RCVD APR 5 2017

OMB No 1018-0093
Expires 05/31/2017

Department of the Interior
U.S. Fish and Wildlife Service

# Federal Fish and Wildlife Permit Application Form

**Return to:** U.S. Fish and Wildlife Service
Division of Management Authority (DMA)
Branch of Permits, MS: IA
5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104 or 703-358-2104

**Type of Activity:**
**EXPORT/RE-EXPORT/IMPORT/INTERSTATE AND FOREIGN COMMERCE/TAKE OF ANIMALS (LIVE/ SAMPLES/PARTS/PRODUCTS) (*ESA and/or CITES*) (circle/highlight proposed activity)**

☑ **New Application**
☐ **Requesting Re-issuance/Amendment of Permit#:** _____

Complete Sections A or B, and C through H of this application. U.S. address may be required in Section C, see instructions for details.
**See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.**

## 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) | 3. Social Security No | 4. Occupation | 5. Affiliation/ Doing business as (see instructions) |
|---|---|---|---|
| | | | |

| 6.a. Telephone number | 6.b. Alternate telephone number | 6.c. Fax number | 6.d. 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) |
|---|---|
| Point Defiance Zoo & Aquarium | Zoological Institution |

| 2. Tax identification no | 3. Description of business, agency, Tribe, or institution |
|---|---|
| [redacted] | Zoo and Aquarium Facility |

| 4.a. Principal officer Last name | 4.b. Principal officer First name | 4.c. Principal officer Middle name/ initial | 4.d. Suffix |
|---|---|---|---|
| Houck | John | [redacted] | |

| 5. Principal officer title | 6. Primary contact name |
|---|---|
| Deputy Director | Marla Waddell |

| 7.a. Business telephone number | 7.b. Business telephone number | 7.c. Business fax number | 7.d. Business e-mail address |
|---|---|---|---|
| 253-404-3654 | [redacted] | 253-591-5448 | marla.waddell@pdza.org |

## C. All applicants complete address information

[redacted] Apartment #, Suite #, or Room #, no P.O. Boxes)

| 1.b. City | 1.c. State | 1.d. Zip code/Postal code | 1.e. County/Province | 1.f. Country |
|---|---|---|---|---|
| Tacoma | WA | 98407 [redacted] | | USA |

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

| 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. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $100 nonrefundable processing fee**. 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. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
Yes ☑ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue MA 789828-0 No ☐

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.

John Houck — 03/23/2017
Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) — Date of signature (mm/dd/yyyy)

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|---|---|---|---|
| | | | |

| 2. Date of birth (mm/dd/yyyy) | 3. Social Security No. | 4. Occupation | 5. Affiliation/ Doing business as (see instructions) |
|---|---|---|---|
| | | | |

| 6.a. Telephone number | 6.b. Alternate telephone number | 6.c. Fax number | 6.d. 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) |
|---|---|
| Smithsonian National Zoological Park- SCBI | |

| 2. Tax identification no. | 3. Description of business, agency, Tribe, or institution |
|---|---|
| [redacted] | Conservation Research & Breeding Facility |

| 4.a. Principal officer Last name | 4.b. Principal officer First name | 4.c. Principal officer Middle name/ initial | 4.d. Suffix |
|---|---|---|---|
| Kelly | Dennis | | |

| 5. Principal officer title | 6. Primary contact name |
|---|---|
| Director | Laura Morse |

| 7.a. Business telephone number | 7.b. Alternate telephone number | 7.c. Business fax number | 7.d. Business e-mail address |
|---|---|---|---|
| 202-633-3239 | [redacted] | 202-633-8727 | morsel@si.edu |

## C. All applicants complete address information

| 1. Physical address (Street address, Apartment #, Suite #, Room #, no P.O. Boxes) | | | | |
|---|---|---|---|---|
| [redacted] | 1.d. Zip code/Postal code: 22630 | 1.e. County/Province | 1.f. Country USA |

| 2.a. Mailing Address (include if different than physical address; include name of contact person if applicable) |
|---|
| Laura Morse, Registrar L/T, PO Box 37012 MRC 5507 |

| 2.b. City | 2.c. State | 2.d. Zip code/Postal code: | 2.e. County/Province | 2.f. Country |
|---|---|---|---|---|
| Washington | DC | 20013-7012 | | USA |

## D. All applicants MUST complete

1. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $100 nonrefundable processing fee**. Federal, Tribal, State, and local government agencies, and those actingon 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. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☑ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: 165US700310/9 No ☐
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 thisapplication for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) — Date of signature (mm/dd/yyyy): 03/15/2016

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|---|---|---|---|
| | | | |

| 2. Date of birth (mm/dd/yyyy) | 3. Social Security No. | 4. Occupation | 5. Affiliation/ Doing business as (see instructions) |
|---|---|---|---|
| | | | |

| 6.a. Telephone number | 6.b. Alternate telephone number | 6.c. Fax number | 6.d. 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) |
|---|---|
| Nashville Zoo | Zoological Institution |

| [redacted] | 3. Description of business, agency, Tribe, or institution |
|---|---|
| | Zoo and Aquarium Facility |

| 4.a. Principal officer Last name | 4.b. Principal officer First name | 4.c. Principal officer Middle name/ initial | 4.d. Suffix |
|---|---|---|---|
| Schwartz | Richard | J. | Mr. |

| 5. Principal officer title | 6. Primary contact name |
|---|---|
| President | Rick Schwartz |

| 7.a. Business telephone number | 7.b. Alternate telephone number | 7.c. Business fax number | 7.d. Business e-mail address |
|---|---|---|---|
| 615 833 1534 ext 122 | [redacted] | 615 333 0728 | rschwartz@nashvillezoo.org |

## C. All applicants complete address information

[redacted]m #, no P.O. Boxes)

| [redacted] | 1.d. Zip code/Postal code | [redacted] | 1.f. Country |
|---|---|---|---|
| | 37211 | | USA |

[redacted]clude name of contact person if ap[redacted]

Same as above

| 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. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $100 nonrefundable processing fee**. 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. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☑ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: MA 839465-0 No ☐
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.

   _____
   Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) Date of signature (mm/dd/yyyy)

RCVD APR 5 2017

THE RED THERMO SECURED "SP" LOGO IN THE LOWER CORNER OF THIS CHECK MUST FADE TEMPORARILY WHEN WARMED BY TOUCH OR FRICTION. SEE BACK FOR ADDITIONAL FEATURES

**METROPOLITAN PARK DISTRICT OF TACOMA**
**PDZA ADMIN**

[redacted]

DATE 4-[redacted]

PAY TO THE ORDER OF US Fish + Wildlife Service $ 100 00

One Hundred and no/100 DOLLARS

MEMO Per[redacted]

Vickie L Cowan

[redacted]

PERIOR PRESS • 888-590-7998

E. EXPORT/RE-EXPORT/IMPORT/INTERSTATE AND FOREIGN COMMERCE/TAKE OF NON-NATIVE ANIMALS (Live/samples/parts/products) (CITES and/or ESA)

*Allow at least 90 days for the application to be processed. Applications for endangered species permits must be published in the Federal Register for a 30-day public comment period.*

Complete all questions on the application. Mark questions that are not applicable with "N/A". If needed, use a separate sheet of paper. On all attachments or separate sheets you submit, indicate the application question number you are addressing. If you are applying for multiple specimens, be sure to indicate which specimen you are addressing in each response.

What activity are you requesting authorization to carry out (Indicate appropriate activities):

EXPORT [ ] IMPORT [X]

INTERSTATE COMMERCE [ ] FOREIGN COMMERCE [ ]

*Interstate Commerce permits authorize the sale of endangered and threatened species across State lines, but only for that will contribute to enhancing the propagation or survival of that species. Captive-breeding alone will not generally meet this requirement. Scientific research must be related to the species to be permitted. Interstate commerce activities with wildlife require the buyer to obtain a permit prior to the sale.

For EACH animal/specimen involved in the proposed activity provide:

| Scientific name | Common Name | Birth/Hatch Date (mm/dd/yyyy) Or Approximate date | Quantity | Gender, if known | Permanent markings (e.g., tattoo, ID #, microchip #, scars), if alive | Type of Sample or product (e.g., blood, tissue, DNA) |
|---|---|---|---|---|---|---|
| EXAMPLE: *Macaca fascicularis* | Crab-eating macaque | | | | | |
| *Neofelis nebulosa* | Clouded Leopard | See below | 16 | undetermined | | |

**These clouded leopard that we are requesting to import have not yet been born. This permit application that we are requesting is a blanket import permit for future clouded leopards that are produced as part of a partnership between the Clouded Leopard Consortium, the AZA Clouded Leopard Species Survival Plan ® (SSP), Khao Kheow Open Zoo and the Zoological Parks Organization of Thailand (ZPO). Prior to the import the information about each clouded leopard being imported would be provided to USFWS, Division of Management Authority (DMA).**

The current location of the specimen(s) (address and country):

Name: **Khao Kheow Open Zoo**

Address: **MOO 7 Bang PHRA**

City: **Sri Racha**

State/Province: **Chonburi**

County, Postal Code: **Thailand**

**The above location that is listed is the location of the parental stock since the clouded leopards that we are requesting to import have not yet been produced. At the time of import the specimens will be located at the location listed above.**

Recipient/Sender
If export, provide name and address of the recipient in the foreign country.
If import, provide name and address of the exporter in the foreign country.
If interstate or foreign commerce, provide name and address of recipient.

**The application concerns the importation of Clouded Leopards (*Neofelis nebulosa*) from:**

Name:

Business Name: **Khao Kheow Open Zoo**

Address: **MOO 7 Bang PHRA**

City: **Sri Racha**

State/Province: **Chonburi**

Country, Postal Code: **Thailand**

F. SOURCE OF SPECIMEN (answer question 5 or 6 for each animal/specimen involved, as appropriate).

For each animal or animal from which specimen are obtained born in captivity:
If you are the breeder of the specimen(s), please provide a signed and dated statement that includes the following:

Scientific name (genus, species, and, if applicable, subspecies) and common name;
That the animal was bred and born at your facility;
Birth/hatch date (mm/dd/yyyy), and if applicable, identification information (as described in question 2b above);

Name and address of your facility where each animal was bred and born; and
Location (Name of facility, address, city, State/province, postal code) of parental stock.

**We are not the breeder of the clouded leopards that we are requesting to import.**

If you are NOT the breeder of the specimen(s), provide copies of documentation showing that you acquired the animal from the breeder or documentation demonstrating the history of transactions (e.g., chain of ownership of the animal) and a signed and dated statement from the breeder or breeder's record that clearly includes the following:
Scientific name (genus, species, and, if applicable, subspecies) and common name;

**Clouded Leopard, *Neofelis nebulosa***

That each animal was bred and born/hatched at his/her facility;

**The clouded leopards that this import permit application request covers are not yet born. Khao Kheow Open Zoo plans to breed the following pairs and/or trios listed below.**

Birth/hatch date (mm/dd/yyyy), and, if applicable, identification information (as described in question 2b above);

**The clouded leopards that this import permit application request covers are not yet born. Information about each specimen will be provided to USFWS, Division of Management Authority for review and approval prior to each importation.**

Name and address of the breeder's facility; and

**Khao Kheow Open Zoo**
**MOO 7 Bang PHRA**
**Sri Racha, Chonburi, Thailand**

Location (name of facility, address, city, State/province, postal code) of parental stock.

**Khao Kheow Open Zoo**
**MOO 7 Bang PHRA**
**Sri Racha, Chonburi, Thailand**

**Future births planned at Khao Kheow Open Zoo. The following pairs of clouded leopards will be the parental stock from Thailand:**

**Maximus (SB# 1277) X Saap (SB# 1489)**
**Kelly (SB# 1299) X Gan-Gluey (SB# 1457)**
**Soi Dao (SB# 1624) X Blossom (SB# 1594)**
**Yim (SB# 1625) X Guitar (SB# T116)**
**Dawk Mai (SB# 1428) X Pi Pi (SB# NA)**
**Ping (SB# 1728) X Sapan (SB# 1727)**

**There is also the trio of Mai Me Chuu (SB# T117) X Talay (SB# 1729) and Pai (SB# 1730) as well as the pair of Yim (SB# 1625) X Lek(SB# 1595).**

**The specific information about each specimen would be provided to USFWS, Division of Management Authority for review and approval prior to each importation. A sample of the letter that would be provided by the breeder can be found in Appendix A – Thai letter of support.**

For each animal/specimen taken from the wild, provide the following:
Scientific name (genus, species, and, if applicable, subspecies) and common name;
Specific location of where, when, and by whom (name and address) he specimen was removed from the wild;
Purpose of removal and length or approximate length of time held in captivity;
Describe your efforts to use captive specimens (e.g., captive-born, captive held), or parts thereof, in lieu of taking animals from the wild.
Copies of your foreign or domestic collecting permit, license, contract or agreement;
Documentation showing that the specimen(s) was legally obtained by the applicant; and
Copies of any applicable State, Tribal, Federal, or Foreign government permits or licenses that authorized the removal of this animal from the wild.

**No wild animals will be caught and/or imported.**

G. JUSTIFICATION FOR REQUESTED ACTIVITY

Provide a full statement justifying the proposed activity, particularly the following:
a. Describe the purpose of your proposed activity. For example, if the purpose is scientific research, attach a copy of your research proposal outlining the purpose, objectives, methods (e.g., specific information on survey/collection methods, sampling regime, equipment to be used), and whether similar work has already been done or is currently being done. If the purpose is conservation education, provide copies of educational materials (e.g., handouts, text of signage or public presentations), and include the purpose and objectives of the proposed activity. If the purpose is for propagation for conservation purposes, provide a description of how the species will be propagated, disposition of progeny, and cooperative agreements that are/will be established for re-introduction.

**This blanket import permit application is for the importation of sixteen (16) captive bred Clouded Leopards for the proposed activity of propagation for conservation purposes. This import would increase the genetic diversity in the US population by introducing bloodlines not currently represented in the US population. This import is part of a coordinated effort between the Association of Zoos and Aquariums (AZA) and the Zoological Parks Organization (ZPO) of Thailand to increase the genetic diversity of the US population. This import supports the goals of the AZA Clouded Leopard SSP by increasing the genetic**

**diversity of the AZA captive clouded leopard population. Any progeny produced will be managed and dispositioned in accordance with the directives of the Clouded Leopard SSP. The AZA zoos that are currently involved as part of the Clouded Leopard Consortium are Point Defiance Zoo and Aquarium, Smithsonian National Zoological Park and the Nashville Zoo.**

**In addition to the information above, see <u>Appendix B</u> for the "*Clouded Leopard AZA Animal Program Population Viability Analysis Report"* and the "*Thailand Clouded Leopard Consortium Population PVA."***

**The following is an excerpt from The Clouded Leopard Consortium-Strategic Planning Workshop: 29-31 July 2013:**

The clouded leopard (*Neofelis nebulosa*) is found in small areas throughout mainland Southeast Asia, Nepal and China and is among the most specialized and charismatic cat species in the region.
However, it also is one of the least understood, largely because of its cryptic behaviors while living in dense habitat. At present, the species is listed as 'Vulnerable' in the IUCN Red Data Book, an Appendix I species under CITES and "Endangered" under the United States Endangered Species Act. Due to it elusiveness and rugged habitat, definitive surveys of potential numbers for the range have not been conducted. However, clearly human population growth and alteration of pristine habitats (primarily into palm oil plantations) continue to be threats to this species.

Poaching of the clouded leopard for its pelt, teeth and bone (the latter two for medicinal purposes) also is a major concern. For these reasons, most experts agree that the clouded leopard is in decline throughout its historic range in Asia. Thus, ex situ populations are important to support species conservation in light of the unknown, but highly suspect situation in the wild. These managed collections serve as 'insurance' for their wild counterparts, especially a repository of available extant gene diversity that defines and ensures species integrity and well-being. Animals held *ex situ* also are invaluable for generating unique biological knowledge that would never be possible to collect from rarely seen individuals in nature. Much of what we know about the anatomy, physiology, genetics, nutrition, medical needs and ability to reproduce are based on investigations of clouded leopards maintained in captivity. Given that a sustainable *ex situ* population can be established, then one day it may be possible to consider reintroduction studies in appropriate native range. Finally, such a population serves a major role in public awareness, often allowing people their first real look at one of the world's most unique cats. Such inspiration has been shown to have two benefits, one being a greater appreciation for felid biodiversity and the natural world and, secondly, increased funding donations to support both ex situ and in situ conservation activities.

In the late 1980's and early 1990's, studies on clouded leopard reproductive biology began at the Smithsonian Conservation Biology Institute (SCBI; formerly known as the Conservation & Research Center) near Front Royal, Virginia, USA and involved collaborations with zoos throughout North America. Numerous artificial insemination (AI) attempts were performed in clouded leopard females but ovarian responses often were highly variable, and only one successful pregnancy was produced by AI (at Nashville Zoo in 1996) that resulted in the birth of two cubs.

The clouded leopard in captivity always has been enormously challenging to reproduce, largely because of behavioral incompatibility with adult males unpredictably showing aggression (and killing) female mates, even those showing strong signs of estrus. The genesis of this issue has never been understood or resolved, although pairing individuals at a very young age (<18 mo old) reduces the chances of reproductive incompatibility as adults. An additional problem in the USA's Species Survival Plan (SSP) program was that originally all clouded leopards were descended from only a few unrelated founders. Thus, inevitably over the years the population lost genetic diversity and became more 'inbred', leading to even more challenges in producing healthy young. Thus, although the 1980's and 1990's were producing significant new information on the reproductive physiology of the species, the lack of suitable numbers of genetically healthy pairs was not allowing the SSP to succeed in producing a sustainable population.

A dramatic new approach needed to be taken. In 2002, three zoos from the USA (Smithsonian National Zoological Park [NZP], parent organization to the SCBI; the Nashville Zoo [NZ] and the Point Defiance Zoo & Aquarium [PDZA]) along with the *Clouded Leopard SSP agreed to seek out a formal partnership with the Zoological Parks Organization (ZPO) of Thailand to benefit species breeding and research. Within the ZPO, the specific priority partner was the Khao Kheow Open Zoo (KKOZ) in Chonburi. The resulting coalition (the Clouded Leopard Consortium) has worked now for more than 13 years to develop a successful conservation breeding program while generating new knowledge and best practices to enhance husbandry and reproduction for felids, not only for the clouded leopards, but other smaller cat species in the region. High priorities also have centered on building and sharing skills and capacities and supporting field conservation initiatives.

Thailand was ideal for initiating such a program, in part, due to this country's long interest in preserving the clouded leopard as a treasured species. The Smithsonian Institution had a long history of scientific and capacity building collaboration with this country. Thailand also potentially could solve the greatest problem facing the USA SSP-that is, a lack of genetically viable animals. By contrast, zoo with in Thailand (and other Southeast Asia countries) were holding a significant number of wild-caught (often confiscated) clouded leopards that had the potential of being 'founders', essentially a new source of genes for creating a healthy population. Working together and in response to a formal Thai invitation, the international, collaborative partnership was established under the umbrella of a Memorandum of Understanding. The overall advantage for Thailand was to protect and conserve a priority species while building capacity. For the USA, the main benefit was contributing to conservation in a range country while sharing in offspring production, so that some cubs could be imported to rebuild and re-invigorate the USA population. Besides the greater goal of creating a sustainable population there were focused objectives to produce more cubs from a higher proportion of animals, attain higher cub survival and maintain adequate genetic diversity-all while, improving management to enhance animal welfare. And, associated with these priorities was the sharing of expertise to build conservation capacity for clouded leopards living both *ex situ* and *in situ*.

Over the past 13 years the Consortium has shared substantial personnel, financial and intellectual resources. Most significant have been the accomplishments made in improving animal husbandry and creating new knowledge about this rare species. We now know that there are three major factors influencing poor reproductive performance of clouded leopards living in ex situ collections: 1) imbalanced diet; 2) stress associated with inappropriate housing facilities; and 3) inability to create and maintain compatible, breeding pairs. Issue #1 was addressed effectively in the early years of the project. Nutritionally poor diets containing high fat, low protein, imbalanced calcium: phosphorous ratios and no vitamins were changed to include high quality meat and balance vitamin/mineral supplementation. Health returned and abnormalities such as obesity and metabolic bone disease disappeared. Issue #2 was discovered, when inordinately high stress hormones were discovered in clouded leopards maintained in small enclosures of modest height and next to other predators (e.g., tigers and leopards). Hormones became 'normal' and reproduction occurred in a higher proportion of the pairs when cats were moved to state-of-the- art, large-sized, vegetation-rich, enclosures with significant vertical (climbing/perching) space, hiding places and nest boxes. Lastly, as a first step to increase the number of surviving cubs, any neonates born were removed from the dam and hand-reared. Accompanying this strategy was the pairing of young males (~6 month old or younger) with young, unrelated females to promote bonding prior to puberty onset. These management strategies were implemented as a result of the consortium partnership and have proven to be highly successful for producing 'calm' breeding pairs. Since 2002, more than 50 cubs have been born, and 80% of these have survived. Ten animals were imported by the Consortium into the USA to begin reinvigoration the Clouded Leopard SSP. In turn, almost 30 cubs have been produced from imported stock and now are being used as breeders and/or ambassadors to tell the successful story of Thailand's conservation breeding activities.

