and may over- or under-estimate genetic statistics shown in this table

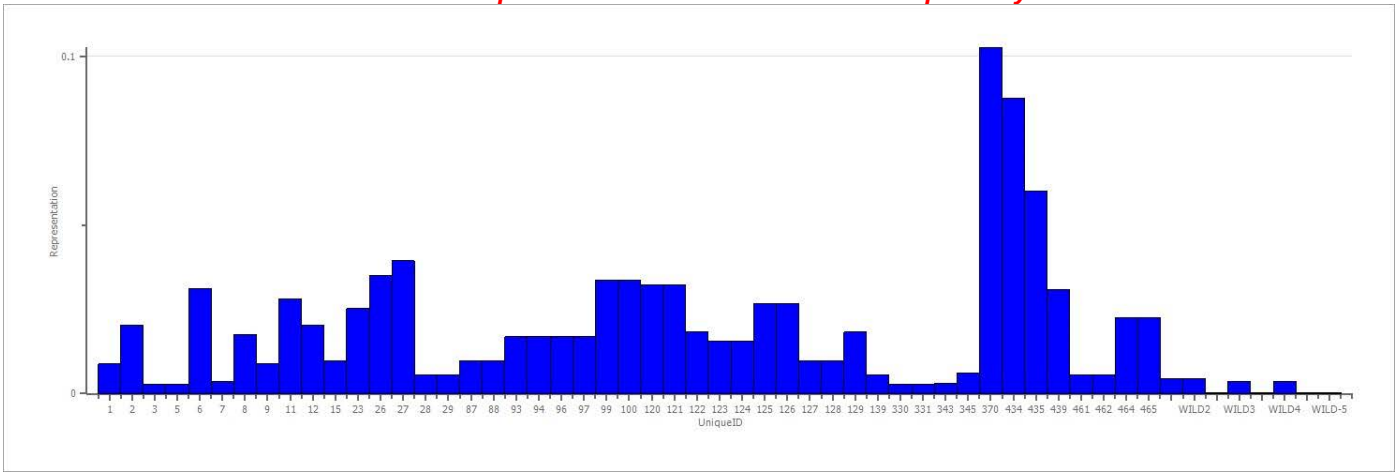


Figure 3. *Founder representation distribution of the analytical Red-crowned Crane SSP population*

Recommendation Outcomes: The website PMCTrack calculates the outcomes for SSP recommendations by comparing Breeding and Transfer Plan recommendations to hatches and transfers recorded in the studbook (Fig. 4). There are many reasons that recommendations might not be fulfilled, including interim recommendations issued by the SSP Coordinator; these reasons can be captured using PMCTrack Outcomes Surveys. Note that starting in 2022, SSP Coordinators directly add interim recommendations to PMCTrack to improve the accuracy of recommendation outcomes. The fulfillment rates of any plan that had outcomes calculated in 2022 or after may reflect inclusion of these interim rates; in the graph, this may include the last plan before 2022, such as a 2021 plan, plus any plans with a date of 2022 or after.

Of the recommendations proprosed in the 2021 Breeding and Transfer Plan, 86% of the BREED WITH recommendations were attempted/fulfilled, and 82% of SEND TO recommendations were attempted/fulfilled as requested. SSP participants are always encouraged to attempt to fulfill recommendations and communicate sucesses and challenges to the SSP Coordinator.

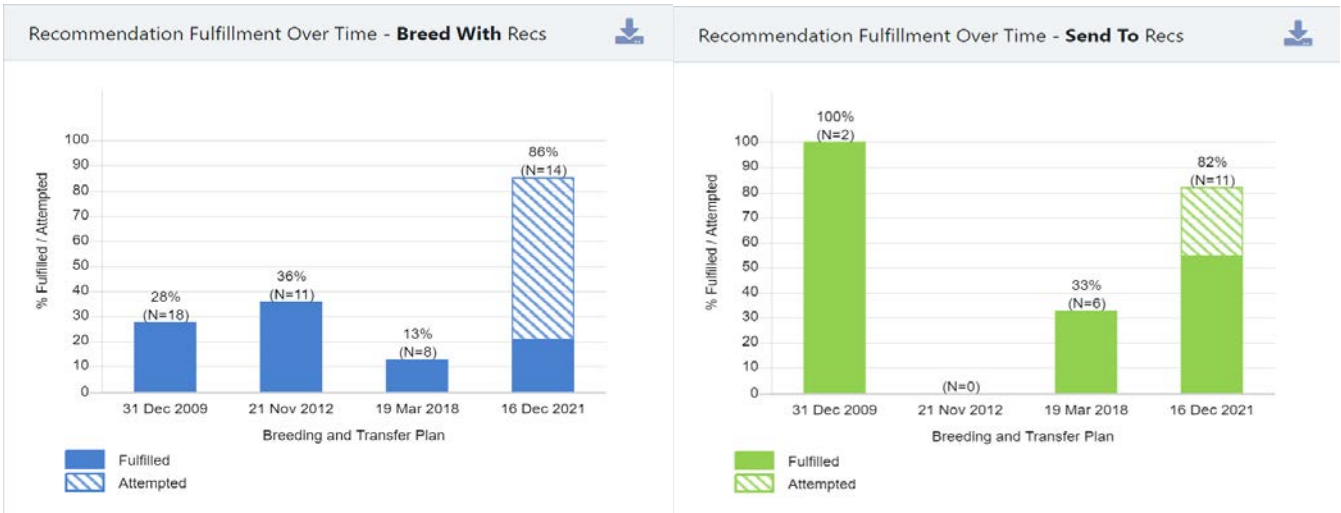


Figure 4. Recommendation outcomes by breeding (left) and transfers (right) for the past Red-crowned Crane SSP Breeding and Transfer Plans. N represents the number of recommendations scored for each recommendation type, per plan, and the number represents the percentage recommendations fulfilled. Please visit PMCTrack.org or contact pmctrack@lpzoo.org for more information or with any questions.

Management Strategies: Approximately 60% of the Red-crowned Crane SSP animals live in North America AZA facilities with the remaining 40% living in three international AZA facilities (1 in Argentina and 2 in South Korea). Five to six hatches are needed per year to maintain the current population size and seven to nine hatches are needed per year over the next 10 years to reach the modified target population size (Table 3). The recommended number of hatches needed per year is for the global SSP and in order to maintain and/or grow the population the AZA facilities in North America should contribute approximately 60% of those animals and the three international facilities should contribute the remaining 40%. Pairings have been recommended with the consideration of mean kinship, maximum avoidance of inbreeding, differences in sire and dam mean kinships, and the needs of individual facilities in an attempt to maintain gene diversity for as long as possible.

Protocols for artificial insemination and semen collection have been established (See Management Strategies) and in some cases will allow for valuable genetic pairings to produce offspring and help to increase long-term gene retention that otherwise may have been impossible.

This is a three-year plan (2024-2027). Interim recommendations will continue to be made as needed until another full set of recommendations are produced. Please promptly report any hatches to the SSP Coordinator, so that interim recommendations can be based on accurate population data. Recommendations contained in this plan supersede all previous recommendations.

Table 3: *Historic reproduction and future population goals*

Current Reproductive Goals Summary		
	Number of Hatches Needed per Year over the next 3 Years	**Target Population Size**
To maintain current population size (λ = 1.00)	5-6	103
To grow to the modified recommended target population size in 10 years (λ = 1.0137). The modified target size now includes the spaces utilized by the non-North American AZA population.	7-9	118
Reproductive Goals Summary from the Last BTP (2021)		
Number of females recommended to breed	13	
Number of hatches since then	7	
Average Number of Events in the SSP Population per Year over the Last Five Years (Global AZA/ North America AZA)		
Average number of hatches per year	2.8 / 2	
Average number of deaths per year	4.6 / 2.6	
Average number of imports per year	1 / 1	
Average number of exports per year	3.4 / 1.2	

1. **The SSP recommends 16 pairs to breed at 16 facilities.** The number of breeding pairs recommended is intended to maintain the current population size and slowly fill additional spaces as they become available.
    a. **Due to space constraints, please contact the SSP Coordinator when eggs are laid. Space needs have to be considered before chicks hatch.**
    b. Facilities recommended to breed are expected to hold offspring for at least two years.

2. **The SSP recommends five transfers to meet facility requests and make new companion or breeding pairs.**

3. The SSP discourages traditional hand rearing of cranes. This rearing method can result in birds that are sexually imprinted on humans, and may impact their ability to be paired and successfully reproduce with other cranes. With cranes, especially males, traditional hand rearing can create aggressive birds which can affect caretaker safety. Costume rearing is an established and effective alternative rearing method that can help preserve natural behaviors. Please contact SSP Coordinator for more information.

4. Red-crowned cranes form strong pair bonds and can be difficult to re-pair in the event of a death or poor genetic matches for breeding. Forming new bonds is possible, though some may take several years. *Red-crowned cranes should not be housed singly*.

5. Facilities interested in artificial insemination and semen collection can reference the Crane Husbandry Manual (https://www.savingcranes.org/wp-content/uploads/2018/08/crane_husbandry_manual.pdf), contact Vice-Coordinator Kim Boardman (kboardman@savingcranes.org) at the International Crane Foundation or contact the SSP Coordinator for more information.

6. Facilities interested in obtaining or placing red-crowned cranes should contact the SSP Coordinator to coordinate transfers that will facilitate genetic and demographic stability.

Breeding and Transfer Recommendations by Facility

ASHEBORO *(New AZA Facility)*

North Carolina Zoo

4401 Zoo Parkway, Asheboro, North Carolina 27205, United States

Facility Note: Contact the SSP Coordinator for further information on the transfer of SB #520 into the SSP.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
518	RCCR2301	F	0	RECEIVE FROM	PINOLA	DO NOT BREED		
520	B23006	F	0	RECEIVE FROM	TBD	DO NOT BREED		SEE NOTES

ATTLEBORO

Capron Park Zoo

201 County Street, Attleboro, Massachusetts 02703, United States

Facility Note: Please attempt AI with this pair. Contact SSP Coordinators for further information on AI. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
157	201002	F	24	HOLD	ATTLEBORO	BREED WITH	168	
168	201001	M	23	HOLD	ATTLEBORO	BREED WITH	157	

BARABOO

International Crane Foundation

PO Box 447, Baraboo, Wisconsin 53913, United States

Facility Note: Contact the SSP Coordinator for further information on the transfer of SB #326 into the SSP. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
49	150055	M	38	HOLD	BARABOO	BREED WITH	326	
150	150060	F	24	HOLD	BARABOO	DO NOT BREED		
313	B23002	F	13	RECEIVE FROM	BATTLE CR	DO NOT BREED		
324	150062	M	8	HOLD	BARABOO	DO NOT BREED		
326	5	F	8	RECEIVE FROM	TBD	BREED WITH	49	SEE NOTES
510	150063	F	1	HOLD	BARABOO	DO NOT BREED		

BATTLE CR

Binder Park Zoo

7400 Division Drive, Battle Creek, Michigan 49014, United States

Facility Note: The SSP is aware facility would like to receive a male. When an appropriate male becomes available, the SSP will make an interim recommendation.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
182	UND	F	22	HOLD	BATTLE CR	DO NOT BREED		
313	B23002	F	13	SEND TO	BARABOO	DO NOT BREED		

BIRMINGHM

Birmingham Zoo

2630 Cahaba Road, Birmingham, Alabama 35223, United States

Facility Note: Contact the SSP Coordinator if eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
110	222033	F	34	HOLD	BIRMINGHM	DO NOT BREED		
256	208008	M	16	HOLD	BIRMINGHM	DO NOT BREED		

CALGARY

Calgary Zoo, Garden & Prehistoric Park

1300 Zoo Road NE, Calgary, Alberta T2E 7V6, Canada

Facility Note: Contact the SSP Coordinator for further information on the transfer of SB #260 into the SSP, and when facility is ready to breed.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
243	111811	F	20	HOLD	CALGARY	DO NOT BREED		
260	A70096	M	18	RECEIVE FROM	TBD	DO NOT BREED		SEE NOTES

CINCINNAT

Cincinnati Zoo & Botanical Garden

3400 Vine Street, Cincinnati, Ohio 45220, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
132	295247	M	29	HOLD	CINCINNAT	BREED WITH	335	
335	218022	F	9	HOLD	CINCINNAT	BREED WITH	132	

CLEVELAND

Cleveland Metroparks Zoo

3900 Wildlife Way, Cleveland, Ohio 44109, United States

Facility Note: Please attempt AI with this pair. Contact SSP Coordinators for further information on AI. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
79	960308	M	32	HOLD	CLEVELAND	BREED WITH	186	
186	121102	F	22	HOLD	CLEVELAND	BREED WITH	79	

COLUMBUS

Columbus Zoo and Aquarium

PO Box 400, Powell, Ohio 43065, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
148	120014	F	25	HOLD	COLUMBUS	BREED WITH	316	
316	115015	M	10	HOLD	COLUMBUS	BREED WITH	148	

DALLAS

Dallas Zoo

650 S R L Thornton Freeway, Dallas, Texas 75203, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
241	04E935	F	20	HOLD	DALLAS	BREED WITH	312	
312	10K715	M	13	HOLD	DALLAS	BREED WITH	241	

DENVER

Denver Zoological Garden

2300 Steele Street, Denver, Colorado 80205, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
65	A15133	F	36	HOLD	DENVER	BREED WITH	113	
113	940417	M	32	HOLD	DENVER	BREED WITH	65	

DREHER PA

Palm Beach Zoo at Dreher Park

1301 Summit Boulevard, West Palm Beach, Florida 33405, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
188	203015	F	21	HOLD	DREHER PA	DO NOT BREED		
268	209237	M	14	HOLD	DREHER PA	DO NOT BREED		