List of some specific accomplishments from the Consortium activities (in addition to those listed above) includes:

- Improved husbandry protocols that include daily enclosure cleanings and water changes, enhanced diets and animal weights taken regularly to assess body condition.
- Training of more than 1,000 Thai students and veterinarians in clouded leopard conservation breeding and related research activities.
- Building and provision of specialized nest boxes to provide cats a secure area while allowing safe and effective removal of neonates for hand-rearing.
- Establishment and implementation of hand-rearing protocols, which has significantly improved infant survival while producing offspring that are socialized to people and noise adaptive to new environments (e.g. shipping, exhibits) and easier to pair for breeding.
- Training of Thai keeper staff in all aspects of clouded leopard management, including cub-rearing.
- Establishment of a full-time, on-site manager at the KKOZ to coordinate Consortium activities.
- Completed studies to allow systematic cryopreservation of clouded leopard sperm yielding >30% motility post-thawing.
- Production and distribution of the Clouded Leopard's Secret conservation storybook, a wild cat teaching kit produced by PDZA.

**This project continues to be supported by the AZA Clouded Leopard SSP. See Appendix C for a Letter of Support from the AZA Clouded Leopard SSP Coordinator.**

Remaining Challenges:

Despite substantial progress, we are far from reaching our overall aim of creating a self-sustaining ex situ population (in Thailand or the USA), salvaging all valuable genetic diversity or applying what is known about this species to studying and conserving it in nature. The priority is to ensure that every genetically valuable specimen reproduces. More investigations and training are possible now because 'surplus' clouded leopards are available (i.e., individuals already well represented in the captive collection). Finally, given that knowledge and the population continues to grow, then opportunities increase for applying what is learned to building tools, information and funding to protect the remaining clouded leopards in the wild and in the future, perhaps even leading to reintroductions.

**In addition to this work, each institution will provide education information and presentations about the plight of this endangered species and how the public can help this species and others. The educational information and messaging for each institution can be found in Appendix D.**

b. Description of the technical expertise of each person (please include CV or resume), as it relates to the proposed activities. If the proposed activity involves the import of live animals, include the experience of each animal caretaker working with the species.

**Each of the institutions that will be receiving Clouded Leopards under this blanket permit have a wealth of expertise with Clouded Leopards and other small cats. The combined technical expertise of the management staff responsible for the management, care and daily maintenance of the Clouded Leopards at these institutions is more than 350 years with this species and/or other related species.**

**At Point Defiance Zoo & Aquarium the staff that will be working with the Clouded Leopards consists of as following personnel:**

Karen Goodrowe Beck, Ph.D. - General Curator: Dr. Goodrowe Beck graduated from the [redacted]). Her doctoral thesis focused on in vitro fertilization and embryo transfer in domestic felids. She was employed by the [redacted] the Reproductive Physiologist, and also served as the Assistant Curator of Mammals of the Toronto Zoo for 9 years. She has served as General Curator at Point Defiance Zoo & Aquarium since 2002, and is responsible for the animal collection and all zoological, curatorial and veterinary personnel. Dr. Goodrowe has experience with tigers, clouded leopards, cheetahs, leopard cats, Canada lynx, bobcat, fishing cat, snow leopards, leopards, jaguar, caracal and serval, both from a reproductive research and breeding program perspective, as well as animal management and husbandry situations.

Karen Wolf, MS, DVM, Dipl. ACZM-Head Veterinarian:
Dr. Wolf received a master's degree in Animal Science from the University of Maryland, in conjunction with the National Zoological Park, with her thesis focused on the reproductive physiology of black-footed ferrets. During this time she also gained extensive technical expertise in assisted reproductive techniques pertaining to a wide variety of felids, including clouded leopards, cheetahs and leopard cats. Following her graduate training, Dr. Wolf received her doctorate of veterinary medicine from [redacted]. She subsequently completed a 1-year internship in zoological medicine at Kansas State University followed by a 3-year residency in Zoological Medicine at the North Carolina Zoo. She gained clinical experience with many felids including Siberian tigers, snow leopards, Pallas cats, lions and servals. Dr. Wolf is currently the head veterinarian at the Point Defiance Zoo & Aquarium and is responsible for the health care of the entire animal collection which includes clouded leopards, Sumatran tigers, Canada lynx and fishing cat. Dr. Wolf was board-certified in zoo animal medicine in 2011.

Karen Povey, Conservation Engagement Curator:
Karen Povey graduated from the [redacted]4 with a B.S. in Zoology and from the University of Washington[redacted]. She was employed by Marine World Africa USA for 15 years as an animal trainer, senior animal trainer, and manager. She has served as Staff /Senior Staff Biologist at

Point Defiance Zoo & Aquarium since 1998, and oversaw the program animal collection at the Wild Wonders Outdoor Theater until 2010 (?) when she moved to the Education department. Ms. Povey serves as the Clouded Leopard SSP Education Advisor and is also co-Education Advisor for the Felid TAG. Ms. Povey is also President of the Clouded Leopard Project (started at PDZA, is a non-profit organization that raises awareness about this highly endangered cat through education initiatives as well as funds for in-situ research and conservation projects.) Through the Clouded Leopard Project and her position at Point Defiance Zoo & Aquarium, she conducts a wide variety of activities on behalf of clouded leopard conservation including raising funds for *in-situ* research and conservation, developing both *in- and ex-situ* education materials, liaising with field researchers, and maintaining a website and blog to raise awareness about clouded leopards (www.cloudedleopard.org). She has thirty years of experience with the husbandry, hand-rearing, and handling of numerous small and large felid species, including clouded leopard, tiger, cougar, leopard, snow leopard, cheetah, bobcat, serval, caracal, Canada lynx, Eurasian lynx, and fishing cat.

Andy Goldfarb, Staff Biologist – Elephant Barn/Clouded Leopards:
Andy Goldfarb graduated with a B.S. in Animal Science from [redacted]ience working with big cats, including tigers, lions, leopards, cougars, jaguars and clouded leopards. Small cat experience includes servals, caracals, lynx, fishing cats and leopard cats. Andy has worked in free contact with all these cats and in protected contact with tigers, lions, clouded leopards and fishing cats. Andy has also worked with a variety of other animals including Asian elephants, musk ok, reindeer, small clawed otters, white cheek gibbons, white handed gibbons, Siamangs, tapirs, and lowland anoa.

Andy worked for [redacted]ifornia. He worked on Tiger Island a free contact interactive display with tigers and trainers. Andy trained many behaviors including voluntary blood withdrawals. Andy was also one of the primary cub raiser and has raised over 90 cubs in his career. Andy served as a manager during his last 5 years with the park. Andy then worked for 5 years at Dream World in Australia, where he was the Asst. Manger of the Tiger Island at the park.

Andy currently is employed at PDZA and has assisted breeding clouded leopards, which to date has resulted in 18 cubs. Andy plays a principle role in the hand rearing process of these cubs. He also serves as a backup project manager for the Thailand Clouded Leopard Consortium. [redacted] has spent over 22 months working with clouded leopards in Thailand. During his time there he has introduced cats that became breeding pairs and has raised several litters of cubs. He also assisted in a shipment of 4 clouded leopards from Thailand to America.

Maureen O'Keefe, Lead Staff Biologist – Wild Wonders Outdoor Theater: Maureen O'Keefe graduated from the [redacted] with the husbandry, hand-rearing, management and training/operant conditioning of numerous large and small cat species including: clouded leopard, tiger, cougar, cheetah, serval, caracal, bobcat, Canada lynx, Siberian lynx, and fishing cat. She also has experience with many other species of mammals, birds, and reptiles. Ms. O'Keefe was employed at an AZA accredited wildlife park in northern [redacted] she held the positions of animal trainer, senior trainer, and supervisor. She then went on to work overseas at a wildlife park in Australia where she held the position of supervisor of Wildlife Theater for three years. Ms. O'Keefe currently is the Lead Staff [redacted] and also assisted with the hand-rearing and training of 18 cubs born at PDZA since 2003. Maureen also serves as vice president to the Clouded Leopard Project.

Christy Webster, Staff Biologist – Southeast Asia:
[redacted] 1997. She has been employed in the zoo/animal care field for 12 years and has experience working with many different species of animals at the Houston Zoo and at Point Defiance Zoo &Aquarium, including Asian-small clawed otters, meerkats, and several species of tamarins, Great-horned Owl, tapirs, anoa and Sumatran Tigers. She has worked with Sumatran tigers at Point Defiance Zoo & Aquarium for 9 years. Christy has also assisted in the hand rearing of all clouded leopard cubs at PDZA.

Shannon Smith, Elephant Manager – Elephant Barn/Clouded Leopards:
[redacted]. She has been employed by Point Defiance Zoo & Aquarium since June, 1995 and has 13 years' experience in the management, husbandry and training/operant conditioning of clouded leopards and snow leopards.

She has assisted in hand-rearing all leopard cubs born at Point Defiance Zoo & Aquarium, and has also worked with a wide variety of animals including primates and marine mammals. Shannon has over 19 years' experience working with the zoo's elephant collection, and became the elephant manager in 2016.

Kadie Burrone, Staff Biologist – Elephant Barn/Clouded Leopards:
[redacted] in the husbandry, management and training/operant conditioning of a variety of hoofstock species, elephants and clouded leopards. She has also worked for two years with primate species, though mainly works with the elephants and clouded leopards. She has assisted in the hand rearing of tiger and clouded leopard cubs.

Telena Welsh, Lead Staff Biologist-Asian Forest Sanctuary:
Telena received a BA in Interdisciplinary Arts and Sciences in [redacted], with experience in the husbandry, management and training of tigers, anoa, and primates, including hand rearing of tiger and clouded leopard cubs. Telena is currently the SSP Coordinator and Studbook Keeper of the Lowland Anoa and the Senior Keeper of the Asian Forest Sanctuary.

**At the Smithsonian National Zoological Park the staff that will be working with the Clouded Leopards consists of as following personnel:**

Copper Aitken-Palmer, DVM, PhD-Chief Veterinarian
Dr. Aitken-Palmer has a [redacted] with his presentation of the Assessment of Male Puberty, Seasonality and Sperm Cryopreservation Methods in the Giant Panda. He has been the Chief Veterinarian at Smithsonian's Conservation Biology Institute in Front Royal, VA since 2012. Dr. Aitken has authored or co-authored several papers since 2010.

Janine L. Brown, MS, PhD-Research Physiologist
Dr. Brown has a BS in Animal Science from [redacted] State University in Animal Science, received in 1984. She is an Adjunct Faculty member at six Universities in North America and remains an Affiliate Professor at George Mason University in Fairfax, VA. Dr. Brown is also Associate Editor of Zoo Biology, on the editorial board of Domestic Animal Endocrinology and on the Advisory Board of the Brazilian Journal of Veterinary Research. She has been the Research Physiologist at Smithsonian Institution, National Zoological Park and at the Smithsonian Conservation Biology Institute, Front Royal, VA.

Priscilla Hart Joyner, BVMS
Dr. Hart Joyner received her veterinary degree ([redacted] in 1999. She worked in a veterinary hospital in England before moving to the US and working at Pittsburgh Zoo & PPG Aquarium. In November 2008 she moved to Cambodia and worked as a Field Veterinarian for the Wildlife Conservation Society and remained [redacted] She has authored and co-authored a number of publications. She is currently a Veterinary Medical Officer in the Department of Conservation Medicine at the Smithsonian National Zoological Park and Conservation Biology Institute. She was board-certified in zoo animal medicine in 2016.

Paul Marinari-Senior Curator
Paul has been with the Smithsonian's facilities since 2012 as the Senior Curator in the Center for Species Survival. He is currently on the Steering Committee of AZA's (Association of Zoos and Aquariums) Small Carnivore Taxon Advisory Group and is the Studbook Keeper for the Black-footed Ferret. Prior to his current position, Paul was a [redacted] at the Black-footed Ferret Conservation Center. He also worked as a Biological Science Technician at Badlands National Park, 1994-1996. He received a [redacted] and an MS in Zoology and Physiology. Mr. Marinari has authored and co-authored several publications with regards to the Black-footed Ferret.

Erika Bauer, PhD-Biologist, Asia Trail
[redacted]. She started working with wildlife in the late 90's doing research at Cleveland Metroparks Zoo and the Pittsburgh Zoo and by 2007 she began working at Smithsonian's National Zoo in their Asia Trail Exhibit and became Interim Curator of Giant Pandas and Primates in 2010. Dr. Bauer has authored several papers on Animal Behaviour.

Jessica Kordell-Zoo Keeper
Jessica has been an animal Keeper at Smithsonian's facilities since 2007 overseeing the reproduction and birth management program for carnivores, providing neonatal care as part of a team which includes 12 clouded leopards and 11 red pandas over the past 7 years. She has also assisted in developing species management plans by writing husbandry and hand-rearing protocols and training other keepers in their correct use. Jessica has a BS in Biology, and she is currently working on a [redacted].

**At the Nashville Zoo the staff that will be working with the Clouded Leopards consists of as following personnel:**

Dr. Heather Robertson-Senior Veterinarian
Dr. Robertson has been the Senior Veterinarian at Nashville since 2011, was the Associate Vet there in 2010 and a Contract Veterinarian in 2009. She received as [redacted] he started her career in the zoo field at Nashville Zoo as an avian keeper in 2001 then continued her education. Dr. Robertson has done research and field studies on Channel Island foxes, feather picking in birds, fetal development in Tamandua, and is currently working on hellbender reproduction.

Dr. Ana Margarita Woc Colburn-Associate Veterinarian
Dr. Woc Colburn received a [redacted], and her DVM from Cornell University in New York in 1999. She has also worked at Smithsonian's National Zoo and the Oklahoma City Zoo. She is the SSP Veterinary Advisor for the Southern Tamandua and an AZA Accreditation Inspector. Dr. Woc Colburn has also authored or co-authored several papers dealing with carnivores, birds and hoofstock.

Jennifer Rupright-Supervisor of Carnivore Department
Jennifer is the Supervisor of the Carnivore Department at Nashville which includes supervising nine keepers in the Historic Farm and Carnivore areas. [redacted]. She has worked at Zoo Atlanta, Sarasota Jungle Gardens, the Knoxville Zoo and a wildlife rehabilitation center.

Jennifer von Dohlen-Zoo Keeper
Jennifer has worked with wildlife since 2002 with bears at a research facility, an exotic animal sanctuary, hand rearing big horn sheep, a keeper at a Pygmy rabbit breeding facility and finally in 2007 at Nashville zoo. Her current position as zoo keeper involves the care and enrichment of clouded leopards (including breeding and introductions), other felid species, red panda and Andean bears. [redacted].

Pujita Venkat-Anteater and Carnivore Keeper
Pujita has worked at Nashville Zoo since 2013, but volunteered there beginning in 2012. Prior to joining the Nashville staff, Pujita worked at Smithsonian's National Zoo as a Primate Keeper Aide and then at their Front Royal facility as a Mammal Keeper Aide. [redacted], she has assisted with Clouded leopard introductions and hand-reared two giant anteater pups along with the daily care of tamandua, Bengal tiger, Eurasian lynx, Andean bear, cougar and red panda.

Faren Healey-Carnivore/Anteater Keeper
Faren has worked at Nashville Zoo in the Carnivore department since March 2015. Prior to that she worked at animal adoption centers taking care of animals housed in the shelters. Faren started her exotic animal career in 2010 working at the Palm Beach Zoo with carnivores. In 2013 she joined the staff at Zoo Miami as a Carnivore keeper, furthering her experience with felids, canids and other carnivores. Her experience includes hand rearing numerous mammal species including Baird's Tapir and bush dogs. Faren has an AS in Zoo [redacted]

Laura Lovely-Carnivore Keeper
Laura has been at Nashville Zoo since May 2015 working in the Carnivore department. Her previous professional experience was at [redacted] where she was a Keeper/Trainer working with the zoo's collection animals in the Asian Gardens and Australia areas. Her career started as a zoo keeper at Santa Fe College while working on her AS in Zoo Animal Technology. She furthered her education by receiving an [redacted]. During the time she worked toward her degrees, she trained several species of animals including Springbok, Crown cranes, guanaco and Rhea.

Jennifer Wu-Carnivore Keeper
Jennifer has worked at the Nashville Zoo for six years. Four of those years were spent caring for 0.4.0 African elephants and the remaining time she worked with a variety of smaller animals, especially Eurasian Lynx, clouded leopards and cougars. As an Education animal keeper, she was the primary trainer for Eurasian lynx and Flemish giant rabbit. Jennifer also was part of a team that hand-reared Eurasian lynx and prehensile-tailed porcupine. [redacted] rsity. Jennifer has also done independent studies on Bobcats and Coyotes and completed an Internship at the Detroit Zoo in their mammal department.

**The resumes for each institutions' staff can be found in Appendix E (Staff Resumes)**

c. Copies of contracts, agreements or other documents that identify persons involved and dates of activities for which authorization is being requested.

**A Memorandum of Understanding (MOU) was written between the Zoological Park Organization in Thailand, Khao Kheow Open Zoo in Thailand, the Bureau of Conservation and Research in Thailand, Smithsonian's Conservation Biology Institute, Nashville Zoo at Grassmere, Point Defiance Zoo & Aquarium and the AZA Clouded Leopard SSP Coordinator. See Appendix F.**

Provide a statement on how the activities will enhance or benefit the wild population (e.g., *in-situ* and *ex-situ* projects)

**The import of these Clouded Leopards will help to enhance the genetic diversity of the captive population in the US by introducing new bloodlines. This import is supported by the Association of Zoos and Aquariums Clouded Leopard SSP®. (See Addendum C – Letter of Support from the Clouded Leopard SSP Coordinator). In accordance with the Clouded Leopard SSP, these Clouded Leopards the Consortium will maintain these specimens for future breeding as part of the SSP. All three zoos are active members of the AZA Clouded Leopard SSP and have been involved for many years with work *in-stiu.* All three zoos are working on Clouded Leopard conservation in Thailand. Moreover, this level of involvement began years ago and will continue in the foreseeable future. A summary of recent support for all three institutions can be found in Appendix G (Clouded Leopard Supported Projects).**

**One of the focuses for these three zoos is long term commitment to conservation and education relating to the preservation of the biodiversity of nature. This commitment to conservation will be accomplished by making an effort to education and inform their guests as to the role they can play in saving habitats and species, like the clouded leopard, throughout the threaten ecosystems. Information about the natural history and conservation will be shared with guests at each institution by trained and knowledgeable staff.**

If live specimens are to be held in captivity as part of the proposed activity:
Provide a detailed description (e.g., size, construction materials, protection from the elements) and photographs or diagrams (no blueprints, please) clearly depicting the existing facilities where the wildlife will be maintained. If the specimens will be housed at multiple facilities, either immediately or within the next year, provide a full description of each facility. If you are unsure of which facilities may be receiving specimens (e.g., SSP has not made final decision), please indicate likely candidates and the mechanism that will be used to determine recipient facilities.