FORTWORTH

Fort Worth Zoological Park

1989 Colonial Parkway, Fort Worth, Texas 76110, United States

Facility Note: Pair are good candidates for foster rearing.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
114	940707	M	33	HOLD	FORTWORTH	DO NOT BREED		Excluded-Infertile
115	940708	F	33	HOLD	FORTWORTH	DO NOT BREED		SEE NOTES

FOSSILRIM

Fossil Rim Wildlife Center

2155 CR 2008, Glen Rose, Texas 76043, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
37	19002	F	40	HOLD	FOSSILRIM	DO NOT BREED		Excluded-Medical
143	19000	M	26	HOLD	FOSSILRIM	DO NOT BREED		

GRANBY

Zoo de Granby

525, rue St-Hubert, Granby, Quebec J2G 5P3, Canada

Facility Note: The SSP is aware that facility would like to receive a male. When an appropriate male becomes available, the SSP will make an interim recommendation.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
501	B14020	F	9	HOLD	GRANBY	DO NOT BREED		

LOUISVILL

Louisville Zoological Garden

1100 Trevilian Way, Louisville, Kentucky 40233, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
240	202072	M	20	HOLD	LOUISVILL	BREED WITH	254	
254	202293	F	17	HOLD	LOUISVILL	BREED WITH	240	

MANHATTAN

Sunset Zoo

2333 Oak Street, Manhattan, Kansas 66502, United States

Facility Note: The SSP recognizes the age of this pair makes reproduction less likely, however a breeding recommendation was given because this pair is genetically valuable. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
40	201005	F	39	HOLD	MANHATTAN	BREED WITH	112	
112	990039	M	32	HOLD	MANHATTAN	BREED WITH	40	

NASHV ZOO *(New AZA Facility)*

Nashville Zoo at Grassmere

3777 Nolensville Pike, Nashville, Tennessee 37211, United States

Facility Note: Facility can receive SB #161 or #162. Contact the SSP Coordinator for further information on the transfer of SB #161 or #162 into the SSP. Contact the SSP Coordinator when facility is ready to breed.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
161	UND	F	14	RECEIVE FROM	TBD	DO NOT BREED		SEE NOTES
314	212001	M	12	RECEIVE FROM	WILDS	DO NOT BREED		

NEW BEDFO

Buttonwood Park Zoo

425 Hawthorn Street, New Bedford, Massachusetts 02740, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
509	2455	M	1	HOLD	NEW BEDFO	DO NOT BREED		
511	2427	F	1	HOLD	NEW BEDFO	DO NOT BREED		

NY BRONX

Bronx Zoo/Wildlife Conservation Society

2300 Southern Boulevard, Bronx, New York 10460, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
321	B16041	F	12	HOLD	NY BRONX	BREED WITH	328	
328	B17241	M	7	HOLD	NY BRONX	BREED WITH	321	

NZP-CRC

Smithsonian Conservation Biology Institute

1500 Remount Road, Front Royal, Virginia 22630, United States

Facility Note: Contact the SSP Coordinator for more information on the transfer of SB #506. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
104	217115	F	30	HOLD	NZP-CRC	DO NOT BREED		
249	215944	F	18	HOLD	NZP-CRC	BREED WITH	315	
315	216278	M	10	HOLD	NZP-CRC	BREED WITH	249	
504	UND	F	2	SEND TO	WINNIPEG	DO NOT BREED		
505	217227	M	2	SEND TO	WINNIPEG	DO NOT BREED		
506	217228	F	2	SEND TO	TBD	DO NOT BREED		SEE NOTES

PINOLA

Pinola Conservancy

410 Kay Lane, Shreveport, Louisiana 71115, United States

Facility Note: Due to space constraints, contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
310	RCCR1602	F	13	HOLD	PINOLA	BREED WITH	317	
317	RCCR1801	M	10	HOLD	PINOLA	BREED WITH	310	
518	RCCR2301	F	0	SEND TO	ASHEBORO	DO NOT BREED		

PROVIDNCE

Roger Williams Park Zoo

1000 Elmwood Avenue, Providence, Rhode Island 02907, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
179	200159	F	23	HOLD	PROVIDNCE	DO NOT BREED		
250	200176	M	17	HOLD	PROVIDNCE	DO NOT BREED		

SD-WAP

San Diego Zoo Safari Park

15500 San Pasqual Valley Road, Escondido, California 92027, United States

Facility Note: Please attempt AI with this pair. Contact SSP Coordinators for further information on AI. Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
131	895343	M	29	HOLD	SD-WAP	BREED WITH	318	
318	816049	F	9	HOLD	SD-WAP	BREED WITH	131	

SEATTLE

Woodland Park Zoo

5500 Phinney Avenue N, Seattle, Washington 98103, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
101	920702	F	31	HOLD	SEATTLE	BREED WITH	102	
102	920701	M	32	HOLD	SEATTLE	BREED WITH	101	

SEOUL

Seoul Zoo

42 Gwang Myong-gil, Gwacheon-city, Gyeonggi-do 427-080, South Korea

Facility Note: Contact the SSP Coordinator prior to acquiring additional animals.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
370	B8115	F	37	HOLD	SEOUL	DO NOT BREED		
371	B81127	F	19	HOLD	SEOUL	DO NOT BREED		
372	B81131	F	18	HOLD	SEOUL	DO NOT BREED		
373	B81132	F	18	HOLD	SEOUL	DO NOT BREED		
374	B81135	M	17	HOLD	SEOUL	DO NOT BREED		
375	B81141	F	16	HOLD	SEOUL	DO NOT BREED		
376	B81142	F	16	HOLD	SEOUL	DO NOT BREED		
377	B81145	F	15	HOLD	SEOUL	DO NOT BREED		
378	B81123	F	19	HOLD	SEOUL	DO NOT BREED		
379	B81154	F	14	HOLD	SEOUL	DO NOT BREED		
380	B81157	F	13	HOLD	SEOUL	DO NOT BREED		
381	B8-1-1-60	F	12	HOLD	SEOUL	DO NOT BREED		
382	B8-1-1-63	F	12	HOLD	SEOUL	DO NOT BREED		
383	B8-1-1-67	F	14	HOLD	SEOUL	DO NOT BREED		Excluded-Unknown Pedigree
385	B81173	F	4	HOLD	SEOUL	DO NOT BREED		
386	B8-1-1-73	F	4	HOLD	SEOUL	DO NOT BREED		
387	B81130	M	18	HOLD	SEOUL	DO NOT BREED		
388	B81133	M	18	HOLD	SEOUL	DO NOT BREED		
390	B81139	M	17	HOLD	SEOUL	DO NOT BREED		
391	B81148	M	15	HOLD	SEOUL	DO NOT BREED		
392	B81150	M	14	HOLD	SEOUL	DO NOT BREED		
395	B8-1-1-61	M	12	HOLD	SEOUL	DO NOT BREED		
396	B81120	M	20	HOLD	SEOUL	DO NOT BREED		
434	B8114	M	38	HOLD	SEOUL	DO NOT BREED		
438	B81136	M	17	HOLD	SEOUL	DO NOT BREED		
514	B81169	F	11	HOLD	SEOUL	DO NOT BREED		
512	B81176	U	1	HOLD	SEOUL	DO NOT BREED		
516	B81165	M	12	HOLD	SEOUL	DO NOT BREED		

TAUTPHAUS

Idaho Falls Zoo at Tautphaus Park

2925 Rollandet Avenue, Idaho Falls, Idaho 83405, United States

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
147	K4A035	F	25	HOLD	TAUTPHAUS	DO NOT BREED		
255	K8A001	M	16	HOLD	TAUTPHAUS	DO NOT BREED		

TEMAIKEN

Parque De Animales Silvestres Temaikn

Ruta 25 km 0.700r, Escobar Pcia, Buenos Aires 1625, Argentina

Facility Note: Contact the SSP Coordinator if pedigree information can be determined.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
440	UND	M	15	HOLD	TEMAIKEN	DO NOT BREED		
441	UND	M	14	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
442	UND	F	14	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
443	TK115788	F	10	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
444	TK119146	U	9	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
446	TK126506	M	8	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
447	TK126549	F	8	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree
448	3968	U	4	HOLD	TEMAIKEN	DO NOT BREED		Excluded-Unknown Pedigree

WATERTNSD

Bramble Park Zoo

PO Box 910, Watertown, South Dakota 57201, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
90	6063	M	31	HOLD	WATERTNSD	BREED WITH	325	
325	6064	F	8	HOLD	WATERTNSD	BREED WITH	90	

WILDS

The Wilds

14000 International Road, Cumberland, Ohio 43732, United States

Facility Note: Due to space constraints, please contact the SSP Coordinator when eggs are laid.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
80	961006	M	32	HOLD	WILDS	DO NOT BREED		
119	222002	F	32	HOLD	WILDS	BREED WITH	151	
151	990404	M	24	HOLD	WILDS	BREED WITH	119	
190	203001	F	21	HOLD	WILDS	DO NOT BREED		
314	212001	M	12	SEND TO	NASHV ZOO	DO NOT BREED		

WINNIPEG *(New AZA Facility)*

Assiniboine Park Zoo

2595 Roblin Boulevard, Winnipeg, Manitoba R3P 2N7, Canada

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
504	UND	F	2	RECEIVE FROM	NZP-CRC	DO NOT BREED		
505	217227	M	2	RECEIVE FROM	NZP-CRC	DO NOT BREED		

YONG IN

Everland Zoological Gardens

310 Jeondae-ri, Pokog-myun, Yongin-si, Gyeonggido 449-715, Korea, Republic Of

Facility Note: Contact the SSP Coordinator prior to acquiring additional animals.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
450	165	M	28	HOLD	YONG IN	DO NOT BREED		
454	174	M	18	HOLD	YONG IN	DO NOT BREED		Excluded-Unknown Pedigree
460	6160	F	18	HOLD	YONG IN	DO NOT BREED		Excluded-Unknown Pedigree
464	163	M	34	HOLD	YONG IN	DO NOT BREED		
469	352	M	26	HOLD	YONG IN	DO NOT BREED		
476	353	F	26	HOLD	YONG IN	DO NOT BREED		
477	169	M	25	HOLD	YONG IN	DO NOT BREED		

Appendices

A. Analytical Assumptions

There are MULTs used throughout the Red Crowned Crane SSP population to complete pedigrees for individual animals. Descriptions of the MULTs can be found in the studbook for this species.

ANALYTICAL DATA FOR TRUE INDIVIDUALS

Studbook ID	Field	TRUE	Overlay	Notes
260	Dam	UNK	WILD4	ZIMS Husbandry notes the bird hatched at VOS G (Netherlands). Presume unrelated to the North American AZA population.
	Sire	UNK	WILD3	
382	Dam	370	370	MULT represents possible sires that were at the facility SEOUL in 2011. MULT11= 434, 437, 438
	Sire	UNK	MULT11	
439	Dam	UNK	WILD	ZIMS Husbandry notes the bird came from South Korea, presume wild caught.
	Sire	UNK	WILD	
502	Dam	UNK	WILD2	502 and 503 were donated to the Honolulu Zoo by the City of Tokyo in 1935. Assume related to one another but not the rest of the SSP.
	Sire	UNK	WILD1	
503	Dam	UNK	WILD2	502 and 503 were donated to the Honolulu Zoo by the City of Tokyo in 1935. Assume related to one another but not the rest of the SSP.
	Sire	UNK	WILD1	

B. Summary of Data Exports

Studbook Name	Crane, Red Crowned (*Grus japonensis*) SSP
Studbook Currentness Date	12/12/2023
Studbook Software and version #	ZIMS for Studbooks 3.0
Overlay Name (if applicable)	2023_Overlay_Red crowned Crane
PMx version #	1.6.5.20220325
.fed file	AZA.fed
Descriptive Survival Statistics Report	Report is archived with PMC/AZA and Median Life Expectancy can be viewed here: https://www.aza.org/species-survival-statistics.

PMx Project: xxRedCrownedCrane121323
Created: 2023-12-13 by PMx version 1.6.5.20220325
File: C:\PMxProjects\xxRedCrownedCrane121323.pmxproj

Primary data file
Data File Name: zims.zims
Common Name: Red-crowned crane
Scientific Name: Grus japonensis
Data Source: ZIMS for Studbooks
Studbook Name: Crane, Red-crowned (Grus japonensis) SSP
Exported On: 2023-12-12
Software version: ZIMS for Studbooks 3.0
Current Through: 2023-12-12
Compiled By: Taylor Keddie
Scope: AZA
Dates: 1970-01-01 to 2023-12-12
Location:
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = Living
User: Lillian Moore

Moves data file
Data File Name: genetic.csv
Common Name: Red-crowned crane
Scientific Name: Grus japonensis
Data Source: ZIMS for Studbooks
Studbook Name: Crane, Red-crowned (Grus japonensis) SSP
Exported On: 2023-12-12
Software version: ZIMS for Studbooks 3.0
Current Through: 2023-12-12
Compiled By: Taylor Keddie
Scope: AZA
Dates: 1970-01-01 to 2023-12-12
Location:
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = None
User: Lillian Moore

Moves data file
Data File Name: demographic.csv
Common Name: Red-crowned crane
Scientific Name: Grus japonensis
Data Source: ZIMS for Studbooks
Studbook Name: Crane, Red-crowned (Grus japonensis) SSP
Exported On: 2023-12-12
Software version: ZIMS for Studbooks 3.0
Current Through: 2023-12-12
Compiled By: Taylor Keddie
Scope: AZA
Dates: 1970-01-01 to 2023-12-12
Location:
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = None
User: Lillian Moore

Locations data file
Data File Name: location.txt

Demographic input files
Census1 file: Exchcens.txt

Selected population was changed from the originally imported data.

C. Animals Excluded from Genetic Analyses

SB ID	Location	Sex	Age	Reason for Exclusion
37	FOSSILRIM	F	38	Medical
114	FORTWORTH	M	31	Infertile
383	SEOUL	F	12	Unknown pedigree
441	TEMAIKEN	M	12	Unknown pedigree
442	TEMAIKEN	F	12	Unknown pedigree
443	TEMAIKEN	F	8	Unknown pedigree
444	TEMAIKEN	U	7	Unknown pedigree
446	TEMAIKEN	M	5	Unknown pedigree
447	TEMAIKEN	F	5	Unknown pedigree
448	TEMAIKEN	U	1	Unknown pedigree
454	YONG IN	M	16	Unknown pedigree
460	YONG IN	F	16	Unknown pedigree

D. Life Tables

Px = survival; Qx = mortality; Lx = cumulative survivorship; Mx = fecundity; Ex = life expectancy; Vx = expected future reproduction,
At Risk (Qx and Mx) = number of animals corresponding values are estimated from.

MALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.75	0.25	110.89	1.00	0.00	110.89	20.95	1.15
1	0.91	0.09	109.98	0.75	0.00	109.98	24.40	1.44
2	0.99	0.02	99.76	0.68	0.00	99.76	24.69	1.55
3	0.95	0.06	96.53	0.67	0.00	96.53	24.54	1.65
4	0.98	0.02	93.69	0.64	0.03	93.69	24.48	1.76
5	0.98	0.02	89.81	0.62	0.07	89.81	24.00	1.82
6	0.96	0.05	86.22	0.61	0.04	86.22	23.80	1.85
7	0.95	0.05	80.56	0.58	0.14	80.56	23.91	1.94
8	0.99	0.01	75.58	0.55	0.17	75.58	23.65	1.90
9	1.00	0.00	72.58	0.55	0.15	72.58	22.80	1.79
10	0.99	0.01	70.20	0.55	0.14	70.20	21.96	1.69
11	0.97	0.03	66.50	0.54	0.20	66.50	21.42	1.63
12	0.99	0.02	65.89	0.52	0.22	65.89	20.89	1.50
13	0.98	0.02	63.27	0.51	0.15	63.27	20.21	1.32
14	1.00	0.00	60.79	0.51	0.12	60.79	19.36	1.21
15	0.95	0.05	55.33	0.51	0.14	55.33	18.86	1.15
16	0.98	0.02	50.91	0.48	0.24	50.91	18.55	1.08
17	1.00	0.00	48.72	0.47	0.17	48.72	17.72	0.87
18	0.98	0.02	44.69	0.47	0.14	44.69	16.90	0.73
19	0.98	0.02	41.78	0.46	0.05	41.78	16.27	0.62
20	0.95	0.05	38.86	0.45	0.14	38.86	15.86	0.61
21	0.97	0.03	35.37	0.43	0.09	35.37	15.47	0.50
22	1.00	0.00	34.25	0.41	0.10	34.25	14.67	0.43
23	0.97	0.03	32.02	0.41	0.03	32.02	13.89	0.34
24	1.00	0.00	30.64	0.40	0.08	30.64	13.10	0.32
25	0.97	0.03	27.81	0.40	0.11	27.81	12.31	0.25
26	0.96	0.04	25.24	0.39	0.10	25.24	11.73	0.16
27	1.00	0.00	24.00	0.37	0.02	24.00	10.94	0.05
28	0.92	0.08	23.46	0.37	0.00	23.46	10.36	0.04
29	1.00	0.00	21.19	0.34	0.00	21.19	9.78	0.04
30	0.85	0.15	19.49	0.34	0.00	19.49	9.49	0.04
31	1.00	0.00	16.54	0.29	0.00	16.54	9.24	0.05
32	1.00	0.00	13.70	0.29	0.00	13.70	8.24	0.05
33	1.00	0.00	10.62	0.29	0.00	10.62	7.24	0.05
34	0.90	0.10	8.73	0.29	0.00	8.73	6.57	0.05
35	0.88	0.13	7.55	0.26	0.00	7.55	6.27	0.06
36	0.86	0.14	6.96	0.23	0.07	6.96	6.08	0.07
37	0.83	0.17	4.78	0.20	0.00	4.78	6.00	0.00

FEMALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.72	0.28	125.03	1.00	0.00	125.03	20.96	1.16
1	0.94	0.06	118.11	0.72	0.00	118.11	24.47	1.46
2	0.95	0.05	102.91	0.68	0.00	102.91	24.84	1.59
3	0.98	0.02	97.09	0.65	0.02	97.09	24.68	1.69
4	0.98	0.02	92.33	0.64	0.08	92.33	24.12	1.74
5	0.97	0.03	89.55	0.62	0.10	89.55	23.76	1.76
6	0.98	0.02	85.24	0.60	0.12	85.24	23.42	1.76
7	0.95	0.05	80.84	0.59	0.10	80.84	23.24	1.75
8	0.99	0.01	80.30	0.56	0.11	80.30	22.94	1.74
9	1.00	0.00	78.40	0.55	0.12	78.40	22.08	1.69
10	0.99	0.01	75.75	0.55	0.07	75.75	21.22	1.63
11	0.99	0.01	72.20	0.55	0.13	72.20	20.50	1.63
12	0.99	0.01	71.04	0.54	0.08	71.04	19.78	1.56
13	0.97	0.03	66.45	0.53	0.11	66.45	19.20	1.55
14	0.95	0.05	60.85	0.52	0.06	60.85	18.93	1.55
15	1.00	0.00	54.17	0.49	0.15	54.17	18.39	1.57
16	0.98	0.02	52.27	0.49	0.05	52.27	17.56	1.47
17	0.98	0.02	47.83	0.48	0.07	47.83	16.90	1.49
18	0.98	0.02	44.36	0.47	0.02	44.36	16.23	1.49
19	0.98	0.02	41.39	0.46	0.08	41.39	15.58	1.54
20	1.00	0.00	40.10	0.45	0.26	40.10	14.76	1.51
21	1.00	0.00	37.98	0.45	0.17	37.98	13.76	1.29
22	0.94	0.06	35.28	0.45	0.16	35.28	13.13	1.18
23	0.97	0.03	32.52	0.43	0.35	32.52	12.68	1.10
24	0.97	0.03	29.81	0.41	0.32	29.81	12.07	0.79
25	1.00	0.00	27.04	0.40	0.18	27.04	11.26	0.49
26	1.00	0.00	25.58	0.40	0.06	25.58	10.26	0.32
27	1.00	0.00	25.47	0.40	0.00	25.47	9.26	0.27
28	1.00	0.00	26.00	0.40	0.04	26.00	8.26	0.27
29	0.89	0.12	24.95	0.40	0.08	24.95	7.71	0.26
30	0.96	0.04	21.82	0.35	0.02	21.82	7.30	0.20
31	1.00	0.00	20.58	0.34	0.07	20.58	6.44	0.18
32	0.85	0.15	17.99	0.34	0.06	17.99	5.90	0.12
33	0.94	0.06	14.66	0.29	0.07	14.66	5.51	0.07
34	0.93	0.07	12.97	0.27	0.00	12.97	4.83	0.00
35	1.00	0.00	12.00	0.25	0.00	12.00	3.98	0.00
36	0.83	0.17	10.25	0.25	0.00	10.25	3.25	0.00
37	0.74	0.26	7.19	0.21	0.00	7.19	2.84	0.00

MALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
38	1.00	0.00	3.13	0.16	0.00	3.13	5.50	0.00
39	1.00	0.00	2.00	0.16	0.00	2.00	4.50	0.00
40	1.00	0.00	2.00	0.16	0.00	2.00	3.50	0.00
41	1.00	0.00	2.00	0.16	0.00	2.00	2.50	0.00
42	0.50	0.50	1.28	0.16	0.00	1.28	2.00	0.00
43	1.00	0.00	1.00	0.08	0.00	1.00	1.50	0.00
44	0.00	1.00	0.00	0.08	0.00	0.00	1.00	0.00
45	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
46	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00

r = 0.025, λ = 1.025, Ro = 1.397, T = 13.4, N@20 = 85

FEMALES

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
38	1.00	0.00	4.00	0.15	0.00	4.00	2.17	0.00
39	0.67	0.33	3.08	0.15	0.00	3.08	1.40	0.00
40	0.00	1.00	1.49	0.10	0.00	1.49	1.00	0.00
41	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
42	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
43	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
44	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
46	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00

r = 0.027, λ = 1.027, Ro = 1.507, T = 15.3, N@20 = 85

E. Ordered Mean Kinship List

These lists are current to December 2023 and values are subject to change with any hatch, death, import, export, inclusion, exclusion, or changes in pedigree or pedigree assumptions. Unknown sexed animals appear on both the male and female side of the mean kinship list and are designated by a "U" following the studbook ID number.

Population MK = 0.0315
(as indicated by the black line)

MALES

SB ID	MK	Known	Age	Location
112	0.0098	1.0000	32	MANHATTAN
132	0.0103	1.0000	29	CINCINNAT
131	0.0103	1.0000	29	SD-WAP
440	0.0105	1.0000	15	TEMAIKEN
464	0.0112	1.0000	34	YONG IN
450	0.0140	1.0000	28	YONG IN
469	0.0140	1.0000	26	YONG IN
477	0.0140	1.0000	25	YONG IN
79	0.0153	1.0000	32	CLEVELAND
168	0.0165	1.0000	23	ATTLEBORO
312	0.0165	1.0000	13	DALLAS
49	0.0173	1.0000	38	BARABOO
314	0.0176	1.0000	12	WILDS
113	0.0204	1.0000	32	DENVER
240	0.0207	1.0000	20	LOUISVILL
324	0.0230	1.0000	8	BARABOO
90	0.0235	1.0000	31	WATERTNSD
250	0.0241	1.0000	17	PROVIDNCE
316	0.0265	1.0000	10	COLUMBUS
328	0.0265	1.0000	7	NY BRONX
151	0.0278	1.0000	24	WILDS
143	0.0288	1.0000	26	FOSSILRIM
317	0.0288	1.0000	10	PINOLA
80	0.0302	1.0000	32	WILDS
102	0.0337	1.0000	32	SEATTLE
509	0.0350	1.0000	1	NEW BEDFO
505	0.0351	1.0000	2	NZP-CRC
256	0.0365	1.0000	16	BIRMINGHM
268	0.0379	1.0000	14	DREHER PA
255	0.0379	1.0000	16	TAUTPHAUS
390	0.0384	1.0000	17	SEOUL
391	0.0384	1.0000	15	SEOUL
315	0.0393	1.0000	10	NZP-CRC

FEMALES

SB ID	MK	Known	Age	Location
40	0.0056	1.0000	39	MANHATTAN
501	0.0089	1.0000	9	GRANBY
321	0.0107	1.0000	12	NY BRONX
476	0.0140	1.0000	26	YONG IN
110	0.0162	1.0000	34	BIRMINGHM
186	0.0165	1.0000	22	CLEVELAND
104	0.0175	1.0000	30	NZP-CRC
241	0.0225	1.0000	20	DALLAS
325	0.0230	1.0000	8	WATERTNSD
115	0.0239	1.0000	33	FORTWORTH
249	0.0253	1.0000	18	NZP-CRC
510	0.0258	1.0000	1	BARABOO
157	0.0260	1.0000	24	ATTLEBORO
188	0.0265	1.0000	21	DREHER PA
318	0.0265	1.0000	9	SD-WAP
254	0.0267	1.0000	17	LOUISVILL
179	0.0268	1.0000	23	PROVIDNCE
65	0.0274	1.0000	36	DENVER
147	0.0274	1.0000	25	TAUTPHAUS
150	0.0278	1.0000	24	BARABOO
310	0.0279	1.0000	13	PINOLA
119	0.0281	1.0000	32	WILDS
335	0.0282	1.0000	9	CINCINNAT
148	0.0299	1.0000	25	COLUMBUS
511	0.0312	1.0000	1	NEW BEDFO
518	0.0312	1.0000	0	PINOLA
101	0.0337	1.0000	31	SEATTLE
506	0.0351	1.0000	2	NZP-CRC
504	0.0355	1.0000	2	NZP-CRC
182	0.0365	1.0000	22	BATTLE CR
313	0.0365	1.0000	13	BATTLE CR
243	0.0365	1.0000	20	CALGARY
190	0.0365	1.0000	21	WILDS
378	0.0384	1.0000	19	SEOUL

MALES

SB ID	MK	Known	Age	Location
434	0.0438	1.0000	38	SEOUL
388	0.0490	1.0000	18	SEOUL
392	0.0490	1.0000	14	SEOUL
395	0.0490	1.0000	12	SEOUL
512U	0.0496	1.0000	1	SEOUL
374	0.0503	1.0000	17	SEOUL
387	0.0503	1.0000	18	SEOUL
396	0.0503	1.0000	20	SEOUL
516	0.0503	1.0000	12	SEOUL
438	0.0537	1.0000	17	SEOUL

FEMALES

SB ID	MK	Known	Age	Location
379	0.0384	1.0000	14	SEOUL
514	0.0398	1.0000	11	SEOUL
371	0.0490	1.0000	19	SEOUL
373	0.0490	1.0000	18	SEOUL
376	0.0490	1.0000	16	SEOUL
377	0.0490	1.0000	15	SEOUL
381	0.0490	1.0000	12	SEOUL
512U	0.0496	1.0000	1	SEOUL
372	0.0503	1.0000	18	SEOUL
375	0.0503	1.0000	16	SEOUL
380	0.0503	1.0000	13	SEOUL
370	0.0513	1.0000	37	SEOUL
382	0.0546	1.0000	12	SEOUL
385	0.0553	1.0000	4	SEOUL
386	0.0553	1.0000	4	SEOUL

F. Definitions

Management Terms

Signature Species Survival Plan® (Signature SSP) Program – A Signature SSP Program are populations that are considered to be sustainable using robust measures of viability and sustainability defined by the AZA Animal Population Management Committee. A Signature SSP meets all of the requirements to become an SSP, and scores at least two positives and does not score any negatives in the SSP Assessment process.