**Point Defiance Zoo & Aquarium**

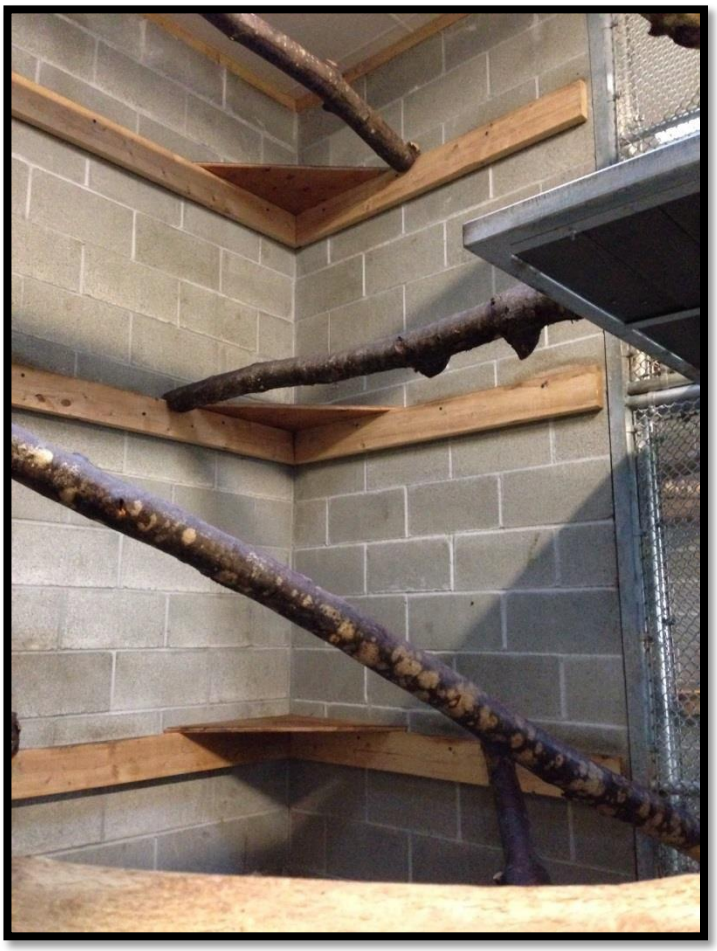
**Clouded Leopard Building:**
**Built in 2011, the clouded leopard exhibit and indoor/outdoor holding areas were designed specifically for clouded leopards. This building also includes a "cub room" for hand raising cubs that also allows the public to view feedings. The dimensions of this facility are as follows: Outdoor exhibit is 20'x 46' x 20'. The indoor holdings are either 9' x 11' (cub room, Holdings 1 and 2) or 9'x 10' (Holdings 3, 4, 5). Outdoor holding yards are 15'x 14' and 15'x 11'.**

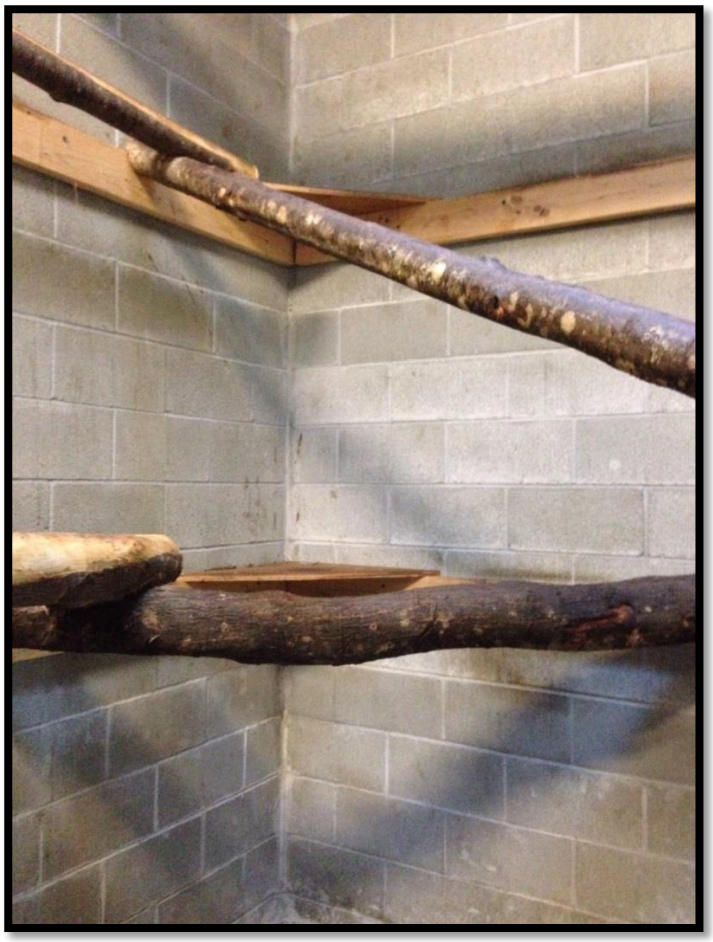
**Clouded Leopard Exhibit at Point Defiance Zoo & Aquarium**

**Cub Den for public viewing of hand rearing cubs**

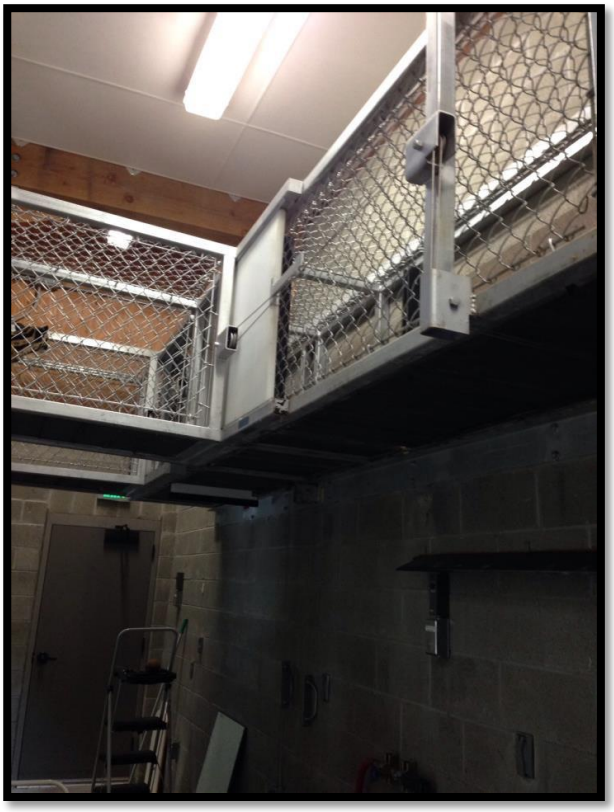
**Two Outdoor holding runs**

**Five Indoor holding rooms**



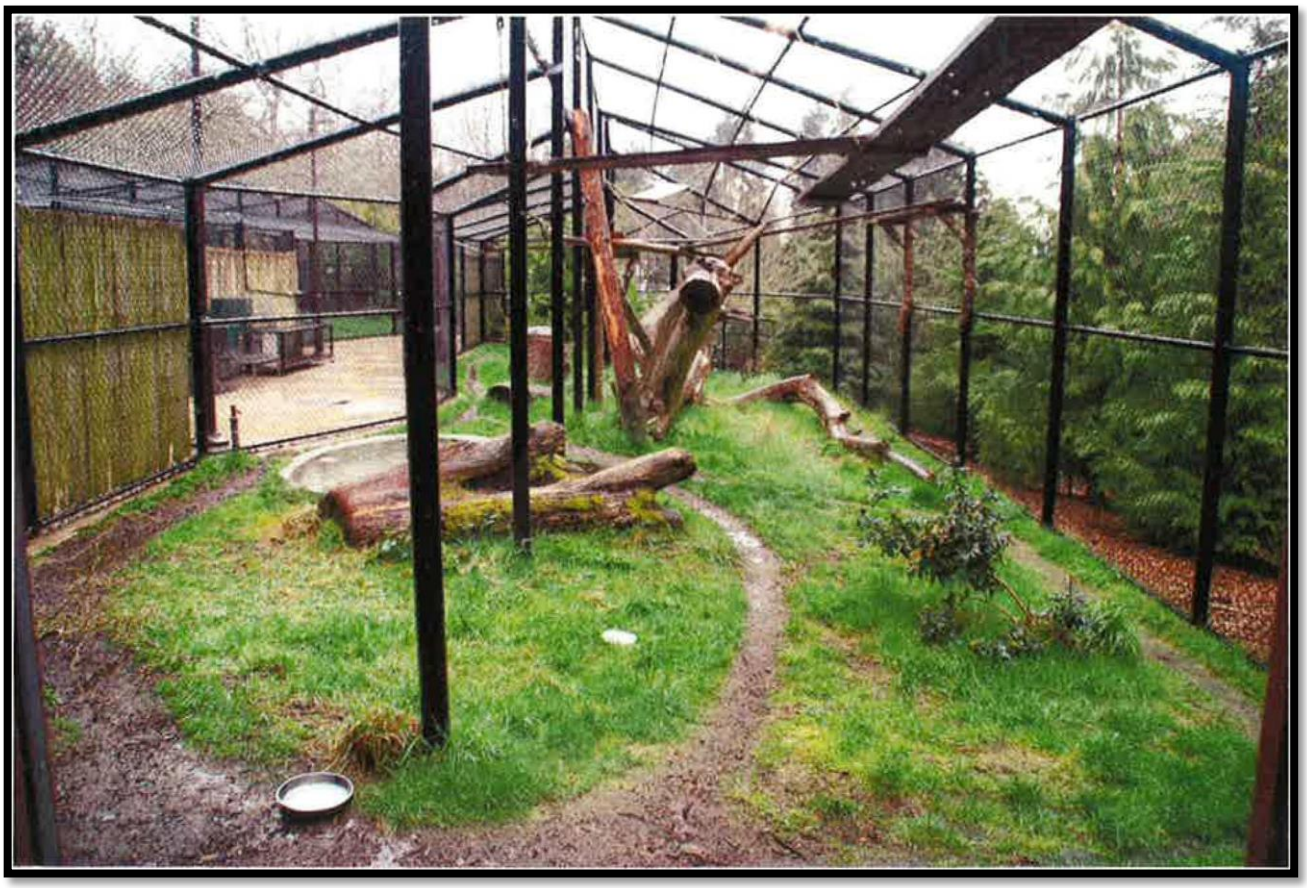


**Above holding transfer chutes in Clouded Leopard building.**



**Wild Wonders Outdoor Theater:**
**An exercise yard (on exhibit to the public) is available for use by younger cubs for exploration. This yard is 1500 sq ft. Clouded Leopard Temporary Holding Photos and Specs**
**Wild Wonders Outdoor Theater (currently holds 1.1clouded leopards). Indoor heated holding enclosures, 8' X 8' X 9' high. Shift to outside yard.**

**Outdoor Exercise Yard, approx. 1500 $ft^2$**

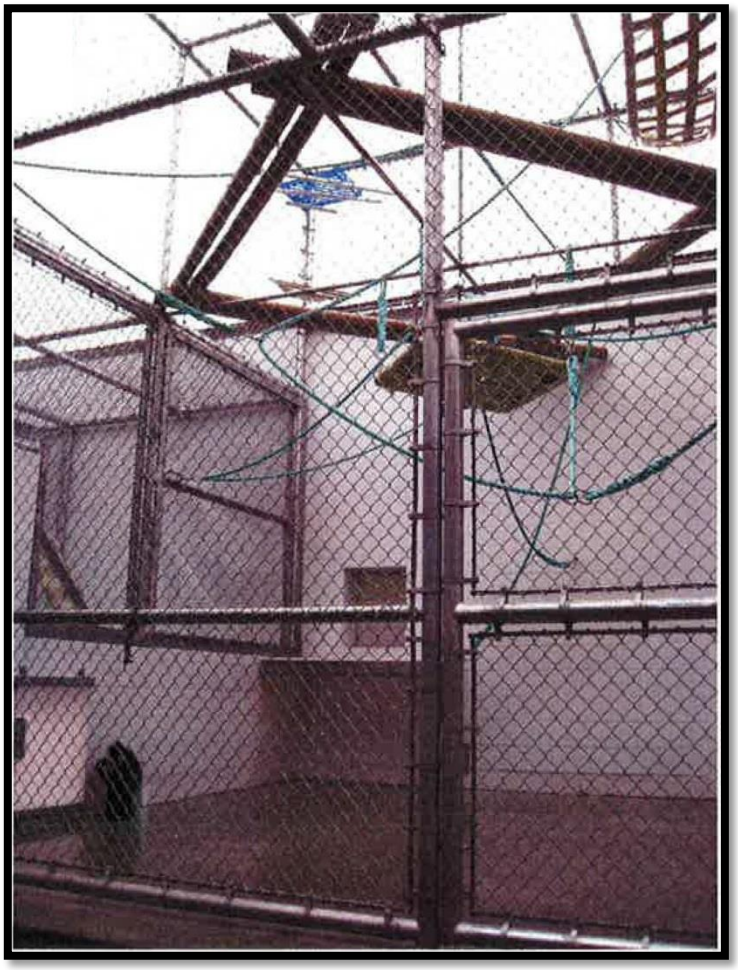


**Southeast Asian Forest Sanctuary:**

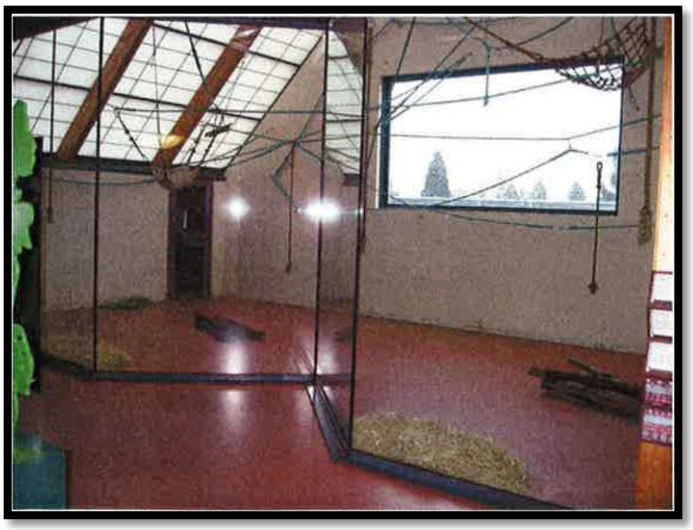
**Inside holdings have heated floors & HVAC. Inside holding #FR: 105 ft2 Ceiling height - 9'**
**Outside holding #A-2: 400 ft2, Ceiling height - 12' (not pictured)**

**Inside holding #G-2: 225 $ft^2$ Ceiling height – 9'**

**Outside holding #G-2: 225 ft2 Ceiling height -20'**



**Dayroom:**
**496 ft2 Indoor heated exhibit, Ceiling high point - 23' Viewing window 11' X 23'. Resilient floor covering.**



**<u>Smithsonian's National Zoo</u>**

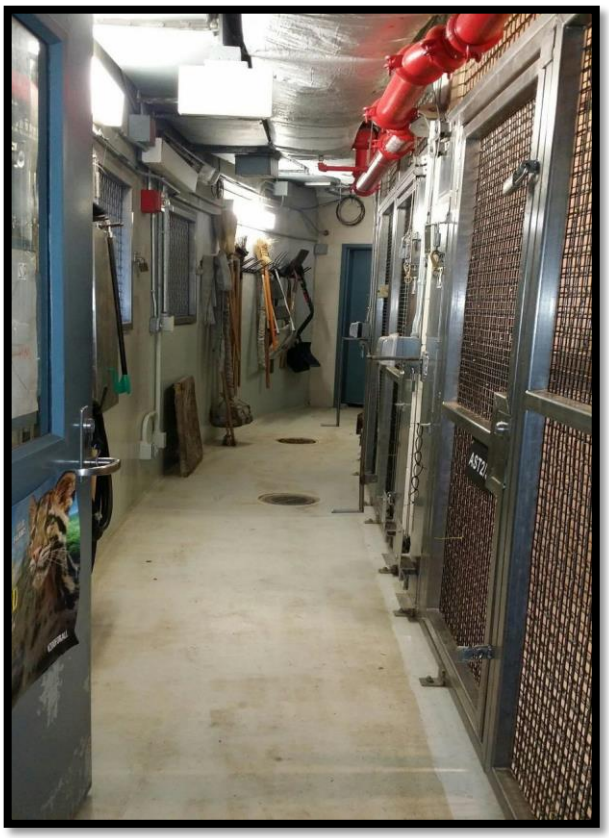
**The Smithsonian National Zoological Park consists of two campuses: the Smithsonian Conservation Biology Institute located in Front Royal, VA and the National Zoo located in Rock Creek, Washington DC. Both campuses hold Clouded leopards.**

**<u>SNZP Rock Creek:</u>**
**The NZP clouded leopard holding area is located in the Zoo's Asia Trail animal exhibition area. The holding area consists of outdoor, on-exhibition enclosure measuring 1200 sq. ft. Three indoor, off- exhibition enclosures measure 70 sq. ft., 72 sq. ft., and 80 sq. ft. respectively.**

**Staff Entryway**

**Visitor Side**

**Keeper area**



**Indoor enclosure**

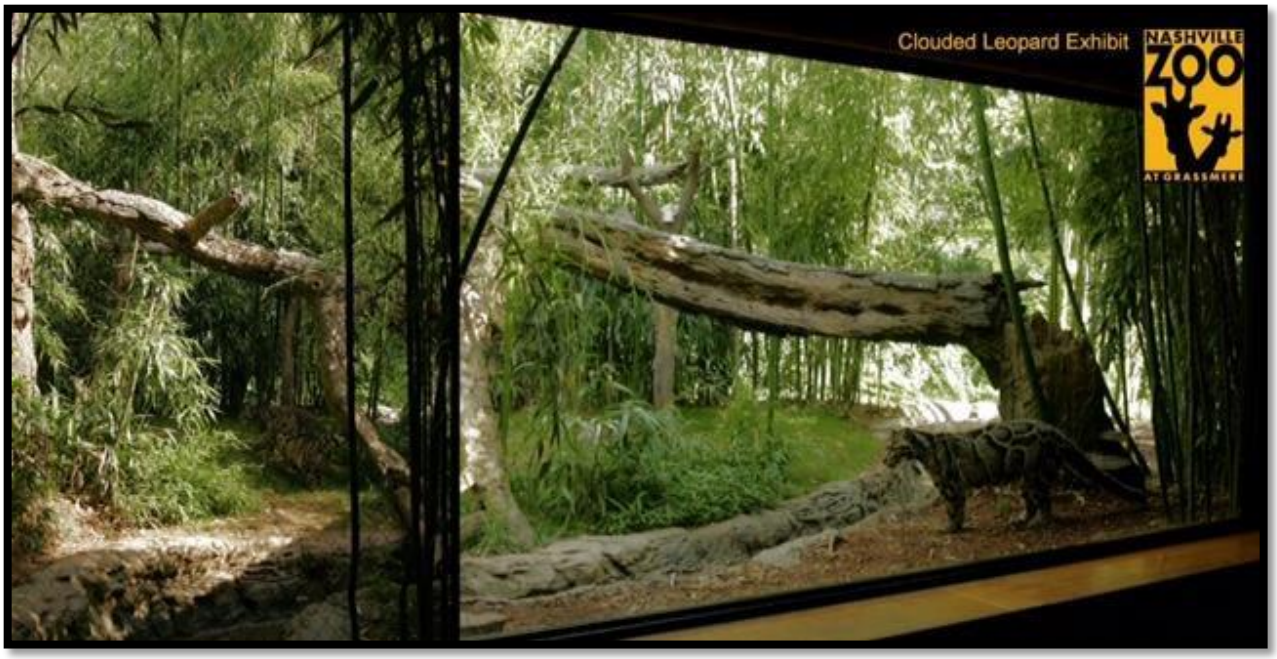
**<u>Smithsonian Conservation Biology Institute, Front Royal, VA (SCBI):</u>**
**The SCBI Clouded leopard facility has five outdoor "pods." Each pod is comprised of a heated building with three indoor enclosures. The two main indoor enclosures each contain ceiling level windows to increase natural light.**

**Each building is connected to two 20-foot-tall wire "corncribs", by wire tunnels, to provide each clouded leopard with a large outdoor living space. The corncribs have plenty of wooden logs for climbing—a natural pastime for clouded leopards living in the wild. In total, each pod provides a single pair of clouded leopards almost 11,000 square feet of space.**

**SCBI Front Royal is not open to public except for one weekend a year during the Autumn Conservation Festival.**

**Nashville Zoo at Grassmere:**

**The Clouded leopard exhibit at Nashville is located along the zoos Bamboo Trail which opened in 2002. The trail features red pandas, rhinoceros hornbills and lemurs along with the clouded leopards. The exhibit is 30' x 25' with natural bamboo forest, running stream and many high perching areas for the leopards. The exhibit is viewed by the public with floor to ceiling windows that allow the visitor an up close view of the cats. The off view holding at the exhibit is 15' x 12' stainless steel construction with wire mesh. Another off view holding area consists of an outdoor area that measures 25' x 25', with wooden cross beams and wire mesh construction and an indoor holding area 11' x 9'.**

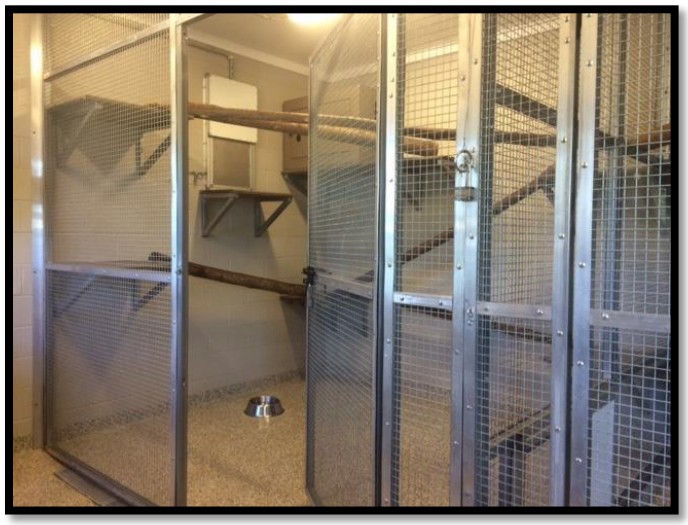



**Nashville Exhibit-30' x 25'**

**Nashville Exhibit**

**Nashville Holding-Outside 25’ x 25’**

**Nashville Holdings-Inside 11’ x 9’ or 15’ x 12’**



A statement of the specific technical experience of CV or resume available to the recipient(s) for maintaining and propagating live specimens of the same or similar species.