Provisional Species Survival Plan® (Provisional SSP) Program – A Provisional SSP Program is a population that is a priority for AZA members, but does not currently meet the definitions of viability and sustainability defined by the AZA Animal Population Management Committee. A Provisional SSP Program meets all of the requirements to become an SSP and does not score a negative in more than two categories in the SSP Assessment process.

Sustainability Partners – AZA Animal Population Management (APM) Committee approved wildlife facilities that regularly exchange animals with AZA-accredited facilities and certified related facilities, typically as part of the Species Survival Plan® (SSP) Program Breeding and Transfer Plan or other SSP Program management process.

Full Participation – AZA policy stating that all AZA accredited facilities and certified related facilities having a SSP animal in their collection are required to participate in the collaborative SSP planning process (e.g., provide relevant animal data to the AZA Studbook Keeper, assign an Institutional Representative who will communicate facility wants and needs to the SSP Coordinator and comment on the draft plan during the 30-day review period, and abide by the recommendations agreed upon in the final plan).

All AZA member facilities and Animal Programs, regardless of management designation, must adhere to the AZA Policy on Responsible Population Management and the AZA Code of Professional Ethics. For more information on AZA policies, see https://www.aza.org/board-approved-policies-and-position-statements.

Currentness Date – The date when the entire studbook is updated. This equates to the first date you received an update after requesting updates from all the facilities included in your studbook.

Demographic Terms

Age Distribution – A visual representation of the numbers or percentages of individuals in various age and sex classes.

Ex, Life Expectancy – The average years of further life for an animal in age class x.

Lambda (λ) or Population Growth Rate – The proportional change in population size from one year to the next. A lambda of 1.11 means an 11% per year increase; a lambda of 0.97 means a 3% decline in size per year. The three lambdas highlighted in this BTP are: 1) Life Table, from the PMx life tables, the change in the population based on the demographic regional and date window exported from the studbook, the life table lambda is the rate at which the population would be expected to grow (in the future) given the birth and death rates reported in the life tables and assuming a stable age distribution (does NOT factor in imports or exports); 2) 5-year, from the studbook census, the 5-year lambda is calculated from observed changes in population size over the last 5 years and includes births, deaths, imports and exports; and 3) Projected, from the PMx stochastic 20-year projections (includes confidence intervals), models how the population is predicted to grow or decline over the next 20 years given the birth and death rates from the life tables and the age structure of the current population.

lx, Age-Specific Survivorship – The probability that a new individual (e.g., age 0) is alive at the *beginning* of age *x*. Alternatively, the proportion of individuals which survive from birth to the beginning of a specific age class.

Mean Generation Time (T) – The average time elapsing from reproduction in one generation to the time the next generation reproduces. Also, the average age at which a female (or male) produces offspring. It is not the age of first reproduction. Males and females often have different generation times.

Median Life Expectancy (MLE) – The 'typical' age at which an average animal is expected to live; 50% will die before the median life expectancy and 50% die after. The MLE reported in Breeding and Transfer Plans (BTPs) and Survival Stats Reports, does excludes individuals that did not survive to their first birthday. The MLE obtained from population management software (PM2000, PMx, ZooRisk) or from life tables in BTPs (e.g., where Lx = 0.5) will be lower because they include those individuals that did not survive to their first birthday in order to project the correct number of births needed. A Survival Statistics Library is maintained for most AZA Animal Programs on the AZA website: https://www.aza.org/species-survival-statistics.

Maximum Longevity – The maximum age at which we have observed a species to live. If the oldest observed animal is currently living, we do not yet know the maximum longevity.

Mx, Fecundity – The average number of same-sexed offspring born to animals in that age class. Because studbooks typically have relatively small sample sizes, studbook software calculates Mx as 1/2 the average number of offspring born to animals in that age class. This provides a somewhat less "noisy" estimate of Mx, though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

Px, Age-Specific Survival – The probability that an individual of age *x* survives an age class; is conditional on an individual being alive at the beginning of the age class. Alternatively, the proportion of individuals that survive from the beginning of one age class to the next.

Qx, Mortality – The probability that an individual of age *x* dies during an age class (Qx = 1-Px). Alternatively, the proportion of individuals that die during an age class. It is calculated from the number of animals that die during an age class divided by the number of animals that were alive at the beginning of the age class (i.e., "at risk").

Risk (Qx or Mx) – The number of individuals that have lived during an age class. The number “at risk” is used to calculate Mx and Qx by dividing the number of births and deaths that occurred during an age class by the number of animals at risk of dying and reproducing during that age class.

Target Population Size (TPS) – The desired number of SSP animals to be held across AZA and approved partner facilities over a specific, stated timeframe. This number is determined with consideration for program roles and goals (genetic, demographic, and others), logistical constraints, spatial competition with other TAG-managed species, and other population-specific concerns. Target Population Size is determined by the Taxon Advisory Group (TAG) and published in their Regional Collection Plan (RCP).

Vx, **Reproductive Value –** The expected number of offspring produced this year and in future years by an animal of age *x*.

Genetic Terms

Allele – Alternate forms of DNA at a particular position in a genome (genetic locus). Alleles represent the most basic form of genetic diversity.

Gene Diversity (GD) – The probability that two alleles randomly sampled from the same genetic locus across a population are not identical by descent. Gene diversity is calculated relative to a population’s founders, which are assumed to be unrelated and not inbred, and is the proportional diversity retained by the current, descendant population.

Effective Population Size (N_e) – The size of a randomly mating population of constant size with equal sex ratio and a Poisson distribution of family sizes that would (a) result in the same mean rate of inbreeding as that observed in the population, or (b) would result in the same rate of random change in allele frequencies (genetic drift) as observed in the population. These two definitions are identical only if the population is demographically stable (because the rate of inbreeding depends on the distribution of alleles in the parental generation, whereas the rate of allele frequency drift is measured in the current generation). More specifically, PMx software uses the definition as the size of the current population that have produced offspring, assuming that there are current breeders, that these current breeders have a Poisson distribution of family sizes, that none of the current breeders are now post-reproductive, and none of the not-yet-breeding adults will breed.

Founder – An individual obtained from a source population (often the wild) that has no known relationship to any individuals in the derived population (except for its own descendants).

Founder Genome Equivalents (FGE) – The number of wild-caught individuals (founders) that represent the same amount of gene diversity as does the population under study. The gene diversity of a population is 1 - 1 / (2 * FGE).

Founder Representation – The proportion of the alleles in the living, descendant population that are derived from that founder.

Inbreeding Coefficient (F) – The probability that the two alleles present at an individual’s genetic locus are identical by descent (i.e., both alleles originated from an ancestor common to both the individual’s parents).

Mean Kinship (MK) – The mean (or average) kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. An individual’s mean kinship is a measure of how well its alleles are represented within a population. Animals with low mean kinships have few relatives, are from under-represented founder lineages, and have transmitted few of their alleles to the next generation; these individuals should be prioritized for breeding to slow a population’s gene diversity loss.

Percent Known – The percentage of an animal's genome that is traceable to known founders. Thus, if an animal has an UNK sire, its % Known = 50. If it has an UNK grandparent, its % Known = 75.

Percent Certain – The percentage of the living individuals’ pedigree that can be completely identified as *certain:* (exact identity of both parents is known) and traceable back to known founders. Individuals that are 100% *certain* do not have any MULTs or UNKs in their pedigree. *Certainty* represents a higher degree of knowledge than *Known* and therefore is always less than or equal to *Known.*

G. AZA Animal Population Management (APM) Committee Disclaimers

This managed population is currently an SSP and subject to AZA Full Participation and Sustainability Partner policies. APM Committee-approved Sustainability Partners are expected to agree and abide by AZA's Code of Professional Ethics, SSP Full Participation Policy, Policy on Responsible Population Management, and Accreditation Standards related to animal care and welfare.

H. Directory of Institutional Representatives

Facility Name	Mnemonic	Contact Name (IR or Advisor)	Email
North Carolina Zoo	ASHEBORO	Wendy Wadsworth	wendy.wadsworth@nczoo.org
Capron Park Zoo	ATTLEBORO	Brenda Young	zooleader201@gmail.com
International Crane Foundation	BARABOO	Kimberly Boardman	kboardman@savingcranes.org
Binder Park Zoo	BATTLE CR	Brett Linsley	blinsley@binderparkzoo.org
Birmingham Zoo	BIRMINGHM	Tiffani Thompson	tthompson@birminghamzoo.com
Wilder Institute/Calgary Zoo	CALGARY	Jennifer Godwin	jenniferg@calgaryzoo.com
Cincinnati Zoo & Botanical Garden	CINCINNAT	Jenny Gainer	jennifer.gainer@cincinnatizoo.org
Cleveland Metroparks Zoo	CLEVELAND	Travis Vineyard	tgv@clevelandmetroparks.com
Columbus Zoo and Aquarium	COLUMBUS	Ann Marie Wookey	ann.wookey@columbuszoo.org
Dallas Zoo	DALLAS	Nathan Compton	Nathan.Compton@dallaszoo.com
Denver Zoo	DENVER	Christopher Munch	cmunch@denverzoo.org
Palm Beach Zoo	DREHER PA	Callie Coxson	ccoxson@palmbeachzoo.org
Fort Worth Zoo	FORTWORTH	Shelly Collinsworth	scollinsworth@fortworthzoo.org
Fossil Rim Wildlife Center	FOSSILRIM	Janet Johnson	janetj@fossilrim.org
Zoo de Granby	GRANBY	Chantal Routhier	crouthier@zoodegranby.com
Louisville Zoological Garden	LOUISVILL	James McKinney	james.mckinney@louisvilleky.gov
Sunset Zoological Park	MANHATTAN	Kirk Nemechek	nemechek@cityofmhk.com
Nashville Zoo, Inc.	NASHV ZOO	Joe DeGraauw	jdegraauw@nashvillezoo.org
Buttonwood Park Zoo	NEW BEDFO	Shara Rapoza	sharac@newbedford-ma.gov
Bronx Zoo	NY BRONX	Chuck Cerbini	ccerbini@wcs.org
Smithsonian's Conservation Biology Institute	NZP-CRC	Chris Crowe	CroweCI@si.edu
Pinola Conservancy	PINOLA	Jessica Cockrell	jcockrell@pinola.net
Roger Williams Park Zoo	PROVIDNCE	Amy Roberts	aroberts@rwpzoo.org
San Diego Zoo Safari Park	SD-WAP	Andrew Stehly	astehly@sdzwa.org
Woodland Park Zoo	SEATTLE	Kim Szawan	Kim.Szawan@Zoo.org
Seoul Zoo	SEOUL	Bosook Kim	kbs6666@seoul.go.kr
Idaho Falls Zoo at Tautphaus Park	TAUTPHAUS	Katie Barry	kbarry@idahofallszoo.org
Fundacion Temaiken	TEMAIKEN	Andres Suares	ASuares@temaiken.org.ar
Bramble Park Zoo	WATERTNSD	Stacy Plocher	splocher@brambleparkzoo.com
The Wilds	WILDS	Daniel Beetem	dbeetem@thewilds.org
Assiniboine Park Zoo	WINNIPEG	Jackie Enberg	jenberg@assiniboinepark.ca
Samsung C&T Everland Zoo	YONG IN	Soonghee Youn	hapysh3@naver.com

Exported from PMCTrack as of 16 January 2024

State of Louisiana

Department of Wildlife and Fisheries
Licensing
Post Office Box 14796
Baton Rouge, LA 70898-4796

OFFICIAL LICENSE

DOB: [redacted]
EXP: 12/31/2024

LIC#: 328452
PAUL M DICKSON
PO BOX 51367
SHREVEPORT LA 71135

1 RES GAME BREEDER

NOT VALID UNLESS SIGNED ON REVERSE SIDE

RESIDENCY REQUIREMENTS

"Bona fide resident" means any person who is a United States citizen or resident alien and has resided in the state continuously during the twelve months immediately prior to the date on which they apply for any license and who has manifested their intent to remain in this state by establishing Louisiana as their legal domicile, as demonstrated by compliance with all of the following, as applicable:

- If registered to vote, they are registered to vote in Louisiana.
- If licensed to drive a motor vehicle, they are in possession of a Louisiana driver's license, or, if over the age of fifteen years and not licensed to drive, they are in possession of a special identification card issued by the Department of Public Safety and Corrections under the provisions of R.S. 40:1321.
- If owning a motor vehicle located within Louisiana, they are in possession of a Louisiana registration for that vehicle.
- If earning income, they have filed a Louisiana state income tax return and has complied with state income tax laws and regulations.

As to a corporation, or other legal entity, a resident shall be any which is incorporated or otherwise organized under and subject to the laws of Louisiana, and which is domiciled in Louisiana and has a permanent physical location of business in Louisiana where records are held.

Any person, corporation, or other legal entity which possesses a resident license from any other state or country shall not qualify for a resident license in Louisiana.

NONRESIDENT means any person who is not a bona fide resident as the term defined above.

Where the proof shows that a license as a resident has been obtained by fraud or subterfuge, the vessels and equipment used under the license shall be forfeited.

Licensees are required to abide by the laws, rules and regulations pursuant to license requirements and to keep informed of any updates and changes to Laws, Rules and Regulations.

Jan 24 2024 6:30AM Payment received: $50.00

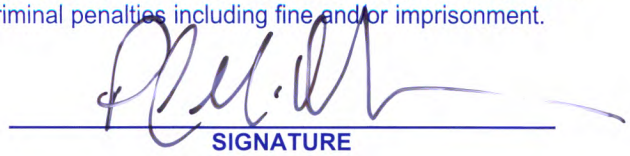
The sale of white-tailed deer meat is illegal and therefore this game breeder's license is not a permit to do so.

1
PAUL M DICKSON
PO BOX 51367
SHREVEPORT LA 71135

An Equal Opportunity Employer

20-115986

I have read the contents of the attached letter. By obtaining and signing this license, I hereby certify that I meet the residency requirements set forth in R.S. 56:8 and any other requirements specified in the attached document. I understand that furnishing false documents or otherwise obtaining any Department issued license by fraud or false representations may subject me to criminal penalties including fine and/or imprisonment.



SIGNATURE

Population Analysis & Breeding and Transfer Plan

Cabot's Tragopan (*Tragopan caboti*) AZA Species Survival Plan® Provisional Program

AZA Species Survival Plan® Coordinator & Studbook Keeper
Chuck Cerbini, Wildlife Conservation Society/Bronx Zoo
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AZA Population Advisor
Kristine Schad Eebes, AZA Population Management Center at Lincoln Park Zoo
(kschad@lpzoo.org)
Alex Garretson, AZA Population Management Center at Lincoln Park Zoo
(agarretson@lpzoo.org)

17 April 2023

PMC Population Management Center

LINCOLN PARK ZOO.

ASSOCIATION OF ZOOS & AQUARIUMS

Table of Contents

Acknowledgments

The Cabot's Tragopan SSP planning meeting was held via online conferencing on 14 December 2022, and attended by the following:

Chuck Cerbini, Wildlife Conservation Society Bronx Zoo
Kristine Schad Eebes, AZA Population Management Center at Lincoln Park Zoo
Alex Garretson, AZA Population Management Center at Lincoln Park Zoo

Cover photo courtesy of Alex Levitskiy, Blue Creek Aviaries

This plan was prepared and distributed with the assistance of the Planning Coordinator, PMCTrack Coordinator, and Program Assistant at the AZA Population Management Center (pmc@lpzoo.org).

Description of Population Status

Species Survival Plan® for the Cabot's Tragopan (*Tragopan caboti*)

Introduction: The Cabot's Tragopan SSP managed population consists of 27 individuals (12 males and 15 females) at 13 AZA facilities. In their 2018 RCP, the Galliformes Taxon Advisory Group (TAG) set a target population size of 60 individuals. Under AZA's new sustainability designations, as of 6 February 2023, this Animal Program is designated as a Provisional SSP.

We performed demographic and genetic analyses of the AZA Regional Cabot's Tragopan Studbook (Current to 31 October 2022) in December 2022 using PopLink 2.4 and PMx version 1.6.5.20220325. The recommendations in this plan supersede those made in previous plans.

Analytical Assumptions and Exclusions: The pedigree of this population is 0% known before assumptions. An analytical studbook was developed previous to and during the 2022 planning meeting to address historical unknownness in this population's pedigree (Appendix A). No individuals were excluded from the potentially breeding population (Appendix C). After these assumptions, the potentially breeding population has an 88% known pedigree.

Demography: According to studbook data, the SSP population of Cabot's tragopan began with the arrival of two individuals at the Denver Zoo in 1983. The first hatches at an AZA facility occurred in 1987 at the San Diego Zoo; however, reproduction did not become consistent for this species at AZA facilities until the mid-1990s. Through a combination of reproduction and continued import of birds from facilities outside of the AZA, the SSP population showed a boom and bust pattern while it gradually increased to its peak of 34 birds in 2018. Over the last five years, the population grew at an average rate of 2.9% a year (five year mean $\lambda = 1.029$) and averaged 7.2 hatches per year.

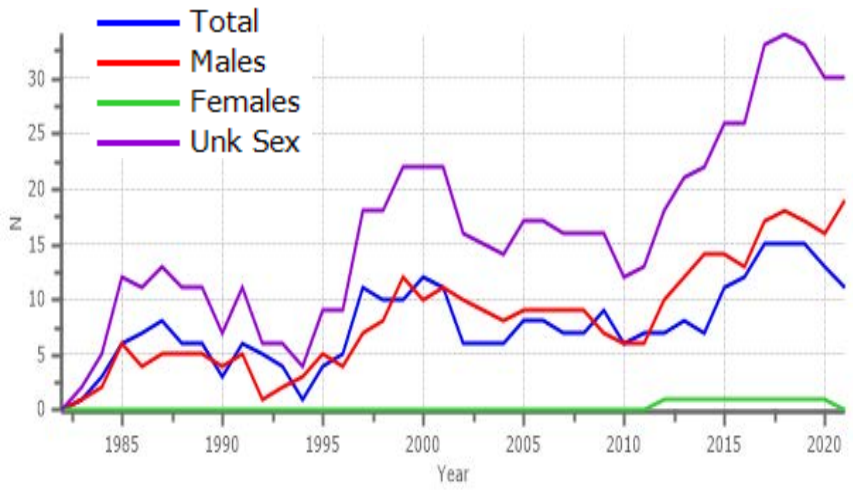

Figure 1. *Census of the Cabot's Tragopan SSP population by sex from 1982 to 2019.*

The age structure for the Cabot's Tragopan SSP population deviates from a stable age structure, with many gaps throughout the reproductive age classes (Figure 2). This structure is indicative of inconsistent breeding at SSP facilities in the past. Encouragingly, the population has a fairly solid base of individuals in the younger age classes. To achieve demographic stability and avoid future demographic bottlenecks, the SSP should continue to focus on consistent annual reproduction and the recruitment of tragopan from the youngest reproductive age classes into the breeding population.

This species typically breeds in pairs or trios of 1.2. According to 85 reproductive events in the studbook, the mean clutch size is 1.64, with a range of one to four eggs. In comparison, the SSP Coordinator has observed clutches of up to five eggs and anecdotally thinks that the true biological median is likely closer to four eggs, but more data are needed to determine what is biologically possible for this newer population. Most clutches are laid in May, but ranging from April through June. This season appears to be extending a bit due to re-clutching a couple weeks after the initial clutches are laid. This re-clutching will also help increase the population size and demographic stability of this population.

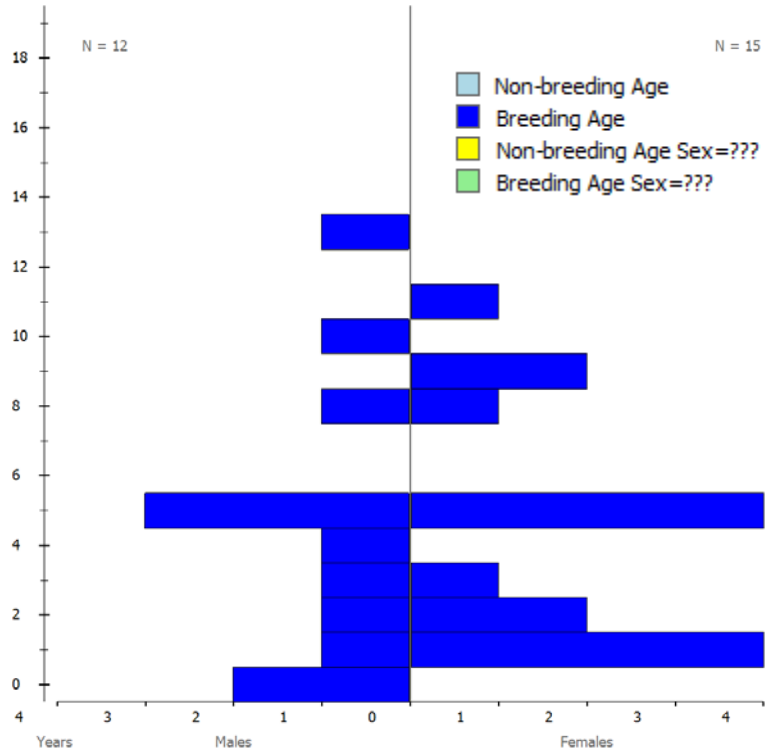

Figure 2. *Age structure of the total Cabot's Tragopan SSP population, N = 27 (12.15.0)*

Table 1: *Demographic status of SSP population, according to studbook.*

Demography Summary		
Current size of SSP population (N) – Total (Males.Females.Unknown Sex)	27 (12.15.0)	
Number of individuals excluded from genetic analyses	0 (0.0.0)	
Population size following exclusions	27 (12.15.0)	
Target population size (Kt) from Galliformes TAG 2018 RCP	60	
Mean generation time (T, years)	5.3	
Population growth rates (λ; lambda)*: Life Table / 5-year / Projected	0.986 / 1.029 / 0.826 <> 0.921 <> 0.998	
Percentage (%) of living population hatched ex situ	100	
Survival/Mortality	**Males**	**Females**
Observed first year mortality rate (Q_x)	0.426	0.310
Median life expectancy (MLE), excluding first year mortalities (years) (from PopLink Survival Statistics Report (https://www.aza.org/species-survival-statistics))	4.6	4.6
Observed maximum longevity (L_x) (Studbook ID # of individual)	14.9 (SB # 141)	13.8 (SB # 54)
Reproduction		
Observed reproductive age range (years)	0.86 – 14.13	1.03–11.07
Gestation/Incubation time	26 - 28 days	
Median number of hatches/clutch	1.64	

* Life table (AZA: 1/1/1997 – present); 5-year from studbook census; Projected from PMx stochastic 20-year projections

Genetics: Based on an analytical studbook, the SSP potentially breeding population is descended from 13 founders with no potential founders remaining. The gene diversity of the population is 86.16%, which is equivalent to that found in four to three founders (FGE = 3.61). Typical AZA program goals include thresholds for tolerance of gene diversity loss over time; 90% gene diversity retention for 100 years is a common management goal. Decreases in gene diversity below 90% of that in the founding population have been associated with reproduction increasingly compromised by, among other factors, lower hatch weights, smaller clutch sizes, and greater neonatal mortality in some species. Based on current population parameters and recent growth rate trends, gene diversity is projected to decline to 62.6% over the next 10 generations (53 years) if the current population continues to grow at its projected growth rate of 2.9% (λ = 1.029). Potential gene diversity remains above the 90% threshold (92.45%), and could potentially be achieved through the increased equalization of founder representation (Figure 3), the recruitment of potential founders, and by breeding animals with low and well-matched mean kinship values.

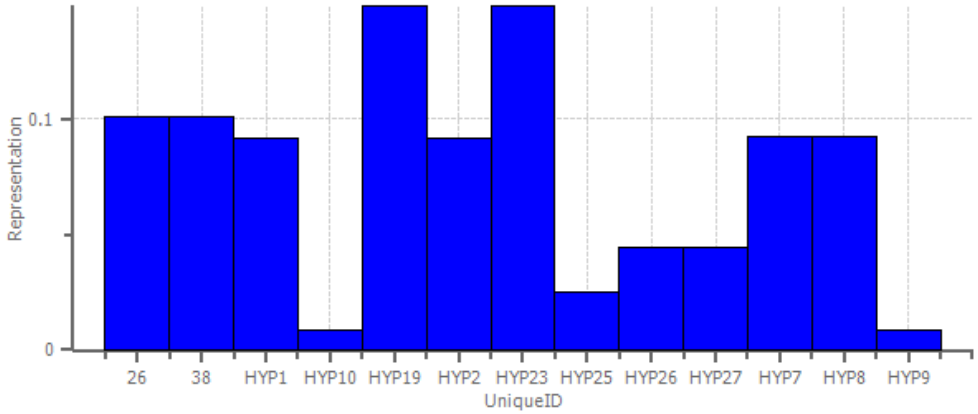

Figure 3. *The unequal distribution of founder lineages for the Cabot's Tragopan SSP potentially breeding population.*

Table 2: *Genetic status and projections for the Cabot's Tragopan SSP population.*

	Genetics Summary*			
	2018	***2020***	**2022**	**Potential**
Founders	*17*	*15*	13	0
Founder genome equivalents (FGE)	*5.10*	*4.38*	3.61	6.53
Gene diversity (GD %)	*90.21*	*88.59*	86.16	92.35
Population mean kinship (MK)	*0.0979*	*0.1141*	0.1384	--
Mean inbreeding (F)	*0.0684*	*0.0905*	0.0527	--
Effective population size (N_e/N)	*0.3448*	*0.3431*	0.3439	--
Percentage of pedigree known before / after assumptions and exclusions	*0% / 100%*	*0% / 100 %*	0% / 100%	--
Percentage pedigree certain after assumptions and exclusions	*100%*	*100%*	96.3%	--
	Projections			
Years to 90% gene diversity	0	GD < 90%	GD < 90%	--
Years to 10% loss of gene diversity	11	16	14	--
Gene diversity in 10 generations (%)	56.5	65.8	62.6	--
	Assuming λ = 1.0037 *Target size = 50* *Generation length = 5* *Starting population size = 30*	*Assuming λ = 1.0209* *Target size = 60* *Generation length = 5* *Starting population size = 30*	*Assuming λ = 1.029* *Target size = 60* *Generation length = 5.3* *Starting population size = 27*	----

**Pedigree assumptions were created for this population and may over- or under-estimate genetic statistics shown in this table. Also note that genetic statistics may not be comparable across years due to changes in software and parameters used for projections from year to year.*

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Recommendation Outcomes: The website PMCTrack calculates the outcomes for SSP recommendations by comparing Breeding and Transfer Plan recommendations to births/hatches and transfers recorded in the studbook (Figure 4). There are many reasons that recommendations might not be fulfilled, including interim recommendations issued by the SSP Coordinator; these reasons can be captured using PMCTrack Outcomes Surveys. Note that starting in 2022, SSP Coordinators directly add interim recommendations to PMCTrack to improve the accuracy of recommendation outcomes. The fulfillment rates of any plan that had outcomes calculated in 2022 or after may reflect inclusion of these interim rates; in the graph, this may include the last plan before 2022, such as a 2020 plan.