**Point Defiance Zoo & Aquarium:**

[redacted]

WORK EXPERIENCE:
General Curator, Point Defiance Zoo & Aquarium; June, 2002-present
Reproductive Physiologist, Toronto Zoo; 1[redacted]2

CONSERVATION, SCIENTIFIC AND ANIMAL MANAGEMENT PROGRAMS:
Vice Chair, Clouded Leopard SSP; 2012-present
North American representative to the Sumatran tiger Global Strategic Management Plan (GSMP), [redacted]servation and Management Committee, 2011-present
Vice Chair, Sumatran Tiger SSP; 2011-present
Tiger SSP Reproductive Advisor; 2008-present
Member, M.Sc. thesis committee – Lisa Triggs
Washington State Oregon Spotted Frog working group and Recovery Team and AZA Taxon Champion; 2007-2011
Felid TAG Steering Committee; 2005-present
Reproductive Advisor, AZA Red Wolf Species Survival Plan®; 1995-present
Reproductive Advisor, AZA Canid Taxon Advisory Group; 1996-present
Post-graduate advisor or committee member for 20 students/post-doctoral fellows.
Publication of more than 50 peer-reviewed articles and book chapters, focusing on wildlife reproduction and animal management strategies.

Karen Wolf, MS, DVM, Dipl. ACZM-Head Veterinarian:
Dr. Wolf received a master's degree in [redacted], in conjunction with the National Zoological Park, with her thesis focused on the reproductive physiology of black-footed ferrets. During this time she also gained extensive technical expertise in assisted reproductive techniques pertaining to a wide variety of felids, including clouded leopards, cheetahs and leopard cats. Following her graduate training, Dr. Wolf received her doctorate of veterinary medicine from the [redacted]. She subsequently completed a 1-year internship in zoological medicine at Kansas State University followed by a 3-year residency in Zoological Medicine at the North Carolina Zoo. She gained clinical experience with many felids including Siberian tigers, snow leopards, Pallas cats, lions and servals. Dr. Wolf is currently the head veterinarian at the Point Defiance Zoo & Aquarium and is responsible for the health care of the entire animal collection which includes clouded leopards, Sumatran tigers, Canada lynx and fishing cat.

**National Zoo:**

Copper Aitken-Palmer, DVM, PhD-Chief Veterinarian
Dr. Aitken-Palmer has a [redacted] with his presentation of the Assessment of Male Puberty, Seasonality and Sperm Cryopreservation Methods in the Giant Panda. He has been the Chief Veterinarian at Smithsonian's Conservation Biology Institute in Front Royal, VA since 2012. Dr. Aitken has authored or co-authored several papers since 2010.

Janine L. Brown, MS, PhD-Research Physiologist
Dr. Brown has a BS in Animal Science from [redacted]. She is an Adjunct Faculty member at six Universities in North America and remains an [redacted] VA. Dr. Brown is also Associate Editor of Zoo Biology, on the editorial board of Domestic Animal Endocrinology and on the Advisory Board of the Brazilian Journal of Veterinary Research. She has been the Research Physiologist at Smithsonian Institution, National Zoological Park and at the Smithsonian Conservation Biology Institute, Front Royal, VA.

**Nashville Zoo:**

Dr. Heather Robertson-Senior Veterinarian
Dr. Robertson has been the Senior [redacted] 6 from University of Tennessee. She started her career in the zoo field at Nashville Zoo as an avian keeper in 2001 then continued her education. Dr. Robertson has done research and field studies on Channel Island foxes, feather picking in birds, fetal development in Tamandua and is currently working on hellbender reproduction.

Dr. Ana Margarita Woc Colburn-Associate Veterinarian
Dr. Woc Colburn received a master's degree in [redacted], [redacted]. She has also worked at Smithsonian's National Zoo and the Oklahoma City Zoo. She is the SSP Veterinary Advisor for the Southern Tamandua and an AZA Accreditation Inspector. Dr. Woc Colburn has also authored or co-authored several papers dealing with carnivores, birds and hoofstock.

The number of years each species has been maintained at the facility;
**See Appendix H for Historical Taxon Reports**

The National Zoological Park has recorded holding of clouded leopards as far back as 1910. Beginning in the early 1980's, National Zoo began breeding clouded leopards and has successfully bred over 80 animals. Currently there are four animals at the National Zoo.

The Nashville Zoo has maintained and bred clouded leopards since1987. Currently there are eleven animals at Nashville.

The Point Defiance Zoo & Aquarium has maintained and bred clouded leopards since 1998. Currently there are 9 animals at PDZA.

The number of births by year for each species for the last 5 years:

PDZA=12

| | |
|---|---|
| 2016 | 2.1.0 |
| 2015 | 3.1.0 |
| 2014 | 1.1.0 |
| 2013 | 1.0.0 |
| 2012 | 1.1.0 |

National=5

| | |
|---|---|
| 2016 | 0.0.0 |
| 2015 | 0.0.1 |
| 2014 | 0.1.0 |
| 2013 | 1.1.0 |
| 2012 | 0.1.0 |

Nashville=19

| | |
|---|---|
| 2016 | 1.0.0 |
| 2015 | 0.2.2 |
| 2014 | 0.0.0 |
| 2013 | 1.4.0 |
| 2012 | 5.4.0 |

Mortalities at the facility with these or similar species in the last 5 years; causes of such mortalities, and steps taken to avoid or decrease such mortalities.

PDZA-3
2014 1.1.0 Female died day of birth, male died the next day
First time mother and no breeding observed. Should have collected fecals and conducted hormonal analysis regardless of whether we saw breeding, because she was paired with a male. That would have allowed us to diagnose pregnancy, have a specific due date and be more prepared for the birth of cubs. The other factor, aside from not having the hormone data, is that the necropsy/histopathology revealed that the cubs were premature. The lungs were not fully developed.
2013 1.0.0 15 year old male, declining health, humanely euthanized

National zoo-

| | | |
|---|---|---|
| 2016 | 0.0.1 | Died on day of birth |
| 2015 | 1.0.0 | 13 yr old male had multiple malignant tumors in chest |
| 2014 | 0.1.0 | 15 yr old female had liver failure |
| 2013 | 1.0.0 | 18 yr old male had kidney failure |
| 2012 | 1.0.0 | 16 yr old male had kidney failure |

Nashville Zoo-7

| | |
|---|---|
| 2016 | 0.0.0 |
| 2015 | 1.0.0 |
| 2014 | 0.0.0 |
| 2013 | 0.0.0 |
| 2012 | 1.2.0 |

<u>2012:</u>
(10/11/12) 0.1.0- 34 day old cub was pulled at 24 hours from dam due to maternal trauma to sibling (3875). During hand-rearing developed regurgitation, GI stasis with unknown cause, treated supportively. On follow up diagnostics, appeared to have megaesophagus. On histopathology had chronic fibrosis of the esophagus which could be indicative of idiopathic megaesophagus.

Prevention: None, this is a congenital disease.

0 day old male cub. Dam Baylie (3172) had 3 cubs born that initially appeared to be nursing. However within less than 24 hours of being pulled 1 cub was missing (this one) and another had a tail wound. Remaining 2 cubs were pulled.

Prevention: For this dam, subsequent cubs were attempted to be pulled earlier than 24-48 hours as well as limiting on breeding. Currently on loan.

20 year old female clouded leopard on loan to Tanganykia Wildlife Park. No necropsy report.

2015
13 year old male clouded leopard. Euthanized (NZP WASH 114146) due to neoplasia.
Since 2009 we have pulled the cubs anywhere from a couple of hours post parturition to 48 hours (depending on the dam) and hand-reared them. This has decreased the percentage of parent induced trauma as well as improving their pairing compatibility and decreasing their overall stress. Cubs receive their first set of vaccines (FVRCP and distemper) at 4-6 weeks and then have 2-3 sets of boosters. Rabies vaccination occurs at 16 weeks or greater. At every 2-4 weeks until they are 12 weeks of age, they are given prophylactic deworming

Our preventative medicine protocol consists of biannual fecal ova parasite evaluation. Routine examination under general anesthesia occurs every 2-3 years and minimally includes vaccine boosters, comprehensive blood work and viral panel serology, heartworm testing, radiographs and ultrasounds. Cats are on heartworm and flea and tick prevention year-round. Cats are monitored daily by trained zoo keepers.

H. IMPORTS, EXPORTS, OR RE-EXPORTS

For shipment of LIVE specimens, the transport conditions for animals must comply with the CITES Guidelines for Transport of Live Animals or, in the case of air transport, with the International Air Transport Association (IATA) live animal regulations (contact airline for information). As such, describe:

The type, size, and construction of any shipping container; and
The arrangements for watering or otherwise caring for the wildlife during transport.

**The animal(s) will be shipped in crates conforming to IATA standards and Animal Welfare regulations to ensure their comfort and safety while in transit. The most direct air route available will be taken in transporting the clouded leopards from Thailand to Seattle, Washington, Washington D.C., and Nashville, Tennessee. Staff at all three institutions have extensive experience shipping and receiving clouded leopards and foresee no difficulties in these importations. Previously, other young clouded leopards were successfully imported from the same source (PRT 090181, 145446 and 09US210142/9) without difficulty.**

**See Appendix I for IATA crate regulations.**

**Each crate will have a water devise secured firmly to the side of the crate. Like other carnivores, clouded leopards do not need feeding during shipping and no food stuffs (meat) will be present in the shipping crate. Staff experienced with clouded leopards will fly to Thailand and accompany the animals back to the listed zoos (PDZA, National, and Nashville). Previously other clouded leopards have been successfully imported from the same source and experienced no difficulties with the importation.**

For import of LIVE CITES Appendix-1 marine mammal specimens, provide a copy of your FWS or NOAA Fisheries permit or authorization.

**This permit application is not for the import of Live CITES Appendix-1 marine mammal specimens but is instead an application for the importation of 16 captive bred Clouded Leopard.**

For import of CITES Appendix-1 listed species, provide information to show the import is not for primarily commercial purposes as outlined in Resolution Conf. 5.10 (www.cites.org)

**The purpose of this proposed activity is conservation education through propagation of an endangered species. A Memorandum of Understanding between the Zoological Park Organization in Thailand, Khao Kheow Open Zoo in Thailand, the Bureau of Conservation and Research in Thailand, Smithsonian's Conservation Biology Institute, Nashville Zoo, Point Defiance Zoo & Aquarium and the Clouded Leopard Species Survival Plan Coordinator. Khao Kheow Open Zoo is the same source that donated a pair of clouded leopards to the Nashville Zoo in January, 2005 and November, 2007, and the National Zoo and Point Defiance Zoo & Aquarium in 2009.**

**(See Appendix F for MOU)**

For export of CITES Appendix-I species, provide a copy of the CITES import permit, or evidence on will be issued by the Management Authority of the country to which you plan to export the specimen(s). In accordance with Article III of the CITES treaty, it is required that import permits are issued before the corresponding export permit.

**This application concerns the importation of 16 clouded leopards over a 5 year period to Point Defiance Zoo & Aquarium, Smithsonian's National Zoo and Nashville Zoo at Grassmere. No exportations are involved in this application.**

If the specimen is being re-exported (e.g., exporting a specimen that was previously imported into the United States), provide:

**This application concerns the importation of 16 clouded leopards over a 5 year period to Point Defiance Zoo & Aquarium, Smithsonian's National Zoo and Nashville Zoo at Grassmere. No exportations or re-exportations are involved in this application.**

A copy of the canceled CITES export or re-export document issued by the appropriate CITES office in the country from which the wildlife was imported (if applicable); and

**This application concerns the importation of 16 clouded leopards over a 5 year period to Point Defiance Zoo & Aquarium, Smithsonian's National Zoo and Nashville Zoo at Grassmere. No exportations or re-exportations are involved in this application.**

A cleared copy of Form 3-177, wildlife Declaration for Import (hard copy or electronic release); or

**This application concerns the importation of 16 clouded leopards over a 5 year period to Point Defiance Zoo & Aquarium, Smithsonian's National Zoo and Nashville Zoo at Grassmere. No exportations are involved in this application.**

If you did not make the original import, provide a copy of the importer's documents outlined above and the invoice or other documentation that shows you acquired the wildlife from the original importer or history of transactions which demonstrate chain of ownership.

**This application concerns the importation of 16 clouded leopards over a 5 year period to Point Defiance Zoo & Aquarium, Smithsonian's National Zoo and Nashville Zoo at Grassmere. No exportations are involved in this application.**

All international shipment(s) must be through a designated port. A list of designated ports (where an inspector is posted) is available from www.fws.gov/le/designated -ports.html. If you wish to use a port not listed, please contact the Office of Law Enforcement for a Designated Port Exemption Permit (form 3-200-2).

**Designated Port of Entry will be Seattle or Los Angeles (depending on available flights) for Point Defiance Zoo & Aquarium; Dulles, Virginia for the National Zoo; and Memphis, Tennessee for the Nashville Zoo.**

Name and address where you wish permit mailed, if different from page 1 (All permits will be mailed via the U.S. Postal Service, unless you identify an alternative means below):

**Please send the permit to the address listed on page 1.**

If you wish the permit to be delivered by means other than USPS regular mail, provide an air bill, pre-paid envelope, or billing information. If you do not have a pre-paid envelope or air bill and wish to pay for a courier service with your credit card, please check the box below. Please DO NOT include credit card number or other information; you will be contacted for this information.

If a permit is issued, please send it via a courier service to the address on page 1 or question 11. I understand that you will contact me for my credit card information once the application has been processed.

**Please send the permit to the address listed on page 1.**

Who should we contact if we have questions about the application? (Include name, phone number, and email):

**Marla Waddell, Registrar**
**Point Defiance Zoo & Aquarium 5400 N. Pearl Street**
**Tacoma, WA 98407**
**253-404-3654**
**marla.waddell@pdza.org**

Disqualification Factor. A conviction, or entry of 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 disqualifies any such person from receiving or exercising the privileges of a permit, unless such disqualification has been expressly waived by the Service Director in response to a written petition. (50 CFR 13.21 (c)) Have you or any of the owners of the business, if applying as a business, been convicted, or entered a plea of guilty or nolo contendere, forfeited collateral, or are currently under charges for any violations of the laws mentioned above?

Yes ☐ No If you answered "yes" provide: a) the individual's name, b) date of charge, c) charge(s) d) location of incident, e) court, and f) action taken for each violation.

Appendix A

SAMPLE

องค์การสวนสัตว์ ในพระบรมราชูปถัมภ์
THE ZOOLOGICAL PARK ORGANIZATION UNDER THE ROYAL PATRONAGE OF H.M. THE KING
ถนนพระราม 5 ดุสิต กรุงเทพฯ 10300 โทร. 02 2819023-6 โทรสาร 02 2826125, 02 2829104
Rama V Rd. Dusit, Bangkok 10300 Thailand Tel. (662) 2819023-6 Fax : (662) 2826125, 2829104 www.zoothailand.org

Ref:1101/ 109

February 2, 2009

Dear Dr. Karen Goodrowe-Beck,

The Zoological Park Organization is delighted to be able to donate four captive born clouded leopards, *Neofelis nebulosa*, to the Point Defiance Zoo & Aquarium as part of our collaborative Thailand Clouded Leopard Consortium breeding program at the Khao Kheow Open Zoo and the AZA's Clouded Leopard Species Survival Plan (SSP) program. We know they will have a good home at the Point Defiance Zoo & Aquarium and the National Zoo's Conservation & Research Center. The cats we are donating are:

1) male studbook # 1222, Sakdaa, born on 26 April 2004;
2) male studbook #1285, Tuk-Tuk, born on 24 Nov 2006;
3) female studbook # 1219, Nok, born on 25 Feb 2004;
4) female studbook #1251, Thap-Thim, born on 13 Sept 2004.

All the cats were born at the Khao Kheow Open Zoo.
MOO 7 Bang PHRA
Sri Racha, Chonburi
Thailand

Sincerely,

Mr. Sophon Dumnui

Director General

The Zoological Park Organization

Bangkok, Thailand

Appendix B

# Clouded Leopard (*Neofelis nebulosa*) AZA Animal Program Population Viability Analysis Report


**Population Biologist**
Katelyn Marti, kmarti@lpzoo.org

**AZA Species Survival Plan Coordinator® and Studbook Keeper**
Bonnie Breitbeil, bonnieb@centralfloridazoo.org

**AZA Felid TAG Chair**
Don Goff, dgoff@beardsleyzoo.org

**AZA Felid TAG Vice – Chair**
Cheryl Morris clmorris@iastate.edu

**April 22, 2013**

Population Viability Analyses (PVAs) for AZA Animal Programs

Lincoln Park Zoo | PMC Population Management Center | Association of Zoos & Aquariums | Institute of Museum and Library Services

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# Executive Summary

## Clouded Leopard AZA Animal Program Population Viability Analysis

Population Viability Analysis (PVA) model scenarios were developed with members of the Association of Zoos and Aquariums (AZA) Felid Taxon Advisory Group (TAG) and Clouded Leopard Animal Program in July 2012. The PVA is being conducted under the support of a two-year grant to Lincoln Park Zoo researchers from the Institute of Museum and Library Services (IMLS) to analyze AZA population's long-term viability. The project team is using ZooRisk 3.80 (Earnhardt et al., 2008), a PVA modeling software, to examine what would happen to AZA populations if current conditions remained the same (the baseline scenario), and then assess the impact of changes such as increasing reproduction, importation strategies, and not utilizing genetic management (alternative scenarios). The current AZA clouded leopard total population size is 72 (32 males, 40 females) individuals at 22 institutions.

## MODEL RESULTS

Model results indicate that if conditions remain the same, the AZA clouded leopard population faces an **annual 2% decline over the next 25 years.** The projected population decline occurs because the number of deaths exceeds the number of births in the population. The baseline AZA model produces, on average, 6 births per year in comparison to an average of 8 projected deaths per year in the first 10 years of the model. The declining population has an only 27% probability of reaching its number of potential space of 82 individuals under current conditions.

The clouded leopard population is able to improve its trajectory with reasonable improvements in reproduction. For instance, an increase from the current average of 6 births per year to 8 births per year (p(B) = 20% scenario), would allow the population to roughly sustain its current size in the next 100 years. If the population can reach an average of 11 births per year, the population will reach the number of potential spaces in approximately 6 years with 100% of model iterations meeting the space goal.

If appropriate, young, reproductively-viable clouded leopards may be available from outside the AZA population and imported in accordance with federal and international regulations. These individuals would benefit the population demographically, but more importantly genetically as inbreeding levels are very high at the end of 100 years under the baseline scenarios (higher than sibling relationship). Model scenarios with both improved reproduction and importations improve the population's demographic and genetic outlook the most at the end of 100 years; however, genetics remain a concern as many of the animals in the current population are related to one another resulting in low gene diversity retention and higher inbreeding levels than desired.

## MANAGEMENT ACTIONS

The AZA Clouded Leopard Animal Program should apply several management strategies in combination with one another to counteract the projected demographic decline, low gene diversity, and high inbreeding levels in the future, and to accommodate institutional interest.

- **Increase reproduction:** The Animal Program should focus on breeding more reproductively viable females to increase the number of offspring produced per year. Any number of births in excess of the current level (6 births per year) will assist the population in growing towards its potential space of 82 animals. All breeding recommendations received are important to the long-term future of this population; institutions should work to get males and females into appropriate breeding situations quickly and work on husbandry to improve breeding success.

- **Importation of young, reproductively viable individuals:** In some cases importation could offset the decline the population is facing in the next several years and increase the long-term gene diversity. However, importations will have less of a positive impact on genetics if the imported individuals are related to the current population or each other, which may be challenging for this population as the source of many of the imports is a population with some animals already related to the AZA population. In addition, it would increase the capacity of the population to produce offspring, which is limited currently by an aging population with many animals unable to breed for medical, behavioral, or age. Imports must be coupled with increased reproduction to successfully grow the population in the long-term and increase gene diversity. Even though modeled levels of imports assisted the population demographically, ultimately this population under most model scenarios had lower-than-desired levels of gene diversity in 100 years.

- **Recruit new institutions and allocate additional spaces:** Space and institutional interest are a main concern for this population if reproduction is increased. If additional spaces are not available it will complicate the placement of offspring or imported individuals. If reproduction and or/importation is successful in improving the population's trajectory, it will quickly be hampered by its small number of potential spaces. As a long-term goal, an increased number of potential spaces for the population will allow for a healthier age structure, a more stable population size, and better long-term genetic health.

- **Research pairing options:** Institutions should work to form alternate pairing situations to provide more flexibility in breeding opportunities, thus increasing the number of females available for breeding. Forming trios (1.2.0) at early ages could allow for the rotation of males between familiar females and may provide additional breeding opportunities for the AZA population. This management strategy could also provide more genetic variation and reduce the issue of long-term bonded pairs that are unable to be managed with other individuals.

# FULL REPORT
# Clouded Leopard AZA Animal Program Population Viability Analysis

## POPULATION VIABILITY ANALYSIS (PVA) MODEL DESCRIPTION

A Population Viability Analysis (PVA) is a computer model that projects the likely future status of a population. PVAs are used for evaluating long-term sustainability, setting population goals, and comparing alternative management strategies. PVAs are tools that can be used to determine the extinction risk of a population, forecast the population's future trajectory, and identify key factors impacting the population's future.

ZooRisk is a PVA software package that can be used to model the dynamics of an individual population (Earnhardt et al., 2008). Full documentation on ZooRisk can be found in the software's manual (Faust et al., 2008). In this analysis, we use it to integrate the complex factors impacting a population – its age and sex structure, demographic rates, stochasticity (random chance due to variation in mortality, fecundity, and sex ratios among individuals), genetic management, and potential management actions. ZooRisk is an individual-based, stochastic model.

Since stochastic models have inherent variation, each model run (or iteration) will produce a slightly different population trajectory, and the model is run 1000 times to reflect the full potential variation a population could experience. For example, there may be a wide range in population trajectories (Fig. 1). For clarity, most figures in this report show the mean population size (Fig. 1). Model results such as mean population sizes, levels of gene diversity (GD), and inbreeding (F) are averaged across 1000 model iterations. Where relevant, results are reported on medium-term (25 year), and long-term (100 year) time frames. Results such as the probability of reaching the potential spaces or extinction are based on the percentage of iterations that hit that target at least once over the next 100 years. Where applicable, ± 1 standard deviation is included; large values represent wider variability in model results.

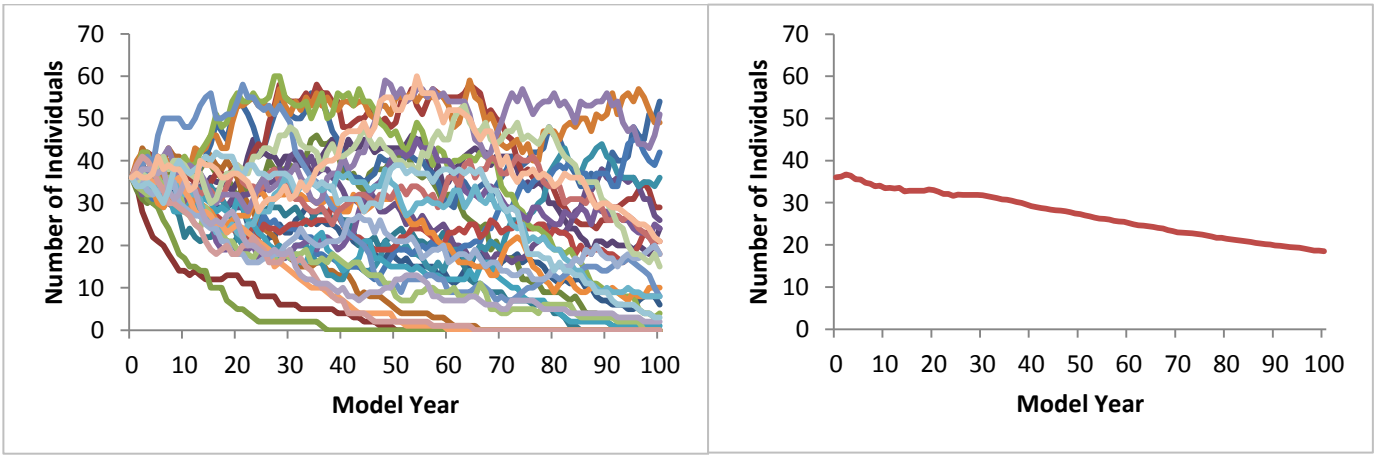


Figure 1. An example of 30 iterations of a stochastic model (left) and what the mean population size averaged across 1000 iterations of the same model would look like (right).

The most powerful use of PVAs is to compare a baseline scenario, reflecting the population's future trajectory if no management changes are made, to alternate scenarios reflecting potential changes. These comparisons can help evaluate the relative costs and benefits of possible management changes. Note that for easy comparison, model results across all scenarios are included in Appendix F.

The future can be uncertain and difficult to predict. Model results are most appropriately used to compare between scenarios (e.g. relative to each other) rather than as absolute predictions of what will happen.

# POPULATION'S DEMOGRAPHIC BACKGROUND

**Demography:** Based on the AZA Clouded Leopard Studbook, the first record of clouded leopards in zoos was in 1901 at the Philadelphia Zoo and the first zoo birth occurred in 1955 at the Cheyenne Mountain Zoo. The population began increasing rapidly in the late 1960s due to increased zoo births and importations. In 1993, the AZA population reached a peak of 116 individuals. The clouded leopard population then began to decline as zoo breeding began to dramatically decrease (242 births from 1985 – 1994 vs. 51 births from 1995 – 2004) (Fig. 2). Over the past 10 years the population declined by 3.8% ($\lambda$ = 0.962), with no births in the AZA clouded leopard population between the years 2004 – 2008 due in part to ongoing challenges with introducing potential mates which prevented the setup of new breeding pairs. However, with recent importations and changes in management strategies focusing on hand-rearing offspring and introducing potential mates at a very young age, over the last three years the population has had a total of 18 offspring and a growth rate of 4.3% ($\lambda$ = 1.043) (Fig. 3).

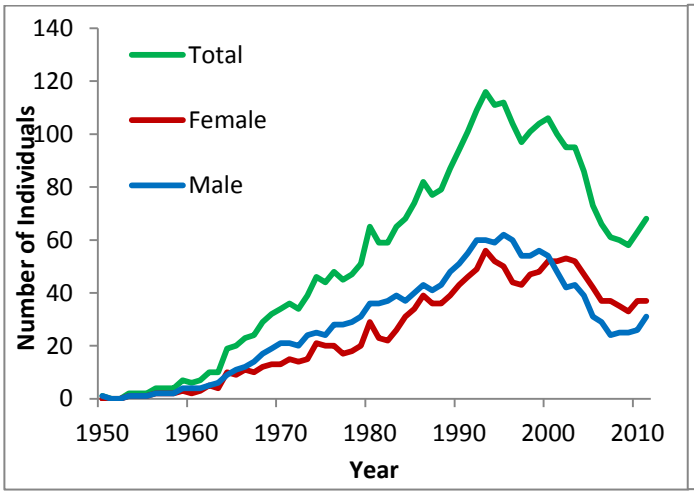


Figure 2. Number of clouded leopards in AZA institutions.

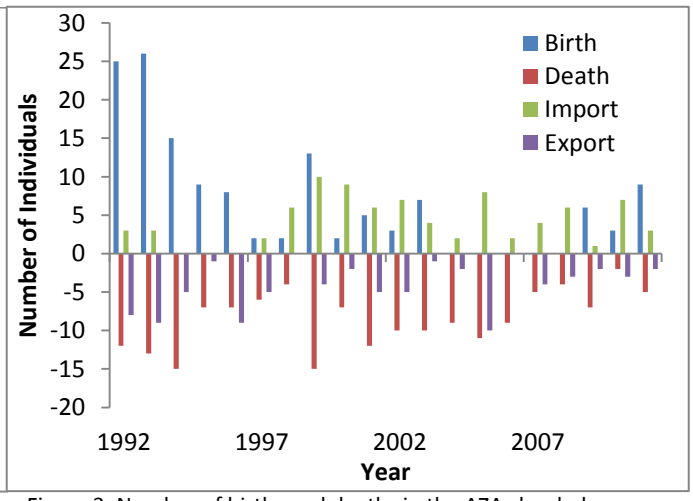


Figure 3. Number of births and deaths in the AZA clouded leopard population over the last 20 years.

# PVA MODEL SETUP

## Starting Population:

ZooRisk uses a starting population to initiate each model scenario, and it incorporates data on each individual's pedigree, age, sex, and reproductive status. Any animals unable to breed due to age, medical issues, or sterilization can be designated as non-reproductive in the model, which removes them from the potentially breeding population. The model assumes that any new animals (either births or imports) are potentially reproductively viable; this may be an optimistic assumption.

At the time of analyses the AZA population consisted of **72 animals (32 males, 40 females) at 22 AZA institutions** (Fig. 4a). For these analyses, 36 AZA clouded leopards were designated as non-reproductive due to factors that prevent them from breeding such as age, sterilization, medical issues, or being unpaired over 9 years of age (females). Non-reproductive animals hold space in the model projections for the remainder of their lives but are not eligible to breed. **This leaves a potentially breeding population of only 36 individuals (19 males and 17 females)** (Fig. 4b).

The majority of modeling scenarios focused on only the AZA population; however for scenarios B, F, G, & H we incorporated a non-AZA institution, Tanganyika Wildlife Park (FOUTS J) that is a potential partner in the AZA Clouded Leopard Animal Program. By including these individuals in these scenarios, the AZA + Non-AZA population consists of **86 animals (37 males, 49 females).** Out of these 86 individuals, 36 were designated as non-reproductive, leaving a potentially breeding population of 50 individuals.

See Appendix D for a complete list of the individuals included in the model and their reproductive status.

## Age Structure:

The age structures (total and potentially breeding) illustrate the high proportion of aging, reproductively senescent clouded leopards within the current AZA population. Female reproductive span is from ages 1 – 12 and male reproductive span is from ages 1 – 14. There is a relatively large base of young animals that may form a reliable pool of breeding individuals in the future (Fig. 4b). Note that due to the current management strategies for this population (pairing of juvenile cats for life); any young cats that are unpaired are not likely to be paired for breeding in the future. This may affect the long-term sustainability of the population as cats typically cats are not repaired. Maximum longevity for clouded leopards in zoos is 21 years old for males and 24 years old for females.

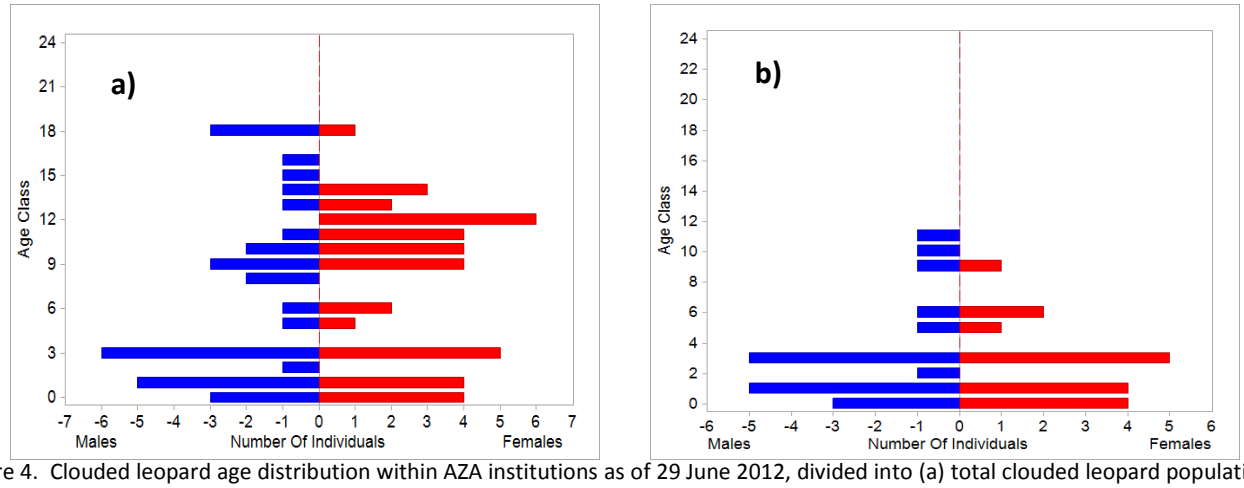


Figure 4. Clouded leopard age distribution within AZA institutions as of 29 June 2012, divided into (a) total clouded leopard population of 72 (32 males, 40 females) and (b) Potentially breeding population of 36 (19.17).

## Current Demographics and Genetics:

All ZooRisk scenarios started with the population's current demographics and genetics (Table 1).

Table 1. Starting demographic and genetic statistics for the clouded leopard population.

| | AZA Population | AZA + Non–AZA Population |
|---|---|---|
| Starting population size (Males.Females.Unknown Sex) | 72 (32.40.0) | 86 (37.49.0) |
| Potentially breeding population size | 36 (19.17.0) | 50 (24.26.0) |
| Percentage of pedigree known (after exclusions and assumptions) | 100% | 100% |
| Gene diversity (GD) | 87.77% | 89.40% |
| Population mean kinship (MK) | 0.1223 | 0.1060 |
| Mean inbreeding (F) | 0.0441 | 0.0899 |
| Mean generation time (T) (years) | 5.2 | 5.2 |
| Number of generations in 100 model years | 19.23 | 19.23 |

**Reproduction:** ZooRisk uses the following parameters to determine how offspring are produced in each model year:

- **Female Reproductive Age Classes:** Ages 1 – 12. One female (#751) in the studbook reproduced at 14 years old, however the management team thought clouded leopards breeding at this age is highly unlikely and the oldest age of breeding is typically 12 years old.

- **Male Reproductive Age Classes:** Ages 1 – 14. One male (#123) in the studbook bred at 15 years old, however the management team though clouded leopards breeding at this age is highly unlikely and the oldest age of breeding is typically 14 years old.

- **Female Probability of Breeding [p(B)]:** Female p(B) is the age-specific probability that a female will have at least one offspring in a given year. Since it is difficult to determine from the studbook what a population could do if all individuals were in breeding situations, model scenarios utilize simplified hypothetical levels of p(B) to illustrate the impact of potential changes in birth rates. All female p(B) were set at a constant value across all the reproductively viable age classes. This constant p(B) can be thought of as an interbirth interval (e.g. p(B) = 25% = each female has an offspring every 4 years on average) or as the percentage of reproductive-aged females reproducing (e.g. 25% of eligible females breed in any given year). Using a constant value means that all reproductively viable females have the same chance of reproduction regardless of age. This probability of breeding is used in the model to stochastically determine whether a paired female produces offspring in any given model year. The model p(B) varies depending on the model scenario. To determine the p(B) used in the baseline scenario, we extracted the average number of births/year over the past three years from the studbook (6 births/year), and then identified a p(B) level in the model that would produce an equivalent average number of projected births annually over the first 10 years of the model. Alternate scenarios used higher or lower p(B) levels.

- **Annual Number of Offspring (ANO):** Based on studbook data, the annual frequency of producing one offspring was 36%, two offspring was 43%, three offspring was 17%, four offspring was 3%, and five offspring was 0.7% per reproductive female. When a female within the model is selected to reproduce in a given model year, ZooRisk uses these frequencies to stochastically determine the number of offspring she produces.

- **Number of Years Between Pairing:** The number of years between pairing was set at 25 years, this means that an individual is never repaired unless their current mate dies. This is the best estimation of the clouded leopard current management strategy where animals are paired at a young age, remain together for life and are not repaired. The ZooRisk model may be more optimistic genetically and demographically due to this representation in the model.

- **Birth Sex Ratio (BSR):** Based on studbook data, the historic birth sex ratio is not significantly different than the expected equal BSR (50 males: 50 females, df = 1, $p > 0.05$). For this population, all scenarios were given a BSR of 0.5 (no bias).

## Mortality:

- **Male and Female Age-Specific Mortality Rates (Qx):** Mortality rates for age classes 0 – 21 for males and age classes 0 – 24 for females were based on studbook data from individuals living within AZA from 01 January 1970 to 19 November 2012. See Appendix E for the male and female mortality rates used in the model.

- **Infant Mortality Rates (Qx):** Male = 32%, female = 34%, based on data from the studbook. Infant mortality rates were altered to reflect the last 10 years for scenarios I & J, as the current strategy of hand-rearing has greatly increased infant survival. Infant mortality was decreased to 13% for both males and females.

- **Maximum Longevity:** Male = 21 years, female = 24 years. These maximums were based on studbook records for animals in AZA institutions (male = #750; female = SB #751).

**Space:** There is limited space available in AZA institutions and in many cases populations can compete for similar spaces. Viability of some species may be limited if too little space is allocated, while others may exceed the space needed to maintain sustainable populations. PVAs can identify the number of spaces needed to attain a population's long-term sustainability. ZooRisk has the option of including a space limitation on population growth. This limitation reduces breeding in the model population as it approaches the potential space limit, mimicking zoo management. For example, a Program Leader may begin to recommend fewer breeding pairs if available spaces for a population become limited.

To determine an appropriate space limitation for the models, the PVA team, in consultation with the AZA Wildlife Conservation and Management Committee (WCMC), developed the approach of using the number of projected spaces in 5 years based on a Taxon Advisory Group's (TAG) Regional Collection Plan (RCP). If that number is unavailable or unsuitable (i.e. if the population is already larger than that space), the team will use the current population size + 10% or 10 individuals, whichever is greater.

Projected spaces for the clouded leopard population for most scenarios was set at 82 individuals for the AZA population and 97 for the non-AZA population (+10 individuals). The 2009 Felid TAG RCP set the clouded leopard long-term target population size at 100, thus for scenarios which explored increased potential space this number was used.

**Genetic Management:** ZooRisk can model genetic management by mean kinship pairings and other genetic criteria, mimicking the way that AZA populations are managed to maintain gene diversity (GD) (Ballou & Lacy, 1995). Therefore, ZooRisk can more accurately project the amount of gene diversity retained through genetic management. Unless otherwise noted, we used mean kinship genetic management in all scenarios. We also modeled alternate scenarios with no genetic management.

**Inbreeding Depression:** One of the largest genetic threats to small populations is the potential detrimental effects of inbreeding, where breeding between close relatives results in decreased short-term and long-term fitness via reductions in fecundity or litter size, increases in infant mortality, and other detrimental effects (DeRose & Roff, 1999; Koeninger Ryan, et al., 2002; Ballou & Foose, 1996; Reed & Frankham, 2003). This phenomenon, called inbreeding depression, has been observed in several ex situ species (Ralls & Ballou, 1982; Olech, 1987; Laikre & Ryman, 1991; Lacy et al., 1993), although effects vary between species (Lacy et al., 1993; Kalinowski et al., 1999). However, inbreeding depression is a concern in the zoo community as many populations have a limited number of founders, small population sizes, and a low chance of receiving additional founders in the future (i.e. they are closed populations) (Lacy, 1997). In other words, inbreeding depression could put this population at higher risk of extinction, particularly if the population size decreases further (Gilpin & Soulé, 1986; Lacy, 1997).