Of the recommendations proprosed in the 2020 Breeding and Transfer Plan, 18% of the BREED WITH recommendations were fulfilled, and 100% of SEND TO recommendations were fulfilled, as requested by December 2022. SSP participants are always encouraged to attempt to fulfill recommendations and communicate sucesses and challenges to the SSP Coordinator.

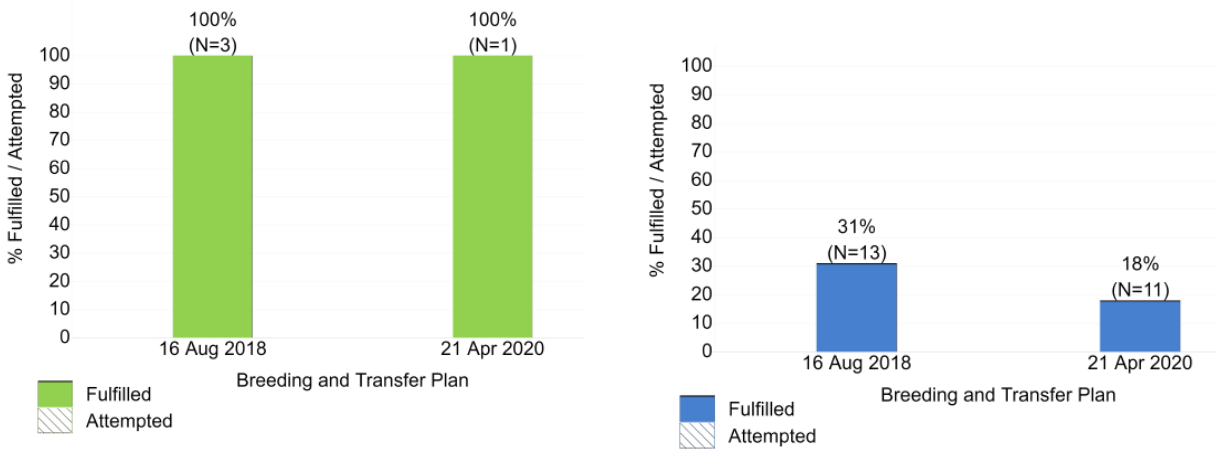

Figure 4. Recommendation outcomes by transfers (left) and breeding (right) for the past Cabot's Tragopan SSP Breeding and Transfer Plans. N represents the number of recommendations scored for each recommendation type, per plan, and the number represents the percentage recommendations fulfilled (filled) or attempted (diagonals). Please visit PMCTrack.org or contact pmctrack@lpzoo.org for more information or with any questions.

Management Strategies: Demography is a priority for this population due to the smaller population size and interest in growing. **A management goal of this three-year planning cycle is to maintain existing and establish more successful breeding pairs and trios at fewer AZA facilities in order to increase reproduction and once the population size has grown, then add more facilities within the SSP.** Due to a completely unknown ancestry, extensive pedigree assumptions were created in order to minimize inbreeding and breeding recommendations for closely related individuals while also reducing the over-representation of certain lineages.

This is still a fairly new population and as such, we are still learning about the maximum longevity, reproductive lifespan, and clutch size. With recent improvements in all these areas as well as a continued increase in participating facilities, the SSP expects an increase in the number of offspring produced as well as their survivorship.

This is a three-year plan (2022 – 2025), but may change to a two-year plan in the future. Interim recommendations will continue to be made as needed until another full set of recommendations are produced. Recommendations contained in this plan supersede all previous recommendations.

Table 3: *Historic reproduction and future population goals.*

Current Reproductive Goals Summary		
	Number of Hatches Needed per Year over the next 3 Years	**Target Population Size**
To maintain current population size (λ = 1.00)	7–8	27
To grow to the TAG's recommended target population size in 5 years (Kt = 60; λ = 1.647)	13–18	60
To grow to the TAG's recommended target population size, in 10 years (Kt = 60; λ = 1.0792)	10–12	60
Reproductive Goals Summary from the Last BTP (2020)		
Number of females recommended to breed	13	
Number of hatches since then	9	
Average Number of Events in the SSP Population per Year over the Last Five Years		
Average number of hatches per year	6.00	
Average number of deaths per year	7.40	
Average number of imports per year	1.20	
Average number of exports per year	0.80	

At this time, the SSP:

1. **Recommends 11 females to breed.**
    a. Facilities recommended to breed are expected to hold offspring for at **least one year**.

2. **Recommends two transfers** to establish new pairs and meet facility requests**.**

3. Is looking for current facilities to get even more serious about breeding this species. The short-term goal is to decrease the number of facilities in order to increase reproduction and the population size. Once that is accomplished, then the SSP will recruit more facilities to join the SSP to meet the demographic and genetic goals for this population. **Facilities interested in breeding, obtaining, or placing Cabot's tragopan should contact the SSP Coordinator to coordinate transfers that will facilitate genetic and demographic stability.**

4. Suggests that facilities receiving animals from outside the SSP should attempt to obtain as much parentage information as possible in order to reduce inbreeding within the population, determine true parentage, and facilitate future breeding and transfer recommendations.

5. Supports research on infertility issues being observed in this population. If you are interested in leading or getting involved in such a project, contact the SSP Coordinator.

6. **Supports the Galliformes TAG's suggestion to replace non-recommended species with Cabot's tragopan** (2018 RCP). These other species include satyr tragopan, Blyth's tragopan, Temminck's tragopan, Himalayan Monal, Koklass pheasant, and Elliot's pheasant.

Breeding and Transfer Recommendations by Facility

DENVER
Denver Zoological Garden
Denver, Colorado

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
233	A17144	M	10	HOLD	DENVER	BREED WITH	234	Demographic pairing
234	A17145	F	9	HOLD	DENVER	BREED WITH	233	Demographic pairing

DULUTH
Lake Superior Zoological Gardens
Duluth, MN

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
231	200271	F	5	HOLD	DULUTH	BREED WITH	254	
254	200296	M	3	HOLD	DULUTH	BREED WITH	231	

GARDENCTY
Lee Richardson Zoo
Garden City, Kansas

Facility Note: The SSP appreciates GARDENCTY's willingness to send out this male to breed. The SSP will prioritize GARDENCTY for Cabot's tragopan again once they are available.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
236	219005	M	4	SEND TO	TOLEDO	BREED WITH	228, 187	Demographic pairing

LOUISVILL
Louisville Zoological Garden
Louisville, Kentucky

Facility Note: The SSP will search for males to breed with these two females once they are reproductively mature and males are available.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
268	202845	F	1	HOLD	LOUISVILL	DO NOT BREED		
269	202846	F	1	HOLD	LOUISVILL	DO NOT BREED		

NATAVPGH
National Aviary in Pittsburgh
Pittsburgh, Pennsylvania

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
200	8496	M	8	HOLD	NATAVPGH	BREED WITH	264	Demographic pairing
264	unknown	F	2	HOLD	NATAVPGH	BREED WITH	200	Demographic pairing

NEW BEDFO
Buttonwood Park Zoo
New Bedford, Massachusetts

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
226	2107	M	5	HOLD	NEW BEDFO	BREED WITH	230	Demographic pairing
230	2105	F	5	HOLD	NEW BEDFO	BREED WITH	226	Demographic pairing
261	2284	F	2	SEND TO	PHILADELP	BREED WITH	158	Demographic pairing

NY BRONX
Bronx Zoo/Wildlife Conservation Society
Bronx, New York

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
165	B11234	F	11	HOLD	NY BRONX	BREED WITH	265	Demographic pairing
265	B21137	M	2	HOLD	NY BRONX	BREED WITH	165	Demographic pairing
272	B22079	M	0	HOLD	NY BRONX	DO NOT BREED		
273	B22085	M	0	HOLD	NY BRONX	DO NOT BREED		

PHILADELP
Philadelphia Zoo
Philadelphia, Pennsylvania

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
158	206241	M	13	HOLD	PHILADELP	BREED WITH	261	Demographic pairing
261	2284	F	2	RECEIVE FROM	NEW BEDFO	BREED WITH	158	Demographic pairing

PINOLA
Pinola Conservancy
Shreveport, Louisiana

Facility Note: The SSP will search for an additional male to breed with one of these females when males are available.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
243	CATR1702	F	5	HOLD	PINOLA	BREED WITH	271	Demographic pairing
256	CATR2001	F	3	HOLD	PINOLA	BREED WITH	271	Demographic pairing
271	CATR2101	M	1	HOLD	PINOLA	BREED WITH	243, 256	Demographic pairing

SEATTLE
Woodland Park Zoo
Seattle, Washington

Facility Note:

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
270	207452	F	1	HOLD	SEATTLE	DO NOT BREED		

ST AUGUST
St. Augustine Alligator Farm
St. Augustine, Florida

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
229	A1713	M	5	HOLD	ST AUGUST	BREED WITH	267	
267	A2221	F	1	HOLD	ST AUGUST	BREED WITH	229	

ST LOUIS
Saint Louis Zoological Park
St Louis, Missouri

Facility Note: The SSP will search for a male to breed with this female when males are available.

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
197	119454	F	8	HOLD	ST LOUIS	DO NOT BREED		

TOLEDO

Toledo Zoological Gardens

Toledo, Ohio

SB ID	Local ID	Sex	Age	Disposition	Location	Breeding	With	Notes
187	13555	F	9	HOLD	TOLEDO	BREED WITH	236, 227	Demographic pairing
227	13306	M	5	HOLD	TOLEDO	BREED WITH	187, 228	Demographic pairing
228	12899	F	5	HOLD	TOLEDO	BREED WITH	236, 227	Demographic pairing
236	219005	M	4	RECEIVE FROM	GARDENCTY	BREED WITH	228, 187	Demographic pairing

Appendices

A. Analytical Assumptions

Hypothetical Individuals

Studbook ID	Sire	Dam	First Location	Notes
HYP1	WILD	WILD	UNKNOWN	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP4 x HYP5 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG.
HYP2	WILD	WILD	UNKNOWN	SSUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
HYP3	HYP1	HYP2	UNKNOWN	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
HYP4	HYP1	HYP2	UNKNOWN	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
HYP5	HYP1	HYP1	UNKNOWN	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG.
HYP6	HYP1	HYP2	UNKNOWN	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG

Studbook ID	Sire	Dam	First Location	Notes
HYP7	WILD	WILD	UNKNOWN	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
HYP8	WILD	WILD	UNKNOWN	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
HYP9	WILD	WILD	UNKNOWN	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
HYP10	WILD	WILD	UNKNOWN	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
HYP11	WILD	WILD	UNKNOWN	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.
HYP12	WILD	WILD	UNKNOWN	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.
HYP13	WILD	WILD	UNKNOWN	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.
HYP14	WILD	WILD	UNKNOWN	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.

Studbook ID	Sire	Dam	First Location	Notes
HYP19	WILD	WILD	UNKNOWN	#163 and 166 were hatched by Don Hunsinger in Montrose, PA, who is a breeder. Don likely received his tragopan from SUMNER or OLSEN stock. The relatedness of these two birds was assessed by the World Pheasant Associations (WPA) and estimated to be half-sublings. With this information, along with similar hatch dates, these two will be assumed to be half-siblings with HYP19 x HYP20 and HYP19 x HYP23 parents, which have wild grandparents.
HYP20	WILD	WILD	UNKNOWN	#163 and 166 were hatched by Don Hunsinger in Montrose, PA, who is a breeder. Don likely received his tragopan from SUMNER or OLSEN stock. The relatedness of these two birds was assessed by the World Pheasant Associations (WPA) and estimated to be half-sublings. With this information, along with similar hatch dates, these two will be assumed to be half-siblings with HYP19 x HYP20 and HYP19 x HYP23 parents, which have wild grandparents.
HYP21	WILD	WILD	UNKNOWN	#165 was hatched at an unknown location in 2011 and then transferred to NY BRONX. Due to the year of hatch, it is likely that this individual was zoo hatched and related to others in the SSP population, but it is not clear how. For now, we will assume that #165 is unrelated to others in the SSP, until we get more information on this individual.
HYP22	WILD	WILD	UNKNOWN	#165 was hatched at an unknown location in 2011 and then transferred to NY BRONX. Due to the year of hatch, it is likely that this individual was zoo hatched and related to others in the SSP population, but it is not clear how. For now, we will assume that #165 is unrelated to others in the SSP, until we get more information on this individual.
HYP23	WILD	WILD	UNKNOWN	#163 and 166 were hatched by Don Hunsinger in Montrose, PA, who is a breeder. Don likely received his tragopan from SUMNER or OLSEN stock. The relatedness of these two birds was assessed by the World Pheasant Associations (WPA) and estimated to be half-sublings. With this information, along with similar hatch dates, these two will be assumed to be half-siblings with HYP19 x HYP20 and HYP19 x HYP23 parents, which have wild grandparents.
HYP24	HYP3	HYP4	UNKNOWN	SB IDs 243 and 244 came to PINOLA from an unknown private breeder, however, conversations with the SSP coordinator suggest that these birds came from the same stock as other existing birds at PINOLA (SB IDs 194 and 196). HYP24 is a combination of HYP3 and HYP4. HYP3 and HYP4 link SB IDs 194 and 196 at PINOLA to their sources at SUMNER R/OLSEN. Thus, HYP24 links 244 and 243 to the same sources as the other PINOLA birds.
HYP25	WILD	WILD	UNKNOWN	While SB IDs 244 and 243 at PINOLA likely came from the same stock as 194 and 196, they were imported 5 years later. This makes it unlikely that 244 and 243 are siblings with 194 and 196. HYP25 was given WILD/WILD parents and made the dam for 244 and 243 to relate these individuals as half siblings to 195 and 196.
HYP26	WILD	WILD	UNKNOWN	#274 hatched at an unknown location in 2018 and transferred to CRAWFRD W in 2019. Similar to other previous pedigree assumptions for this population, this new pedigree assumption was discussed during the 2022 planning meeting and determined that it is fair to assume that it represents a somewhat unique family group, while likely being distantly related to the rest of the SSP population, it was given HYP26 x HYP27 parents and wild grandparents.
HYP27	WILD	WILD	UNKNOWN	