At this time inbreeding depression is not known to be affecting this population. There are several strategies that can delay the effects or lower the probability of inbreeding depression including; pairing based on mean kinship and importing and breeding unrelated individuals (Ballou & Lacy, 1995). These strategies were modeled for all scenarios except those without genetic management.

Inbreeding depression can be challenging to incorporate into PVA models because of uncertainty about which populations and life history traits will be affected, and at what inbreeding level they will become detected. Due to this uncertainty and since modeling inbreeding depression adds an additional layer of complexity to interpretation of results; we have not included a “standard” inbreeding depression effect in the PVA models. Readers should consider that model results may be optimistic if this species would be susceptible to inbreeding depression now or in the future.

# MODEL SCENARIOS

Model scenarios for AZA Clouded Leopard Animal Program were created to reflect what would happen if current approaches continued (baseline) and to address potential alternate management strategies (Table 2); scenarios are described in more detail in their results sections below.

Table 2. ZooRisk Model Scenarios.

| Scenario Name | Scenario Description | p(B) | Potential Space |
|---|---|---|---|
| **Baseline Scenario:** | | | |
| A. AZA Baseline, p(B) = 17% | Reproduction to match past 3 years (2009 - 2011) | 17% | 82 |
| **Alternate Scenarios: Including Non-AZA Institutions** | | | |
| B. AZA + Non-AZA Baseline, p(B) = 19% | Reproduction to match past 3 years(2009 - 2011) for AZA institutions + FOUTS J | 19% | 96 |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | |
| C. p(B) = 20% (AZA) | Increase p(B) to 20% (1 offspring every 5 years for each female) | 20% | 82 |
| D. p(B) = 25% (AZA) | Increase p(B) to 25% (1 offspring every 4 years for each female) | 25% | 82 |
| E. p(B) = 33% (AZA) | Increase p(B) to 33% (1 offspring every 3 years for each female) | 33% | 82 |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | |
| F. p(B) = 20% (AZA + non-AZA) | Increase p(B) to 20% (1 offspring every 5 years for each female) | 20% | 96 |
| G. p(B) = 25% (AZA + non-AZA) | Increase p(B) to 25% (1 offspring every 4 years for each female) | 25% | 96 |
| H. p(B) = 33% (AZA + non-AZA) | Increase p(B) to 33% (1 offspring every 3 years for each female) | 33% | 96 |
| **Alternate Scenario: Decreasing Infant Mortality** | | | |
| I. Decrease IM to 13%; p(B) = 17% | Decrease infant mortality for both males and females to 13% (the infant mortality rate over the last 10 years). p(B) = 17% (baseline), AZA population only. | 17% | 82 |
| J. Decrease IM to 13%; p(B) = 25% | Decrease infant mortality for both males and females to 13% (the infant mortality rate over the last 10 years). Increase p(B) to 25% (baseline), AZA population only. | 25% | 82 |
| **Alternate Scenario: Including Unpaired Females Over 9 Years Old** | | | |
| K. Include Unpaired Females, p(B) = 17% | Include all females that are currently unpaired for breeding and are over 9 years old. Five additional females included in the potentially breeding population = 29 (14.15). AZA population only, Female p(B) = 17%, baseline. | 17% | 82 |
| L. Include Unpaired Females, p(B) = 25% | Include all females that are currently unpaired for breeding and are over 9 years old. Five additional females included in the potentially breeding population = 29 (14.15). AZA population only, Female p(B) increased to 25%. | 25% | 82 |
| **Alternate Scenarios: Varying Imports** | | | |
| M. Import 4 indiv. every 5 yrs, total 24 | Import 2 males, 2 females (ages 0 – 1) every 5 years in model years 1, 6, 11, 16, 21, and 26; 24 individuals total; AZA only | 17% | 82 |
| N. Import 4 indiv. every 1 yr, total 100 | Import 2 males, 2 females (ages 0 – 1) every 1 year until year 25; 100 individuals total; AZA only | 17% | 82 |
| **Alternate Scenarios: Varying Female p(B) + Imports** | | | |
| O. Import 24; p(B) = 20% | Increase p(B) to 20% and import 2 males, 2 females (ages 0 – 1) every 5 years in model years 1, 6, 11, 16, 21, and 26; 24 individuals total; AZA only | 20% | 82 |
| P. Import 24; p(B) = 33% | Increase p(B) to 33% and import 2 males, 2 females (ages 0 – 1) every 5 years in model years 1, 6, 11, 16, 21, and 26; 24 individuals total; AZA only | 33% | 82 |
| Q. Import 100; p(B) = 20% | Increase p(B) to 20% and import 2 males, 2 females (ages 0 – 1) every 1 year until year 25; 100 individuals total; AZA only | 20% | 82 |
| R. Import 100; p(B) = 33% | Increase p(B) to 33% and import 2 males, 2 females (ages 0 – 1) every 1 year until year 25; 100 individuals total; AZA only | 33% | 82 |
| **Alternate Scenarios: Varying Female p(B) + Potential Space** | | | |
| S. Spaces = 100; P(b) = 20% | Increase p(B) to 20% and increase number of potential spaces to 100; AZA only | 20% | 100 |
| T. Spaces = 100; P(b) = 33% | Increase p(B) to 33% and increase number of potential spaces to 100; AZA only | 33% | 100 |
| **Alternate Scenarios: Varying Female p(B) + Imports + Potential Space** | | | |
| U. Potential spaces= 100; Import 100 indiv; p(B) = 20% | Increase p(B) to 20% and import 2 males, 2 females (ages 0 – 1) every 1 year until year 25; 100 individuals total and increase potential spaces to 100; AZA only | 20% | 100 |
| V. Potential spaces= 100; Import 100 indiv; p(B) = 33% | Increase p(B) to 33% and import 2 males, 2 females (ages 0 – 1) every 1 year until year 25; 100 individuals total and increase potential spaces to 100; AZA only | 33% | 100 |

# BASELINE MODEL

## *If Conditions Remain the Same*

### AZA Baseline Scenario:

The clouded leopard AZA baseline scenario, p(B) = 17%, describes what might happen to the population if conditions remain the same, specifically if the population experiences the mortality patterns observed in the studbook and maintains a birth rate equivalent to that observed over the last three years (from 2009 – 2011, the population produced an average of **6 births per year**). Typically baseline analyses are based on birth rates from the last decade, however due to changes in management strategies for this population which resulted in no births produced for five consecutive years (2004 – 2008), the management team decided to use the last three years as representative of the number of offspring the population is currently capable of producing.

In this baseline scenario, if no changes are made, over the next 10 years the population will quickly decline to about 55 individuals. At the end of 100 years, the mean population size will be 30 individuals (Fig. 5).

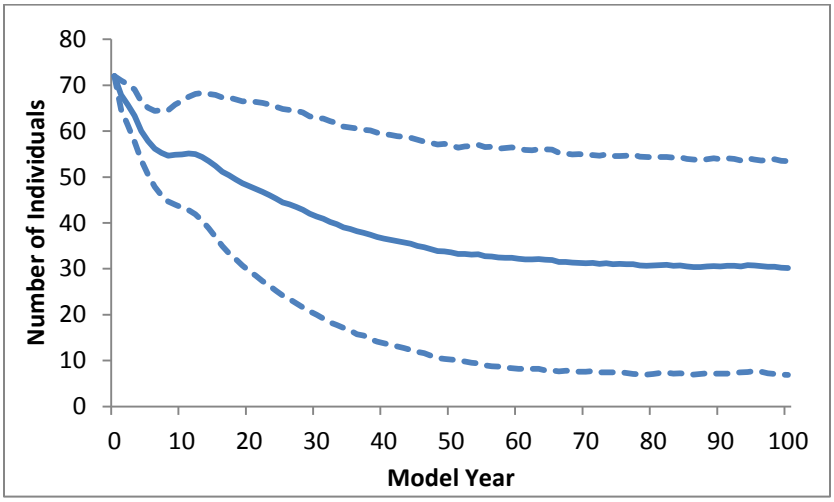


Figure 5. Projected Total Population Size for the baseline model scenario (p(B) = 17%). Solid line is mean results across the 1000 iterations, and dashed lines are ± 1 standard deviation.

The projected population decline occurs because deaths exceed births, especially in the first 10 model years. The baseline model produces, on average, 6 births per year in comparison to an average of 8 projected deaths per year in the first 10 years of the model. These average levels of births and deaths can be anticipated by the clouded leopard population if breeding does not increase from current levels or other changes are not made.

Under this scenario, the population's structure changes over the next 25 years as older animals transition out of the population and are slowly replaced by new births (Fig. 6). The baseline scenario produces a thin, columnar age pyramid in model year 25 with an average of 45 individuals in the population (Fig. 6c).

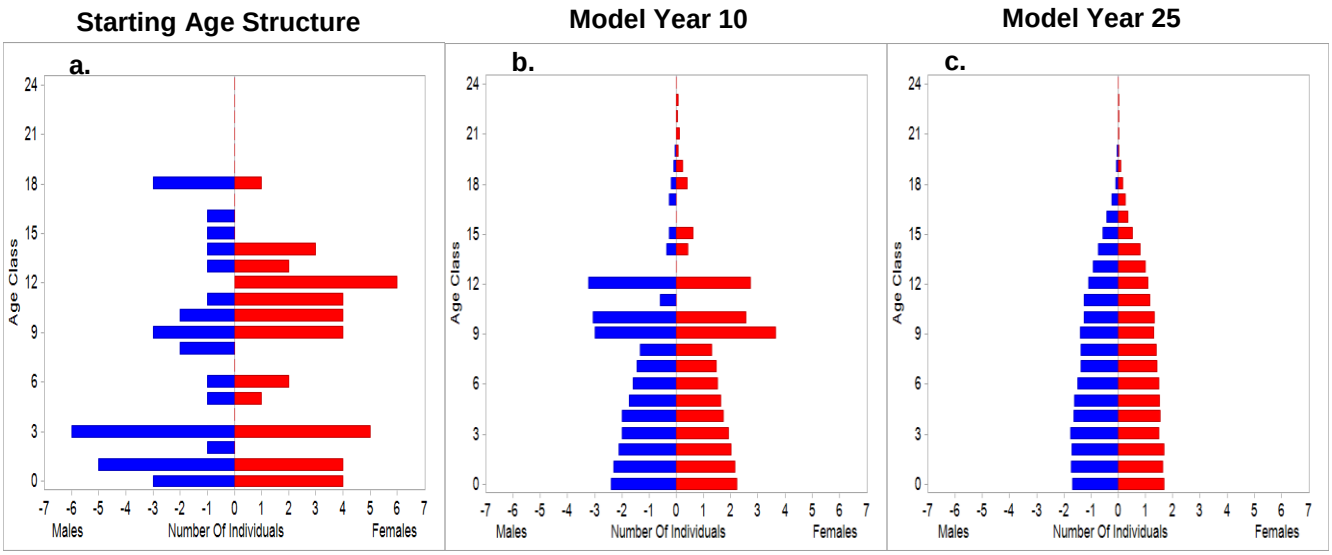


Figure 6. Clouded leopard population age structures under baseline scenario, p(B) = 17%: (a) starting age structure; (b) average age structure at model year 10; (c) average age structure at model year 25. Results are averaged across 1000 iterations. Starting population = 72 (32 males and 40 females).

## AZA + Non-AZA Baseline Scenario:

The clouded leopard AZA + non-AZA baseline scenario, Scenario B. p(B) = 19%, describes what might happen to the combined AZA + non-AZA population if conditions remain the same, specifically if this population experiences the mortality patterns observed in the studbook and maintains a birth rate equivalent to that observed over the last three years (from 2009 – 2011, the population produced an average of **10 births per year**). Potential space for the AZA + non-AZA population was set at 96 individuals (+10 individuals than the current population).

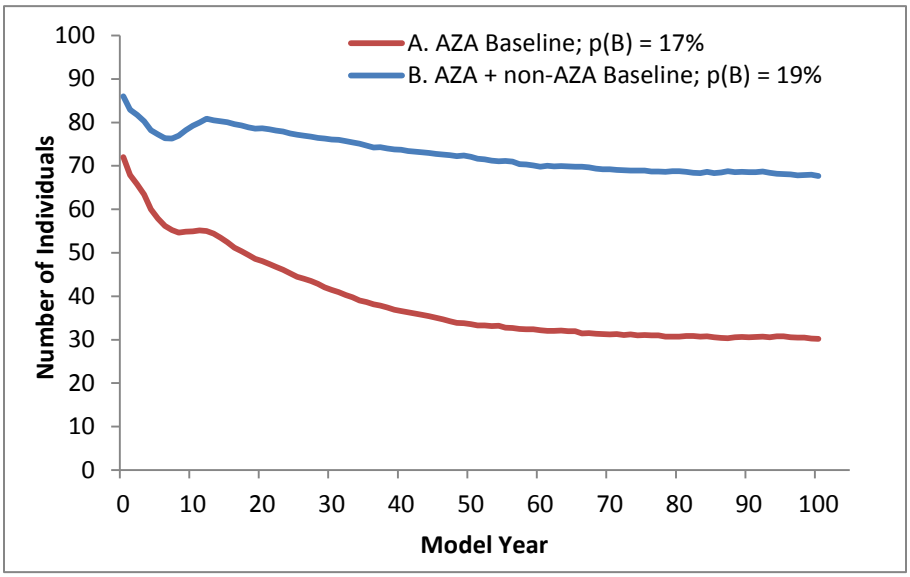


Figure 7. Projected Total Population Size for the baseline model scenarios for the AZA population and the AZA + non-AZA population. Mean results across 1000 iterations.

Table 3. Baseline Model Results. Starting population for scenario A = 72 (32.40). Starting GD = 87.77%. Starting F = 0.0441. Starting population for Scenario B = 86 (37.49). Starting GD = 89.40%. Starting F = 0.0899.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 or 96 Individuals | Median Time to 82 or 96 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years) | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| B. AZA + Non-AZA Baseline, p(B) = 19% | 77 ± 19 | 68 ± 28 | 86% | 19 | 8% | 81.5 | 70% ± 8% | 0.28 ± 0.06 |

[1] *All population sizes, GD, and F are the mean values across 1000 iterations.*

[2] *One standard deviation.*

## Results for Baseline Scenarios:

1. If no management changes are made, the AZA population will have on average only 30 (± 23) individuals in 100 years, a low probability of reaching the number of potential spaces (27%), and a relatively high probability of extinction (57%).

2. With the incorporation of the non-AZA institutions the clouded leopard population reaches the projected number of spaces in 86% of model iterations and only decreases by about 10 individuals from its original population size, ending with a mean population size of 77 individuals in 100 years. This shows the importance of additional reproductive aged animals and their value to the clouded leopard program.

3. Both populations face a steep demographic bottleneck over the first 10 years of the model due to the current population structure, which is made up of many animals that are non-reproductive, cannot contribute to the population's growth, and are expected to reach the end of their lifespans within the next decade. Once these animals pass out of the population, the population's decline begins to slow.

4. With the inclusion of the non-AZA animals, the gene diversity retained over 100 years is greatly increased. However, both the AZA and the AZA + Non-AZA baseline scenarios have low levels of gene diversity at 100 years (AZA = 55%, AZA + non-AZA = 70%).
    a. **The projected mean final inbreeding coefficient (F) in both scenarios is greater than sibling relationship**.
        - It is likely that these projections are optimistic, as they do not incorporate any effects of inbreeding depression (e.g., lowered fecundity, increase mortality). The decline, small population, and high levels of mean inbreeding (F) at the end of 100 years would create a small population which may experience such additional effects, which are not factored into these model scenarios.

## *Alternate Model Scenarios*

## *Varying Female Probability of Breeding [p(B)] – AZA only*

One way to avoid the projected population decline is to improve reproduction, which we modeled by increasing the probability of breeding [p(B)] for reproductive-aged females (ages 1 – 12). We modeled the impact of varying levels of p(B) between the baseline (p(B) = 17%) and up to a maximum of p(B) = 33% which is equivalent to each reproductive-aged female producing a litter approximately every 3 years. Managers felt this was the minimum interbirth interval for current management practices. For detailed model results, see Figure 8, 9 and Table 4 below.

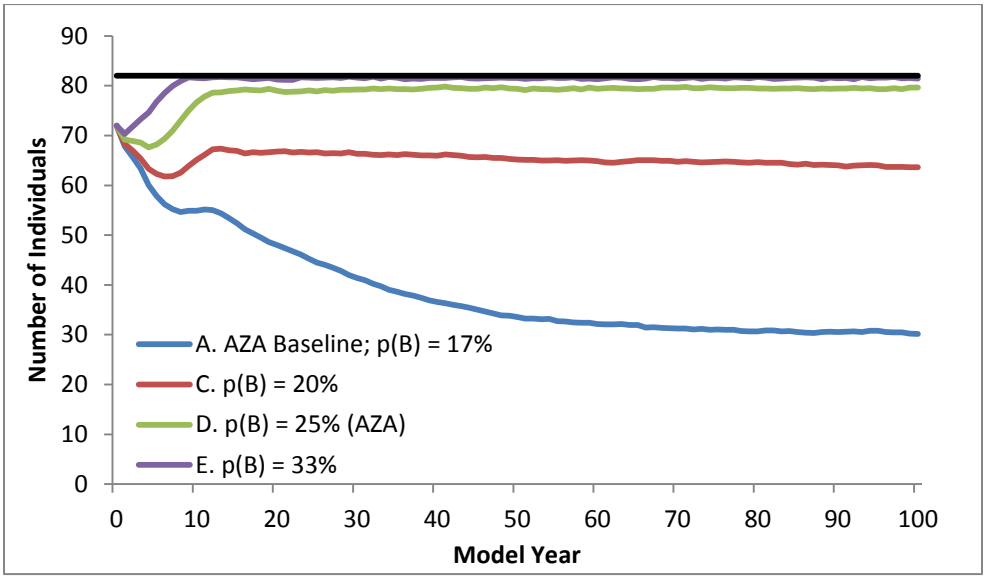


Figure 8. Projected mean total population size under varying female probability of breeding (p(B)) levels for the AZA population. The black line represents the potential space available of 82 individuals.

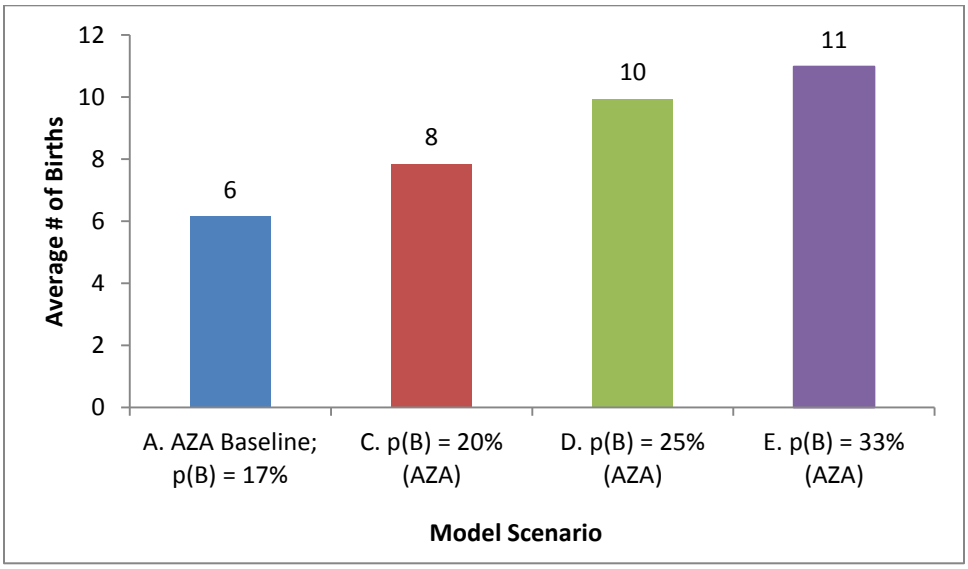


Figure 9. Projected mean total number of offspring per year over the first 10 years of the model based on varying levels of female probability of breeding (p(B)) for the AZA population. Note that this is the total number of offspring produced before any infant mortality occurs – these would not have to be surviving births.

The levels of female p(B) explored above may be high for the current population given its current age structure and potential husbandry challenges. However, historically the clouded leopard population has had periods of very high rates of breeding with short interbirth intervals that make these p(B) levels potentially realistic. In the 1980s, there was roughly the same number of potentially breeding clouded leopards in the AZA population as there is currently (Fig. 10). From 1980 – 1990 the female p(B) ranged from 0.286 – 0.826, with an average of 0.49, which is equivalent to a female reproducing every other year. For this reason, the modeling team believes that a female p(B) of 33%, an interbirth interval of 3 years, much longer than the 2 year interbirth intervals seen in the past, is an attainable goal for the clouded leopard population.

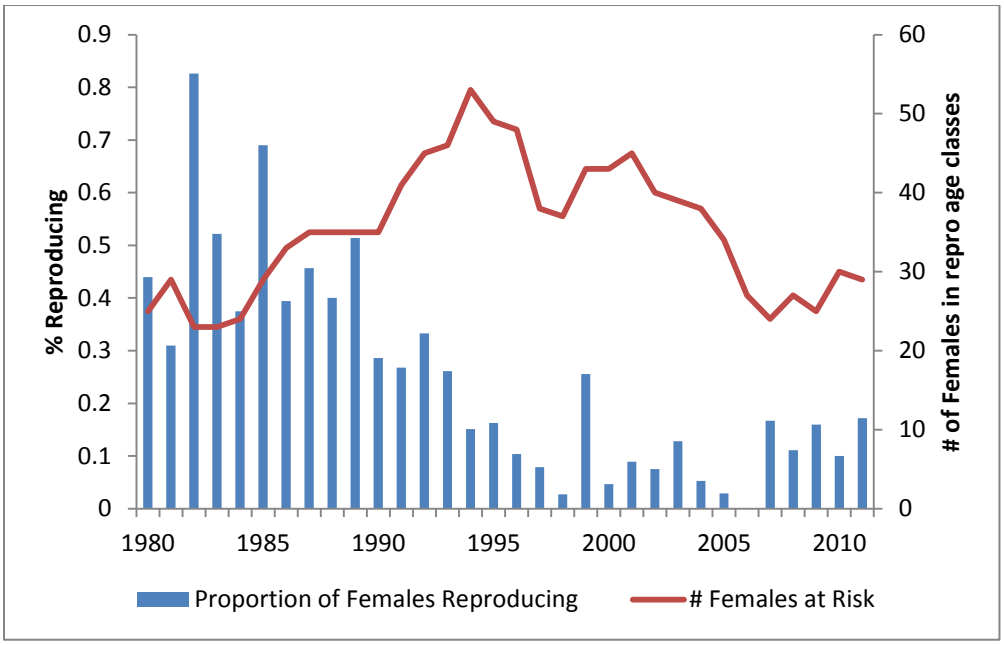


Figure 10. Proportion of the number of female clouded leopards reproducing verses the number of females in the potentially breeding population (ages 1-12) from 1980 to 2011.

Table 4. Model results under varying (p(B)) for AZA institutions. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| C. p(B) = 20% (AZA) | 67 ± 17 | 64 ± 21 | 90% | 19 | 7% | 71 | 68% ± 8% | 0.31 ± 0.06 |
| D. p(B) = 25% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| E. p(B) = 33% (AZA) | 82 ± 4 | 81 ± 4 | 100% | 6 | 0% | - | 76% ± 2% | 0.23 ± 0.02 |

[1] *All population sizes, GD retained, and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

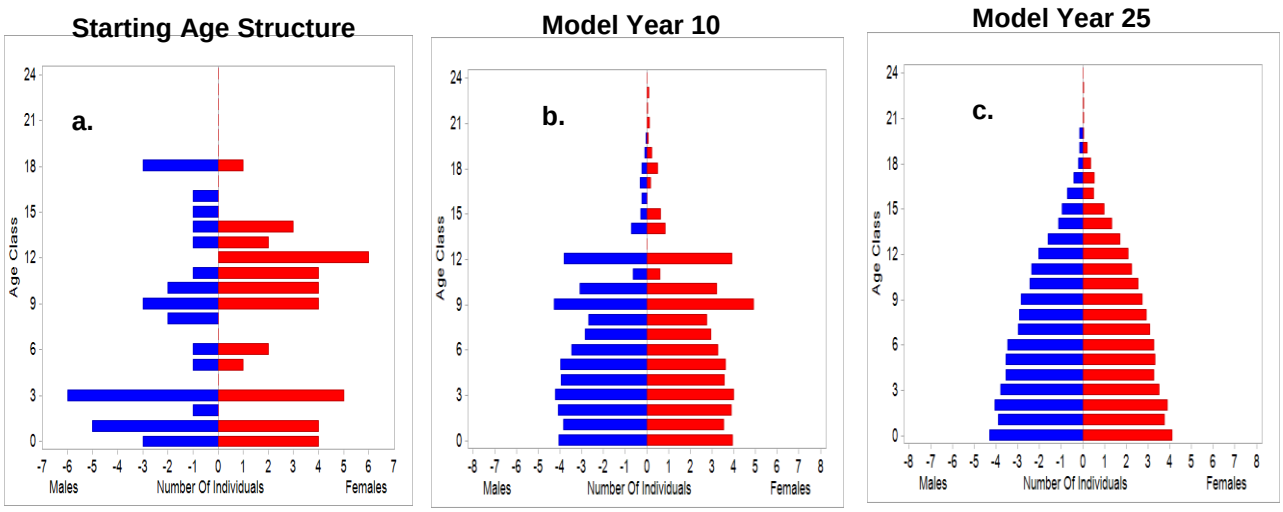


Figure 11. Clouded leopard population age structures under Scenario D p(B) = 25%: (a) starting age structure; (b) average age structure at model year 10; (c) average age structure at model year 25. Results are averaged across 1000 iterations. Starting population = 72 (32.40).

### Results for Scenarios Varying Female Probability of Breeding [p(B)] AZA population:

1. If the AZA population is able to add two additional births to its existing birth rate (increase to 8 births per year in Scenario C. p(B) = 20%), the population is able to roughly maintain is current population size in 100 years, and is more likely to reach its potential spaces than the baseline scenario (90%). Note that this is the total number of offspring produced before any infant mortality occurs – these would not have to be surviving births. Over the last three years, the AZA population has been producing an average of 6 births per year. This small increase to 8 births per year allows the population to retain 68% gene diversity in 100 years and significantly decrease the probability of reaching extinction.
    a. However, even with this increased level of breeding, the population still experiences the demographic bottleneck over the first 10 years of the model due to the many older, non-reproductive animals in the population.

2. To prevent the population from experiencing a population bottleneck in the first 10 model years, the female probability of breeding should be increased to at least 25% (10 births per year- Scenario D). This level of breeding will allow the population to maintain its current size for the first 10 model years and then begin growing once the older animals have passed out of the population. With this level of breeding, the population is able to reach the number of potential spaces (82) in approximately 10 years. The population can retain about 74% gene diversity, though inbreeding levels at the end of 100 years is still high with levels exceeding sibling relationship (0.25).

3. If the population is able to increase to 11 births per year (Scenario E. p(B) = 33%), it can avoid the demographic decline all together and reach the projected spaces in approximately 6 years. Under this scenarios gene diversity retained at the end of 100 years is approximately 76% and inbreeding remains high at roughly a sibling relationship (0.23).

4. The levels of inbreeding at the end of 100 years (equal to or higher on average than that of full siblings) remain a serious concern even under the scenarios with the highest breeding rates, indicating that increasing breeding of the current AZA population alone is not enough to prevent the population from experiencing a genetic crisis in the future.

# ALTERNATE MODEL SCENARIOS

## *Varying Female Probability of Breeding [p(B)] – AZA + non-AZA*

The AZA Clouded Leopard Animal Program could potentially work with Tanganyika Wildlife Park (FOUTS J), a non-AZA institution. This institution houses 15 (6 male and 9 female) clouded leopards. With the addition of these animals the AZA + non-AZA population becomes 86 (37.49) animals, with a potential breeding population of 50 (24.26). We modeled a baseline scenario with this population and scenarios with increased female probability of breeding [p(B)] for reproductive-aged females (ages 1 – 12). We modeled the impact of varying levels of p(B) between the AZA + non-AZA baseline (p(B) = 19%) and up to a maximum of p(B) = 33%. For detailed model results, see Figure 12, 13 and Table 5 below.

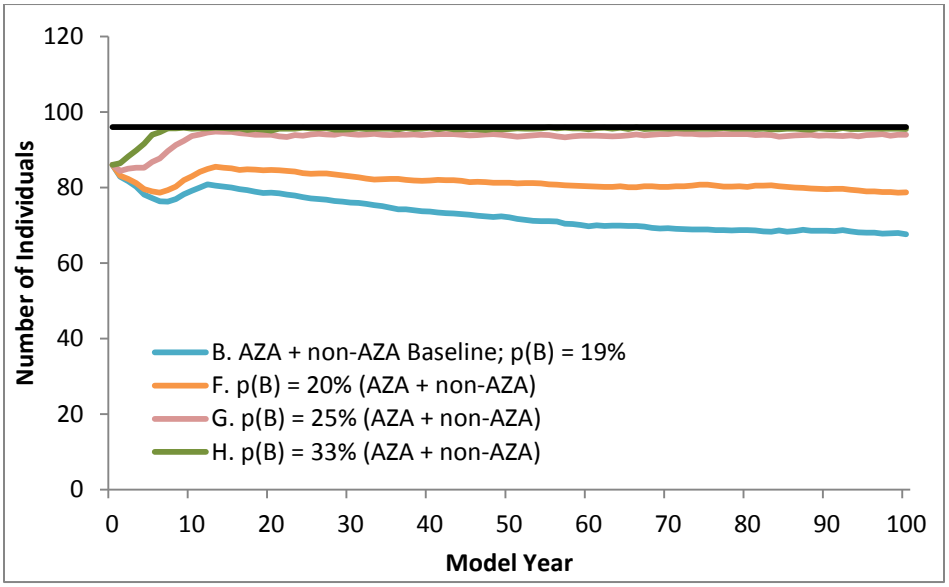


Figure 12. Projected mean total population size under varying female probability of breeding (p(B)) levels for the AZA + non-AZA population. The black line represents the potential space available of 96 individuals.

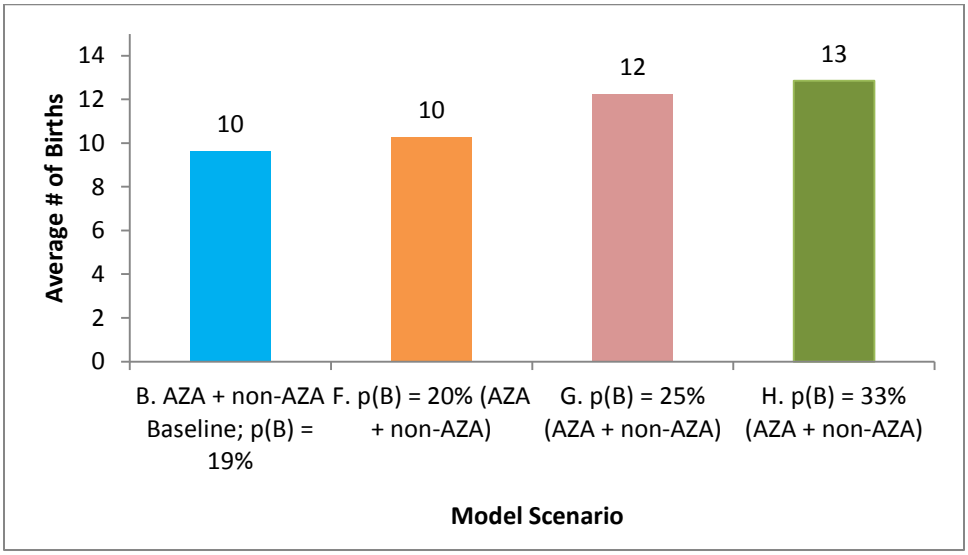


Figure 13. Projected mean total number of offspring per year over the first 10 years of the model based on varying levels of female probability of breeding (p(B)) for AZA and non-AZA populations. Note that this is the total number of offspring produced before any infant mortality occurs – these would not have to be surviving births.

Table 5. Model results under varying (p(B)) AZA +non-AZA populations. Starting population (AZA population) = Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441. Starting population (AZA + non-AZA population) = 86 (37.49). Starting GD = 89.40%. Starting F = 0.0899.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 or 96 Individuals | Median Time to 82 or 96 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| B. AZA + Non-AZA Baseline, p(B) = 19% | 77 ± 19 | 68 ± 28 | 86% | 19 | 8% | 81.5 | 70% ± 8% | 0.28 ± 0.06 |
| F. p(B) = 20% (AZA + non-AZA) | 84 ± 15 | 79 ± 22 | 96% | 14 | 2% | 80 | 73% ± 6% | 0.26 ± 0.05 |
| G. p(B) = 25% (AZA + non-AZA) | 94 ± 6 | 94 ± 7 | 100% | 8 | 0% | - | 77% ± 2% | 0.22 ± 0.02 |
| H. p(B) = 33% (AZA + non-AZA) | 96 ± 4 | 95 ± 4 | 100% | 5 | 0% | - | 79% ± 1% | 0.21 ± 0.02 |

[1] *All population sizes, GD retained, and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

### Results for Scenarios Varying Female Probability of Breeding [p(B)] – AZA + non-AZA:

1. With the inclusion of the non-AZA institutions, the population is able to roughly maintain the current population size under its current conditions. However, like the AZA population, the AZA + non-AZA population experiences a decline in the first 10 model years as older, non-breeding animals in the current population age out.

2. By increasing the number of births per year to 12 (Scenario G. p(B) = 25% (AZA + non-AZA)) the population can maintain its current size over the several years and then begin increasing to the potential spaces (96), reaching it in approximately 8 years. With this level of breeding, the population can retain approximately 77% gene diversity and inbreeding levels of 0.22 in 100 years.

3. An increase to 13 births per year in Scenario H (only 3 more births than the current rate) allows the population to avoid the demographic decline and reach the potential space in about 5 years. This increased level of breeding helps the population retain 79% gene diversity in 100 years and slightly lowers the inbreeding coefficient to 0.21 (relatedness in-between siblings and half siblings).

# ALTERNATE MODEL SCENARIOS

## *Decreasing Infant Mortality*

Infant mortality used in all scenarios are based on historical data from 1970 – July 2012 (males = 32% and females = 34%). However, over the past four years, most clouded leopard cubs are being hand-reared by zoo keepers with expertise on rearing young cubs. This practice has decreased the infant mortality in both male and female offspring. Over the last 10 years, the infant mortality for both sexes has been approximately 13%. We explored what would happen to the population if the infant mortality rates remained low. Decreased infant mortality was modeled with baseline breeding rates and an increased rate (p(B) = 25%). For detailed model results, see Figure 14 and Table 6 below.

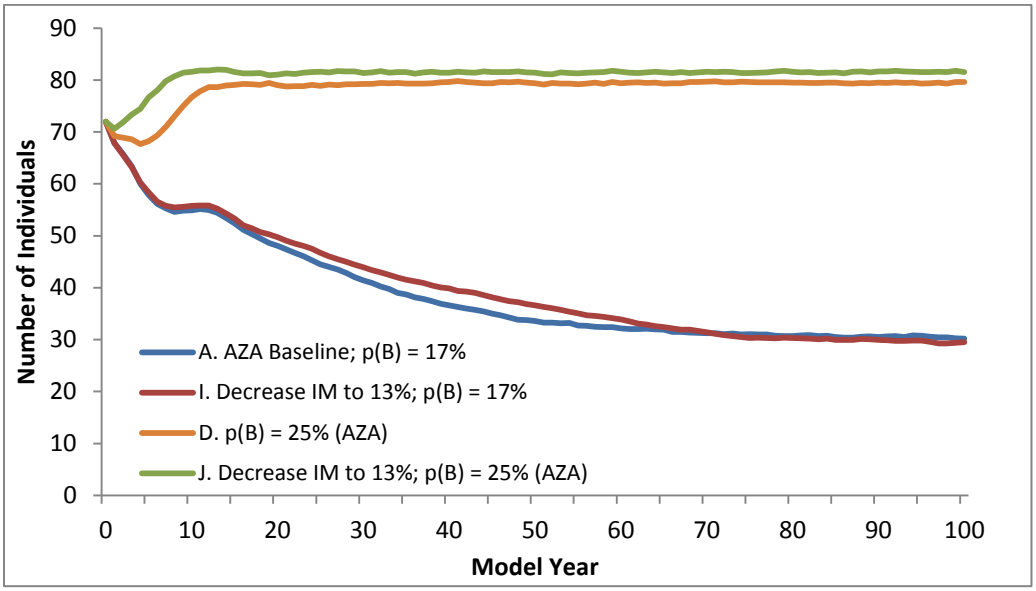


Figure 14. Mean projected population size under a scenario with decreasing infant mortality to 13%. Results are averaged across 1000 iterations.

Table 6. Model results under decreasing infant mortality scenarios. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| I. Decrease IM to 13%; p(B) = 17% | 47 ± 20 | 29 ± 23 | 31% | 24 | 53% | 75 | 56% ± 15% | 0.38 ± 0.12 |
| D. p(B) = 25% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| J. Decrease IM to 13%; p(B) = 25% | 82 ± 4 | 82 ± 5 | 100% | 6 | 0% | - | 75% ± 2% | 0.25 ± 0.02 |

[1] *All population sizes, GD retained, and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached*

### Results for Scenarios with Decreased Mortality:

1. If infant mortality continues to remain at 13% (the level over the past 10 years) the population can expect to have a slightly higher population size throughout most model years. In addition, gene diversity retained may be increased in 100 years and inbreeding levels may be slightly decreased.

# ALTERNATE MODEL SCENARIOS

## *Including Unpaired Females Over Nine Years Old*

The current management strategy for breeding clouded leopards is to pair the animals before they reach one year old and maintain this pair for the remainder of the animal's lives. Currently, if an animal has not been paired at a young age or if their mate dies they are typically left unpaired. In the AZA population there are 5 female cats that are unpaired (SB# 1176, 1177, 1182, 1179, and 1144); however, since they have never bred they are genetically valuable to the population. We modeled what may happen if these females were included in the potentially breeding population under baseline probability of breeding rates and increased rates. For detailed model results, see Figure 15 and Table 7 below.

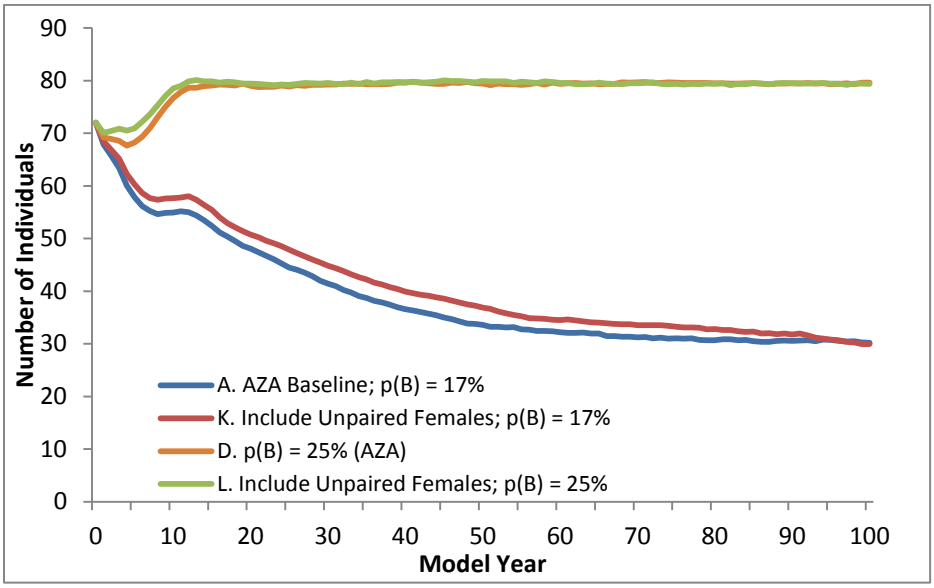


Figure 15. Mean projected population size under a scenario with including unpaired females over nine years old. Results are averaged across 1000 iterations.

Table 7. Model results under include unpaired females over nine years old. Starting population (including unpaired females) = 72 (32.40). Starting GD = 89.34%. Starting F = 0.0653. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| K. Include Unpaired Females, p(B) = 17% | 48 ± 20 | 30 ± 23 | 32% | 21 | 50% | 71 | 57% ± 15% | 0.37 ± 0.12 |
| D. p(B) = 25% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| L. Include Unpaired Females, p(B) = 25% | 79 ± 7 | 79 ± 7 | 100% | 9 | 0% | - | 74% ± 2% | 0.25 ± 0.03 |

[1] *All population sizes, GD retained, and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached*

**Results for Scenarios with Including Unpaired Females:**

1. Allowing the five females that are currently unpaired to breed in the model allows for slightly faster population growth especially under the baseline scenario as these females are reproductive aged and can produce additional offspring in the model. At the end of 100 years, there is the same number of individuals.