Analytical Data for True Individuals

Studbook ID	Field	TRUE	Overlay	Notes
163	Dam	UNK	HYP23	#163 and 166 were hatched by Don Hunsinger in Montrose, PA, who is a breeder. Don likely received his tragopan from SUMNER or OLSEN stock. The relatedness of these two birds was assessed by the World Pheasant Associations (WPA) and estimated to be half-siblings. With this information, along with similar hatch dates, these two will be assumed to be half-siblings with HYP19 x HYP20 and HYP19 x HYP23 parents, which have wild grandparents.
	Sire	UNK	HYP19	
165	Dam	UNK	HYP23	New information for the 2022 planning meeting indicate that #165 was hatched by Don Hunsinger in Montrose, PA, who is a breeder, before being transferred to NY BRONX. This also includes #165 being a full sibling to #163 and half-sibling to #166. With all this in mind, #165's assumed parents have been changed to HYP19 x HYP23, the same as #163.
	Sire	UNK	HYP19	
166	Dam	UNK	HYP20	#163 and 166 were hatched by Don Hunsinger in Montrose, PA, who is a breeder. Don likely received his tragopan from SUMNER or OLSEN stock. The relatedness of these two birds was assessed by the World Pheasant Associations (WPA) and estimated to be half-siblings. With this information, along with similar hatch dates, these two will be assumed to be half-siblings with HYP19 x HYP20 and HYP19 x HYP23 parents, which have wild grandparents.
	Sire	UNK	HYP19	
182	Dam	UNK	HYP12	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.
	Sire	UNK	HYP11	
183	Dam	UNK	HYP14	PRITCHETT is in Washington state and imported 2 zoo hatched tragopan from Glen Howe in 1998. #182 and 183 both came from UNKNOWN location and arrived at PRITCHETT in early 1990s. At this time, most tragopan were zoo hatched, but some imports were still occurring from China. For these reasons, #182 and 183 will be given HYP11 x HYP12 and HYP13 x HYP14 parents, with WILD grandparents to represent these likely unique pedigrees at this time.
	Sire	UNK	HYP13	
192	Dam	UNK	HYP6	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP5	
193	Dam	UNK	HYP10	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
	Sire	UNK	HYP9	
194	Dam	UNK	HYP4	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP3	
195	Dam	UNK	HYP4	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including

Studbook ID	Field	TRUE	Overlay	Notes
	Sire	UNK	HYP3	SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
196	Dam	UNK	HYP4	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP3	
201	Dam	UNK	HYP2	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP1	
207	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
208	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
209	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
210	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same

Studbook ID	Field	TRUE	Overlay	Notes
	Sire	UNK	26	parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
212	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
213	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
214	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
215	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
216	Dam	UNK	38	These nine tragopan all originated at HOWE GLEN sometime between 1990 and 2010. He received animals from Europe and Pheasant Trust and has been hatching tragopan since 1983. All other tragopan known to be from HOWE GLEN are either dead or LTF and have unknown parents and no living descendants, except for #73, 72, and 84, which all have the same

Studbook ID	Field	TRUE	Overlay	Notes
	Sire	UNK	26	parents - #26 x 38. As a conservative assumption, these nine tragopan will be assumed to have the same parents (26 x 38) to show their relatedness to these other individuals from HOWE GLEN. In addition, two individuals from ROBERTS D, which are also from HOWE GLEN in the 1990s will be assumed related to these nine and given the same parents (26 x 38). However, the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
233	Dam	UNK	HYP2	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP1	
234	Dam	UNK	HYP2	SUMNER R Ron received tragopan from China as well as HOWE GLEN and was breeding a lot. He was also using AI to increase production and likely had a couple dozen tragopan. He also sent birds to many locations, including SEXTON and LANDIG. So HYP1 x HYP2 parents were created to represent a breeding pair at SUMNER R. HYP3 x HYP4 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to SEXTON. HYP5 x HYP6 (representing offspring of HYP1 x HYP2) will represent the parents of the offspring sent to LANDIG
	Sire	UNK	HYP1	
26	Dam	UNK	WILD	According to the studbook, only #26, 35, 36, and 38 came from TIANHU and all went to SANDIEGOZ. Because TIANHU is in the native range of Cabot's tragopan and SANDIEGOZ brought these individuals in to breed, we will assume that these individuals were wild caught and unrelated to each other. However, #35 and 36 are dead with no living descendants, so only #26 and 38 will receive this assumption.
	Sire	UNK	WILD	
38	Dam	UNK	WILD	According to the studbook, only #26, 35, 36, and 38 came from TIANHU and all went to SANDIEGOZ. Because TIANHU is in the native range of Cabot's tragopan and SANDIEGOZ brought these individuals in to breed, we will assume that these individuals were wild caught and unrelated to each other. However, #35 and 36 are dead with no living descendants, so only #26 and 38 will receive this assumption.
	Sire	UNK	WILD	
61	Dam	UNK	38	#79 and 61 came from ROBERTS D is in Cross Plains, WI, from HOWE GLEN. ROBERTS D received tragopan from HOWE GLEN in the 1990s (when these two arrived) and had about 10 breeding pairs. He appears to have imported other species of birds from African in the 1960s and 1970s. As a conservative assumption, these tragopan will be assumed to have the same parents (26 x 38) as the other nine individuals currently descended from the HOWE GLEN tragopan in the 1990s. This will show their relatedness to these other individuals from HOWE GLEN, however the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	
78	Dam	UNK	HYP8	OLSEN R imported 3.1 from China around the mid/late-1980s and again for 4 zoo hatched tragopan from China in 2000. There appear to be two imports over time from the Hunan breeding center in China. #78 and 193 both hatched at OLSEN R, but about 10 years apart. So these are likely zoo bred individuals, but potentially unrelated and not too distant from the wild population. These two individuals will get the assumed parents HYP7 HYP8 and HYP9 x HYP10, with WILD grandparents.
	Sire	UNK	HYP7	
79	Dam	UNK	38	#79 and 61 came from ROBERTS D is in Cross Plains, WI, from HOWE GLEN. ROBERTS D received tragopan from HOWE GLEN in the 1990s (when these two arrived) and had about 10 breeding pairs. He appears to have imported other species of birds from African in the 1960s and 1970s. As a conservative assumption, these tragopan will be assumed to have the same parents (26 x 38) as the other nine individuals currently descended from the HOWE GLEN tragopan in the 1990s. This will show their relatedness to these other individuals from HOWE GLEN, however the true relatedness of these 11 individuals is unknown and could be siblings or more distant cousins.
	Sire	UNK	26	

Studbook ID	Field	TRUE	Overlay	Notes
243, 244	Sire	UNK	HYP24	#243 and 244 came to PINOLA from an unknown private breeder, however, conversations with the SSP coordinator suggest that these birds came from the same stock as other existing birds at PINOLA (SB IDs 194 and 196). HYP24 is a combination of HYP3 and HYP4. HYP3 and HYP4 link SB IDs 194 and 196 at PINOLA to their sources at SUMNER R/OLSEN. Thus, HYP24 links 244 and 243 to the same sources as the other PINOLA birds. While SB IDs 244 and 243 at PINOLA likely came from the same stock as 194 and 196, they were imported 5 years later and it is not known if they came from the same private breeder. This makes it unlikely that 244 and 243 are siblings with 194 and 196. HYP25 was given WILD/WILD parents and made the dam for 244 and 243 to relate these individuals as half siblings to 195 and 196.
	Dam	UNK	HYP25	
274	Sire	UNK	HYP27	#274 hatched at an unknown location in 2018 and transferred to CRAWFRD W in 2019. Similar to other previous pedigree assumptions for this population, this new pedigree assumption was discussed during the 2022 planning meeting and determined that it is fair to assume that it represents a somewhat unique family group, while likely being distantly related to the rest of the SSP population, it was given HYP26 x HYP27 parents and wild grandparents.
	Dam	UNK	HYP26	

B. Summary of Data Exports

Studbook Name	Tragopan, Cabot's (Tragopan caboti)
Studbook Currentness Date	31 October 2022
Studbook Software and version #	ZIMS for Studbooks release date: 6 September 2022
Overlay Name (if applicable)	PMC2022
PMx version #	1.6.0.20220325
.fed file	AZA.fed
Descriptive Survival Statistics Report	Report is archived with PMC/AZA and Median Life Expectancy can be viewed here: https://www.aza.org/species-survival-statistics

PMx Project: Cabot's Tragopan new assumptions
Created: 2022-12-14 by PMx version 1.6.5.20220325
File: C:\PMxProjects\Cabot's Tragopan new assumptions.pmxproj

Primary data file
Data File Name: zims.zims
Common Name: Cabot's tragopan
Scientific Name: Tragopan caboti
Data Source: ZIMS for Studbooks
Studbook Name: Tragopan, Cabot's (Tragopan caboti)
Exported On: 2022-12-14
Software version: ZIMS for Studbooks 3.0
Current Through: 2019-03-27
Compiled By: Chuck Cerbini, Chuck Cerbini
Scope: AZA
Dates: 1997-01-01 to 2022-12-14
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = Living
User: Alex Garretson

Moves data file
Data File Name: genetic.csv
Common Name: Cabot's tragopan
Scientific Name: Tragopan caboti
Data Source: ZIMS for Studbooks
Studbook Name: Tragopan, Cabot's (Tragopan caboti)
Exported On: 2022-12-14
Software version: ZIMS for Studbooks 3.0
Current Through: 2019-03-27
Compiled By: Chuck Cerbini, Chuck Cerbini
Scope: AZA
Dates: 1997-01-01 to 2022-12-14
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = None
User: Alex Garretson

Moves data file
Data File Name: demographic.csv
Common Name: Cabot's tragopan
Scientific Name: Tragopan caboti
Data Source: ZIMS for Studbooks
Studbook Name: Tragopan, Cabot's (Tragopan caboti)
Exported On: 2022-12-14
Software version: ZIMS for Studbooks 3.0
Current Through: 2019-03-27
Compiled By: Chuck Cerbini, Chuck Cerbini
Scope: AZA
Dates: 1997-01-01 to 2022-12-14
Association: AZA / Association of Zoos & Aquariums (AZA)
Other Filters: Status = None
User: Alex Garretson

Region data file
Data File Name: LOCATION.TXT
Locations data file
Data File Name: location.txt
Demographic input files
Census1 file: Exchcens.txt
4 births to parents with unknown ages have been added in proportion to known aged parents. This is 3% of TOTAL births (N=133)

C. Animals Excluded from Genetic Analyses

No animals were excluded from analysis.

D. Life Tables

Px = survival; Qx = mortality; Lx = cumulative survivorship; Mx = fecundity; Ex = life expectancy; Vx = expected future reproduction,
At Risk (Qx and Mx) = number of animals corresponding values are estimated from.

Males

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.57	0.43	44.28	1	0.01	44.28	-	1.27
1	0.82	0.18	31.66	0.57	0.27	31.66	-	1.89
2	0.9	0.1	28.98	0.47	0.28	28.98	-	1.88
3	0.76	0.24	27.15	0.42	0.33	27.15	-	1.91
4	0.86	0.14	19.69	0.32	0.29	19.69	-	1.96
5	0.88	0.12	16.63	0.28	0.15	16.63	-	1.92
6	0.86	0.14	13.16	0.25	0.31	13.16	-	2.02
7	0.82	0.18	15.24	0.21	0.31	15.24	-	2.02
8	0.85	0.15	12.6	0.17	0.21	12.6	-	2.04
9	0.73	0.27	8.79	0.15	0.64	8.79	-	2.3
10	1	0	7.55	0.11	0.19	7.55	-	1.97
11	0.86	0.14	6.29	0.11	0.42	6.29	-	1.92
12	0.67	0.33	5.52	0.09	0.58	5.52	-	1.94
13	1	0	3.5	0.06	1	3.5	-	1.7
14	0.67	0.33	2.97	0.06	0.83	2.97	-	0.83
15	1	0	2	0.04	0	2	-	0
16	0.5	0.5	1.93	0.04	0	1.93	-	0
17	1	0	0	0.02	0	0	-	0
18	1	0	0	0.02	0	0	-	0
19	1	0	0	0.02	0	0	-	0

r = -0.003, λ = 0.997, Ro = 0.985, T = 5.9, N@20 = 12

Females

Age	Px	Qx	Risk Qx	Lx	Mx	Risk Mx	Ex	Vx
0	0.69	0.31	53.48	1	0	53.48	4.921	1.18
1	0.84	0.16	48.24	0.69	0.1	48.24	5.209	1.55
2	0.78	0.23	37.21	0.58	0.28	37.22	5.184	1.76
3	0.9	0.1	29.14	0.45	0.57	29.15	5.036	1.75
4	0.78	0.22	27.55	0.41	0.24	27.55	4.784	1.39
5	0.96	0.04	23.4	0.32	0.18	23.4	4.407	1.31
6	0.91	0.09	20.35	0.31	0.12	20.35	3.644	1.19
7	0.76	0.24	18.75	0.28	0.46	18.75	3.159	1.26
8	0.88	0.13	14.29	0.21	0.47	14.29	2.667	0.97
9	0.64	0.36	9.07	0.18	0.44	9.08	2.174	0.65
10	0.67	0.33	4.63	0.12	0.1	4.64	1.8	0.31
11	0.5	0.5	2.06	0.08	0.26	2.06	1.333	0.34
12	0	1	0.96	0.04	0.26	0.96	1	0.26
13	0	1	0	0	0	0	0	0
14	0	1	0	0	0	0	0	0
15	0	1	0	0	0	0	0	0
16	0	1	0	0	0	0	0	0
17	0	1	0	0	0	0	0	0
18	0	1	0	0	0	0	0	0
19	0	1	0	0	0	0	0	0

r = -0.014, λ = 0.986, Ro = 0.933, T = 4.8, N@20 = 12

E. Ordered Mean Kinship List

These lists are current to January 2023 and values are subject to change with any hatch, death, import, export, inclusion, exclusion, or changes in pedigree or pedigree assumptions.

Population MK = 0.1384

Males				
SB ID	**MK**	**Known**	**Age**	**Location**
233	0.0567	1.000	10	DENVER
271	0.0801	1.000	1	PINOLA
158	0.1016	1.000	13	PHILADELP
265	0.1253	1.000	2	NY BRONX
229	0.1321	1.000	5	ST AUGUST
272	0.1479	1.000	0	NY BRONX
273	0.1479	1.000	0	NY BRONX
236	0.1613	1.000	4	GARDENCTY
254	0.1688	1.000	3	DULUTH
227	0.1696	1.000	5	TOLEDO
226	0.1788	1.000	5	NEW BEDFO
200	0.1798	1.000	8	NATAVPGH

Females				
SB ID	**MK**	**Known**	**Age**	**Location**
243	0.0456	1.000	5	PINOLA
234	0.0567	1.000	9	DENVER
231	0.0992	1.000	5	DULUTH
264	0.1166	1.000	2	NATAVPGH
267	0.1166	1.000	1	ST AUGUST
228	0.1321	1.000	5	TOLEDO
230	0.1414	1.000	5	NEW BEDFO
165	0.1520	1.000	11	NY BRONX
187	0.1613	1.000	9	TOLEDO
256	0.1628	1.000	3	PINOLA
261	0.1688	1.000	2	NEW BEDFO
268	0.1810	1.000	1	LOUISVILL
269	0.1810	1.000	1	LOUISVILL
270	0.1810	1.000	1	SEATTLE
197	0.1914	1.000	8	ST LOUIS

F. Definitions

Management Terms (as of December 2021)

Green Species Survival Plan® (Green SSP) Program – A Green SSP Program has a population size of 50 or more animals and is projected to retain 90% gene diversity for a minimum of 100 years or 10 generations. Green SSP Programs are subject to AZA's Full Participation and Sustainability Partner Policies.

Yellow Species Survival Plan® (Yellow SSP) Program – A Yellow SSP Program has a population size of 50 or more animals but cannot retain 90% gene diversity for 100 years or 10 generations. Yellow SSP participation by AZA facilities is voluntary. Yellow SSP Programs are subject to AZA's Sustainability Partner Policy.

Red Species Survival Plan® (Red SSP) Program – A Red SSP Program has a population size of twenty or more animals managed among three or more participating AZA facilities. If a population does not meet these minimum criteria, but has an IUCN designation of Critically Endangered, Endangered, or Extinct in the Wild, and the TAG has developed three goals to sustain this population, then the population will be considered a Red SSP Program. Red SSPs cannot retain 90% gene diversity for 100 years or 10 generations and participation by AZA facilities is voluntary. Red SSP Programs are subject to AZA's Sustainability Partner Policy.

Candidate Program – A Candidate Program either has a population size of fewer than twenty individuals and/or found at fewer than three AZA facilities or it does not yet have a completed studbook so the population size is unclear. A Candidate Program is overseen by the TAG, with no additional AZA accountability requirements.

Sustainability Partners – AZA Animal Population Management (APM) Committee approved wildlife facilities that regularly exchange animals with AZA-accredited facilities and certified related facilities, typically as part of the Species Survival Plan® (SSP) Program Breeding and Transfer Plan or other SSP Program management process.

Full Participation – AZA policy stating that all AZA accredited facilities and certified related facilities having a Green SSP animal in their collection are required to participate in the collaborative SSP planning process (e.g., provide relevant animal data to the AZA Studbook Keeper, assign an Institutional Representative who will communicate facility wants and needs to the SSP Coordinator and comment on the draft plan during the 30-day review period, and abide by the recommendations agreed upon in the final plan).

All AZA member facilities and Animal Programs, regardless of management designation, must adhere to the AZA Policy on Responsible Population Management and the AZA Code of Professional Ethics. For more information on AZA policies, see https://www.aza.org/board-approved-policies-and-position-statements.

Currentness Date – The date when the entire studbook is updated. This equates to the first date you received an update after requesting updates from all the facilities included in your studbook.

Demographic Terms

Age Distribution – A visual representation of the numbers or percentages of individuals in various age and sex classes.

Ex, Life Expectancy – The average years of further life for an animal in age class x.

Lambda (λ) or Population Growth Rate – The proportional change in population size from one year to the next. A lambda of 1.11 means an 11% per year increase; a lambda of 0.97 means a 3% decline in size per year. The three lambdas highlighted in this BTP are: 1) Life Table, from the PMx life tables, the change in the population based on the demographic regional and date window exported from the studbook, the life table lambda is the rate at which the population would be expected to grow (in the future) given the birth and death rates reported in the life tables and assuming a stable age distribution (does NOT factor in imports or exports); 2) 5-year, from the studbook census, the 5-year lambda is calculated from observed changes in population size over the last 5 years and includes births, deaths, imports and exports; and 3) Projected, from the PMx stochastic 20-year projections (includes confidence intervals), models how the population is predicted to grow or decline over the next 20 years given the birth and death rates from the life tables and the age structure of the current population.

lx, Age-Specific Survivorship – The probability that a new individual (e.g., age 0) is alive at the *beginning* of age *x*. Alternatively, the proportion of individuals which survive from birth to the beginning of a specific age class.

Mean Generation Time (T) – The average time elapsing from reproduction in one generation to the time the next generation reproduces. Also, the average age at which a female (or male) produces offspring. It is not the age of first reproduction. Males and females often have different generation times.

Median Life Expectancy (MLE) – The 'typical' age at which an average animal is expected to live; 50% will die before the median life expectancy and 50% die after. The MLE reported in Breeding and Transfer Plans (BTPs) and Survival Stats Reports, does excludes individuals that did not survive to their first birthday. The MLE obtained from population management software (PM2000, PMx, ZooRisk) or from life tables in BTPs (e.g., where Lx = 0.5) will be lower because they include those individuals that did not survive to their first birthday in order to project the correct number of births needed. A Survival Statistics Library is maintained for most AZA Animal Programs on the AZA website: https://www.aza.org/species-survival-statistics.

Maximum Longevity – The maximum age at which we have observed a species to live. If the oldest observed animal is currently living, we do not yet know the maximum longevity.

Mx, Fecundity – The average number of same-sexed offspring born to animals in that age class. Because studbooks typically have relatively small sample sizes, studbook software calculates Mx as 1/2 the average number of offspring born to animals in that age class. This provides a somewhat less "noisy" estimate of Mx, though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

Px, Age-Specific Survival – The probability that an individual of age *x* survives an age class; is conditional on an individual being alive at the beginning of the age class. Alternatively, the proportion of individuals that survive from the beginning of one age class to the next.

Qx, Mortality – The probability that an individual of age *x* dies during an age class (Qx = 1-Px). Alternatively, the proportion of individuals that die during an age class. It is calculated from the number of animals that die during an age class divided by the number of animals that were alive at the beginning of the age class (i.e., "at risk").

Risk (Qx or Mx) – The number of individuals that have lived during an age class. The number “at risk” is used to calculate Mx and Qx by dividing the number of births and deaths that occurred during an age class by the number of animals at risk of dying and reproducing during that age class.

Target Population Size (TPS) – The desired number of SSP animals to be held across AZA and approved partner facilities over a specific, stated timeframe. This number is determined with consideration for program roles and goals (genetic, demographic, and others), logistical constraints, spatial competition with other TAG-managed species, and other population-specific concerns. Target Population Size is determined by the Taxon Advisory Group (TAG) and published in their Regional Collection Plan (RCP).

Vx, **Reproductive Value –** The expected number of offspring produced this year and in future years by an animal of age *x*.

Genetic Terms

Allele – Alternate forms of DNA at a particular position in a genome (genetic locus). Alleles represent the most basic form of genetic diversity.

Gene Diversity (GD) – The probability that two alleles randomly sampled from the same genetic locus across a population are not identical by descent. Gene diversity is calculated relative to a population’s founders, which are assumed to be unrelated and not inbred, and is the proportional diversity retained by the current, descendant population.

Effective Population Size (N_e) – The size of a randomly mating population of constant size with equal sex ratio and a Poisson distribution of family sizes that would (a) result in the same mean rate of inbreeding as that observed in the population, or (b) would result in the same rate of random change in allele frequencies (genetic drift) as observed in the population. These two definitions are identical only if the population is demographically stable (because the rate of inbreeding depends on the distribution of alleles in the parental generation, whereas the rate of allele frequency drift is measured in the current generation). More specifically, PMx software uses the definition as the size of the current population that have produced offspring, assuming that there are current breeders, that these current breeders have a Poisson distribution of family sizes, that none of the current breeders are now post-reproductive, and none of the not-yet-breeding adults will breed.

Founder – An individual obtained from a source population (often the wild) that has no known relationship to any individuals in the derived population (except for its own descendants).

Founder Genome Equivalents (FGE) – The number of wild-caught individuals (founders) that represent the same amount of gene diversity as does the population under study. The gene diversity of a population is 1 - 1 / (2 * FGE).

Founder Representation – The proportion of the alleles in the living, descendant population that are derived from that founder.

Inbreeding Coefficient (F) – The probability that the two alleles present at an individual’s genetic locus are identical by descent (i.e., both alleles originated from an ancestor common to both the individual’s parents).

Mean Kinship (MK) – The mean (or average) kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. An individual’s mean kinship is a measure of how well its alleles are represented within a population. Animals with low mean kinships have few relatives, are from under-represented founder lineages, and have transmitted few of their alleles to the next generation; these individuals should be prioritized for breeding to slow a population’s gene diversity loss.

Percent Known – The percentage of an animal's genome that is traceable to known founders. Thus, if an animal has an UNK sire, its % Known = 50. If it has an UNK grandparent, its % Known = 75.

Percent Certain – The percentage of the living individuals’ pedigree that can be completely identified as *certain:* (exact identity of both parents is known) and traceable back to known founders. Individuals that are 100% *certain* do not have any MULTs or UNKs

in their pedigree. *Certainty* represents a higher degree of knowledge than *Known* and therefore is always less than or equal to *Known*.

G. AZA Animal Population Management (APM) Committee Disclaimers

as of June 2019

This Animal Program is currently a Provisional SSP and recommendations proposed are non-binding – participation is voluntary. Transfers to non-AZA facilities must comply with each facility's acquisition/transfer policy, in accordance with the AZA Policy on Responsible Population Management. APM Committee-approved Sustainability Partners are expected to agree and abide by AZA's Code of Professional Ethics, SSP Full Participation Policy, Policy on Responsible Population Management, and Accreditation Standards related to animal care and welfare.

H. Directory of Institutional Representatives

Mnemonic	Facility	Institutional Representatives (IRs)	IR Email
AKRON	Akron Zoological Park	Shane Good	S.Good@akronzoo.org
DENVER	Denver Zoo	John Azua	jazua@denverzoo.org
DULUTH	Lake Superior Zoo	Jessica Phoenix	jphoenix@lszoo.org
EVANSVLLE	Mesker Park Zoo & Botanic Garden	Leigh Ramon	lramon@meskerparkzoo.com
FRANKLINP	Franklin Park Zoo	Lisa Zidek-Sullivan	lzideksullivan@zoonewengland.org
FT WAYNE	Fort Wayne Children's Zoo	Michelle Smurl	michelle.smurl@kidszoo.org
GARDENCTY	Lee Richardson Zoo	Kristi Newland	Kristi.Newland@gardencityks.us
GREENVISC	Greenville Zoo	James Traverse	jtraverse@greenvillesc.gov
LOUISVILL	Louisville Zoological Garden	James McKinney	james.mckinney@louisvilleky.gov
MOODY	Rainforest & Aquarium at Moody Gardens, Inc.	Paula Kolvig	pkolvig@moodygardens.org
NATAVPGH	National Aviary	Teri Grendzinski	Teri.Grendzinski@aviary.org
NEW BEDFO	Buttonwood Park Zoo	Kerry Silvia	kerry.silvia@newbedford-ma.gov
NORRISTOW	Elmwood Park Zoo	Michele Goodman	mgoodman@elmwoodparkzoo.org
NY BRONX	Bronx Zoo	Chuck Cerbini	ccerbini@wcs.org
OKLAHOMA	Oklahoma City Zoo and Botanical Garden	Holly Ray	hray@okczoo.org
PHILADELP	Philadelphia Zoo	Peter Bibeault	bibeault.peter@phillyzoo.org
PINOLA	Pinola Conservancy	Jessica Cockrell	jcockrell@pinola.net
SANDIEGOZ	San Diego Zoo	Christopher Holmes	cholmes@sdzwa.org
SEATTLE	Woodland Park Zoo	Shawn Pedersen	shawn.pedersen@zoo.org
ST AUGUST	St. Augustine Alligator Farm	Gennifer Anderson	ganderson@alligatorfarm.com
ST LOUIS	Saint Louis Zoo	Amanda Burr	abender@stlzoo.org
TOLEDO	Toledo Zoo & Aquarium	Monica Blackwell	monica.blackwell@toledozoo.org
TORONTO	Toronto Zoo	Jon Spero	jspero@torontozoo.ca

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