2. At the end of 100 years, there is slightly increased gene diversity retention and lower level of inbreeding for the baseline levels of breeding (scenarios A & K). Under the increased level of breeding (scenarios D & L) there is no difference in the gene diversity between adding the unpaired females or not.

# ALTERNATE MODEL SCENARIOS

## *Varying Imports*

The Clouded Leopard Animal Program is a partner in the Thailand Clouded Leopard Consortium which is based in Khao Kheow Open Zoo in Thailand. This location serves as a breeding and rescue center for clouded leopards, which typically come to the center as confiscations or wild rescues. As a partner of the consortium, the AZA population is able to import clouded leopards from Khao Kheow. There have been eight cats transported from Thailand to AZA institutions since the relationship started in 2002 and the Program is investigating the import of additional cats.

Note that many previous importations are from a single institution and this increases the likelihood of animals being related to one another. Currently out of the eight animals imported from Thailand, seven of them have a sibling that was also imported at the same time. If this pattern continues, imported individuals would likely be related to each other or the AZA population. If this is true, model scenarios including importations would be optimistic in terms of genetic predictions, as imported animals are not potential founders to the current population.

To simulate the impact of importing individuals from outside the current managed population, we modeled two importation strategies that were felt to be potentially realistic in consultation with the modeling team. Imported individuals are assumed to be reproductively viable and unrelated (potential founders) to the current population. Only the AZA population was modeled with importation strategies. The two scenarios include:

- Importing 2.2 in years 1, 6, 11, 16, 21, and 26 for a total of 24 individuals
- Importing 2.2 in every year until year 25 for a total of 100 individuals

All imported individuals were between ages 0 and 1 (age is randomly assigned within this range) and had an even sex ratio. This is typical for animals coming from Thailand as they are typically paired for breeding before being sent to the AZA zoos. Results are presented in Figure 16 and Table 8.

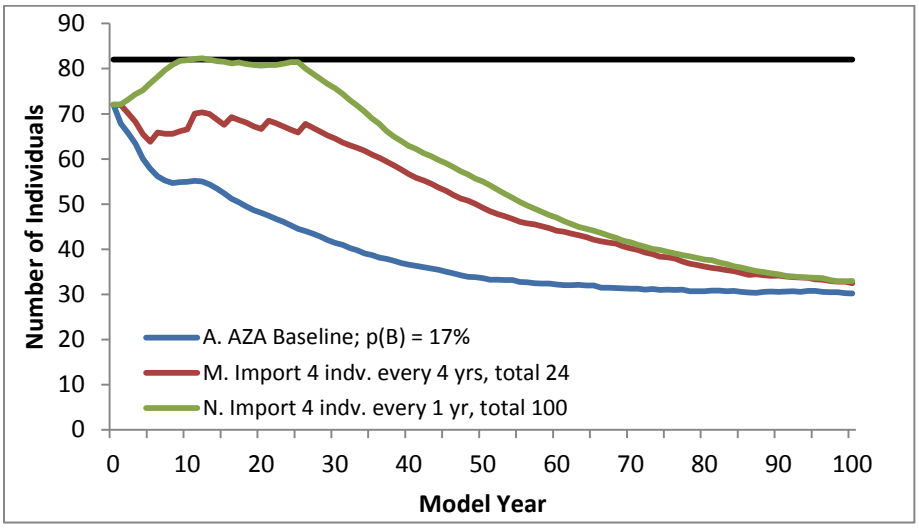


Figure 16. Projected mean total clouded leopard population size under various import scenarios. Results are averaged across 1000 iterations. The black line represents the potential space available of 82 individuals.

Table 8. Model results under varying import scenarios. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years) | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| M. Import 4 indiv. every 5 yrs, total 24 | 66 ± 15 | 32 ± 23 | 75% | 16 | 29% | 85 | 68% ± 14% | 0.25 ± 0.10 |
| N. Import 4 indiv. every 1 yr, total 100 | 81 ± 4 | 33 ± 24 | 100% | 7 | 22% | 87 | 71% ± 14% | 0.22 ± 0.09 |

[1] *All population sizes, GD retained, and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

## Results for Scenarios with Varying Imports:

1. Importation alone cannot improve the population's chances of reaching its potential spaces over the long-term. With the smaller importation scenario (M), the population continues to decline at a slightly slower rate than baseline, and then increases while importations are occurring. Once importations halt, the population declines again. The larger importation strategy (N) allows the population to increase quickly to the potential space, however once the importations stop, the population starts to decline again. At the end of 100 years all three scenarios (A, M, & N) have similar population sizes.

2. The importations increase genetic diversity and decrease inbreeding levels from the baseline level. However, they still have low gene diversity and high inbreeding levels (sibling level or slightly lower) at the end of 100 years. The low levels of reproduction in these model scenarios mean that the genes of the new imports (potential founders to the population) are not captured as much as they could be at higher reproduction levels.

    a. Level of gene diversity and inbreeding are also likely optimistic as they assume that all imports are unrelated to each other or the current population, which for this population is not likely to be the case.

# ALTERNATE MODEL SCENARIOS

## *Combining Multiple Management Actions – Varying Female Probability of Breeding [p(B)] and Imports*

We created combination scenarios to show how combining multiple management strategies could assist the population to increase more quickly or retain more gene diversity, including improving reproduction and importation strategies. The importation strategy used was the same as in Scenarios M and N above. For detailed model results, see Figure 17 and Table 9 below.

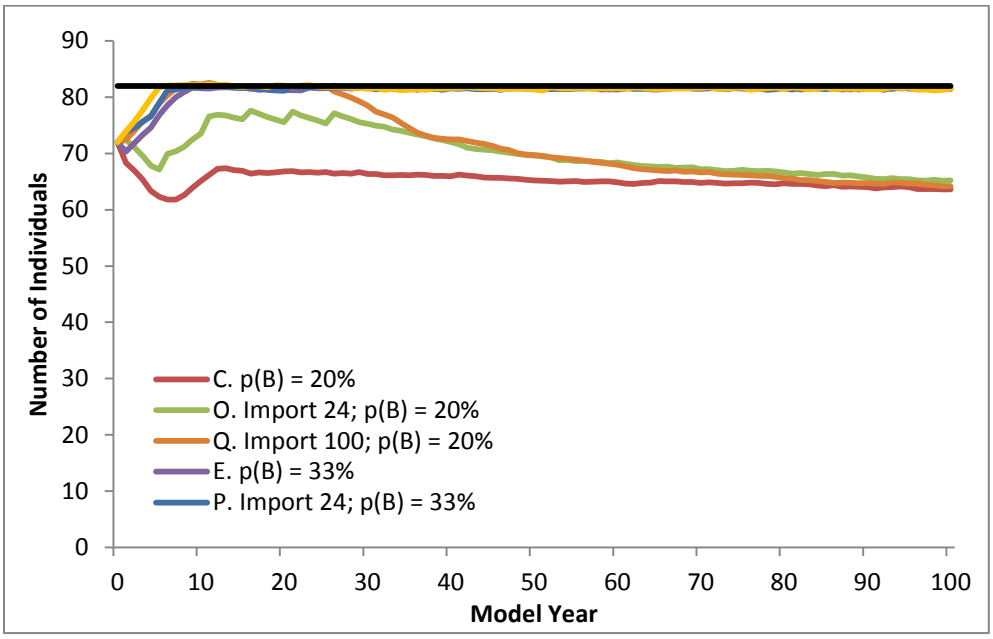


Figure 17. Mean population size under scenarios combining increased reproduction and imports. Results are averaged across 1000 iterations. The black line represents the potential space available of 82 individuals.

Table 9. Model results under varying female probability of breeding and imports scenarios. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| C. p(B) = 20% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| E. p(B) = 33% (AZA) | 82 ± 4 | 81 ± 4 | 100% | 6 | 0% | - | 76% ± 2% | 0.23 ± 0.02 |
| O. Import 24; p(B) = 20% | 75 ± 9 | 65 ± 20 | 99% | 11 | 3% | 83 | 78% ± 7% | 0.20 ± 0.05 |
| P. Import 24; p(B) = 33% | 82 ± 4 | 82 ± 4 | 100% | 5 | 0% | - | 85% ± 1% | 0.14 ± 0.02 |
| Q. Import 100; p(B) = 20% | 82 ± 4 | 64 ± 21 | 100% | 6 | 2% | 84.5 | 82% ± 7% | 0.16 ± 0.05 |
| R. Import 100; p(B) = 33% | 82 ± 3 | 81 ± 4 | 100% | 5 | 0% | - | 88% ± 1% | 0.11 ± 0.02 |

[1] *All population sizes and GD retained are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

**Results for Scenarios Varying Female p(B) and Imports:**

1. All importation scenarios with increased reproduction will reach the potential space (82 individuals) at some point during the model years. However, only import scenarios with increased reproduction levels of 33% (scenarios E, P, & R) are able to maintain a population size of 82 individuals at the end of 100 years.
    a. Even with a large importation (100 individuals), the scenarios with increased female p(B) = 20% is not able to maintain a population size of 82 at the end of 100 years. Once the importations stop, the population begins to slowly decline.
    b. Scenarios with p(B) of 33% (scenarios E, P, & R) all reach the potential space in approximately the same number of years (5-6 years). However, the gene diversity retention is increased and inbreeding levels are greatly reduced in the scenarios with importations.
    c. It is very possible that reproductive rates in the population may automatically increase if imported individuals are young and reproductively viable. If imports are brought in, institutions should strive to encourage reproduction to assist in increasing the population size. Though if imports are related to the current population or each other, benefits to the genetics of the population will not be as great.

# ALTERNATE MODEL SCENARIOS

## *Combining Multiple Management Actions – Increased Probability of Breeding [p(B)] and Space*

We created combination scenarios to show how combining multiple management strategies could assist the population to increase more quickly or retain more gene diversity, including improving reproduction and increasing the population's potential number of spaces available to 100. Potential space was increased to 100 as this was recommended by the Felid TAG 2009 Regional Collection Plan (RCP). Results are presented in Figure 18 and Table 10.

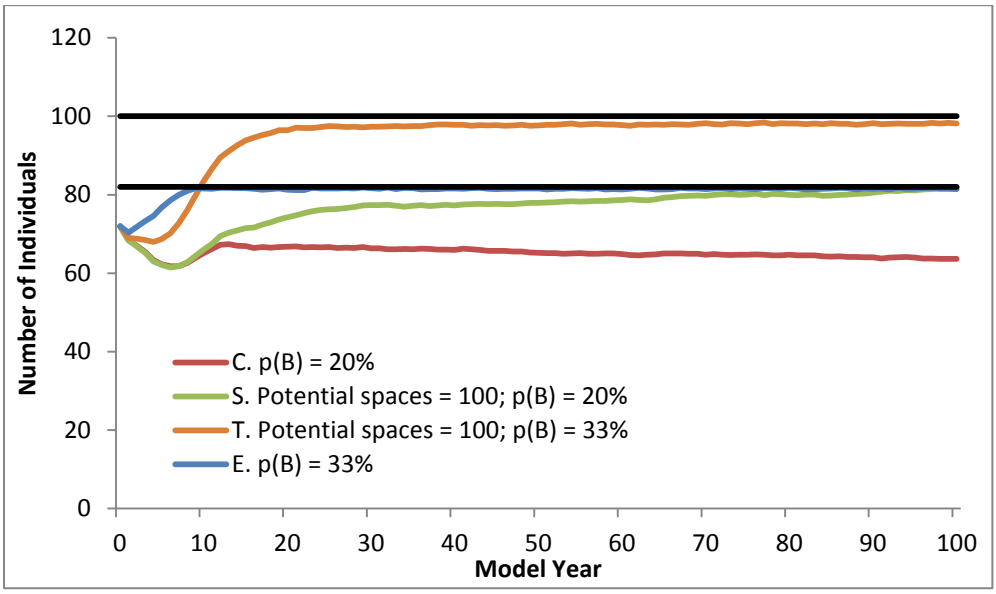


Figure 18. Mean projected population size under scenarios with increasing female probability of breeding with the addition of potential spaces. Results are averaged across 1000 iterations. The black lines represent the potential spaces of 82 or 100 individuals.

Table 10. Model results under increasing female p(B) and additional space. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 or 100 Individuals | Median Time to 82 or 100 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| C. p(B) = 20% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| S. Spaces = 100; P(b) = 20% | 76 ± 24 | 82 ± 24 | 84% | 27 | 0% | 72.5 | 70% ± 8% | 0.29 ± 0.06 |
| E. p(B) = 33% (AZA) | 82 ± 4 | 81 ± 4 | 100% | 6 | 0% | - | 76% ± 2% | 0.23 ± 0.02 |
| T. Spaces = 100; P(b) = 33% | 98 ± 8 | 98 ± 6 | 100% | 13 | 0% | - | 76% ± 2% | 0.24 ± 0.02 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*
[2] *One standard deviation.*
[3] *A dash (-) indicates that extinction is never reached.*

**Results for Scenarios Combining Increased Female p(B) and Space:**

1. With additional space and increased reproduction (scenarios S & T) the population is able to increase at a slightly faster rate than under the scenarios that just increased reproduction (C & E).
    - **a.** All scenarios have a high probability of reaching the potential available space, though with increased space it takes longer for the population to reach the potential space.
2. Increasing reproduction and space would allow the population to retain slightly higher mean GD at the end of 100 years. However, there is not a significant difference between the scenario's GD retention and levels of inbreeding still remain high.

# ALTERNATE MODEL SCENARIOS

## *Combining Multiple Management Actions - Varying Female Probability of Breeding [p(B)], Imports, and Space*

We created combination scenarios to show how combining multiple management strategies could assist in avoiding the demographic decline facing this population in the next several years, including improving reproduction, importation, and increasing the population's potential spaces. Results are presented in Table 11, Figure 19.

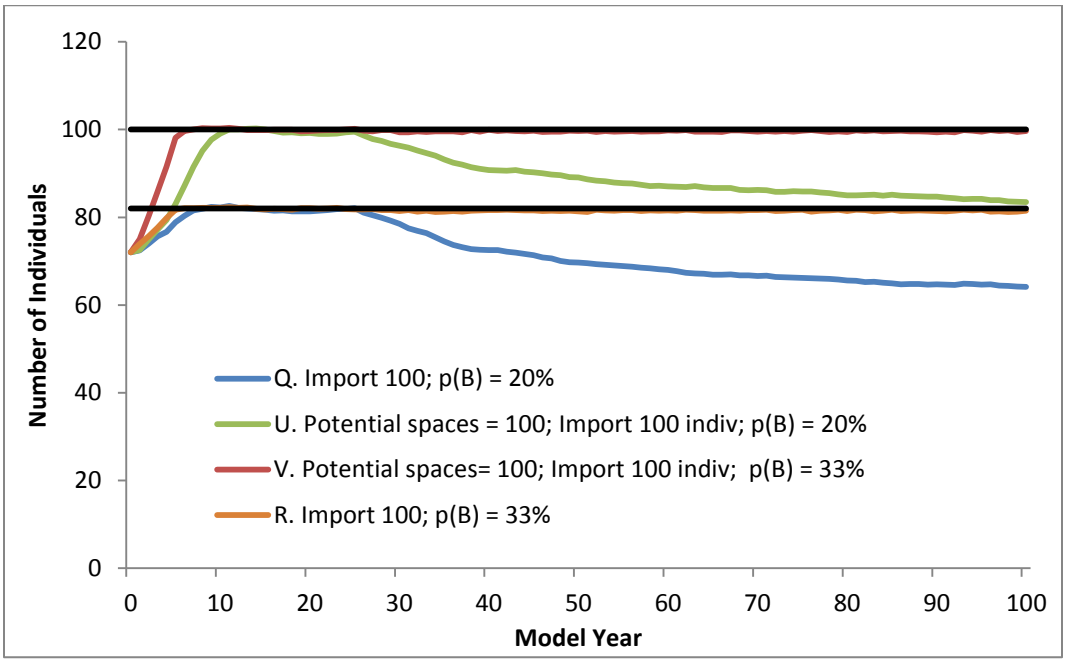


Figure 19. Mean population size under increased p(B), space, and importation scenarios, averaged across 1000 iterations. The black horizontal lines represent the potential available spaces of 82 or 100 individuals.

Table 11. Model results under increasing female p(B), importations, and additional space. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Probability of Reaching 82 Individuals | Median Time to 82 or 100 Individuals (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 27% | 24 | 57% | 70 | 55% ± 14% | 0.38 ± 0.11 |
| C. p(B) = 20% (AZA) | 79 ± 7 | 80 ± 7 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| E. p(B) = 33% (AZA) | 82 ± 4 | 81 ± 4 | 100% | 6 | 0% | - | 76% ± 2% | 0.23 ± 0.02 |
| Q. Import 100; p(B) = 20% | 82 ± 4 | 64 ± 21 | 100% | 6 | 2% | 84.5 | 82% ± 7% | 0.16 ± 0.05 |
| R. Import 100; p(B) = 33% | 82 ± 3 | 81 ± 4 | 100% | 5 | 0% | - | 88% ± 1% | 0.11 ± 0.02 |
| U. Potential spaces= 100; Import 100 indiv; p(B) = 20% | 100 ± 5 | 84 ± 22 | 100% | 9 | 1% | 77.5 | 85% ± 5% | 0.13 ± 0.04 |
| V. Potential spaces= 100; Import 100 indiv; p(B) = 33% | 100 ± 4 | 100 ± 5 | 100% | 6 | 0% | - | 90% ± 1% | 0.09 ± 0.02 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

**Results for Scenarios Combining Varying p(B), Space, and Importations:**

1. The time it takes for compatible scenarios (i.e. C, Q, U) to reach the potential space is very similar; however, the major difference in the scenarios is the amount of gene diversity retained and the levels of inbreeding.

2. With increased imports, the population is able to maintain much higher levels of gene diversity and keep lower inbreeding levels as compared to increased reproduction alone.
    a. Scenario E p(B) = 33% has an inbreeding level of 0.23 at the end of 100 years. With the addition of a large importation (scenario R) the inbreeding level at the end of the 100 years it decreases to 0.11. Then with the addition of increased space the inbreeding level decreases even more to 0.09 (lower than half-sibling relationship) in 100 years.

3. It is important to note the role of unrelated imports in these scenarios as they provide the additional gene diversity which lowers the inbreeding levels in 100 years for many of these scenarios. Increased breeding and space are important to maintain these imports once they are part of the population, but without imports, the population will continue to become more related and could face detrimental genetic effects in the future.

# GENETIC RESULTS ACROSS SCENARIOS

Some of the risks inherent to small populations are related to the potential impacts of inbreeding depression. Inbreeding depression can result in higher mortality or lower reproduction rates throughout a population and can increase over time as inbreeding in the population increases. Although explicit effects of inbreeding depression were not included in model scenarios, if this population ***is*** susceptible to inbreeding depression, it would mean that the model scenarios presented are likely optimistic (i.e. if we included inbreeding depression, the model's demographic projections over time would be worse). The majority of scenarios were run simulating genetic management by creating pairs using ranked mean kinship, the typical strategy used to manage zoo populations. However, current management practices in the clouded leopard SSP do not match the genetic management strategy used in projections, which re-pairs animals after a mate dies. Currently in the SSP, cubs are intended to be paired for life and no new pairs are being established. Thus, genetic and demographic results of the model projections may be more optimistic than actual SSP management, where animals may not have an opportunity to breed again if their mate dies.

The AZA clouded leopard population is descended from 18 potential founders that were assumed to be unrelated, and the living population is estimated to have retained 87% of the gene diversity of the source population and the average inbreeding level is currently at 0.0441. If no additional importations occur and the population remains closed in the future, gene diversity will decrease and inbreeding levels will increase through genetic drift. Scenario A with current p(B) = 17% for the AZA population reaches an inbreeding level (F) of 0.38, much greater than sibling relationship (0.25)(Fig. 20b). Increased reproduction and use of a mean kinship genetic management strategy will help the population retain higher levels of gene diversity and minimize inbreeding for a longer period of time (Fig. 20a); however, as many young cats in the population are related the levels still remain at concerning levels in 100 years. The scenarios that result in the best genetic projections are those that involve combining increasing reproduction and importations (P, Q, R, U, and V), which could result in a much lower risk of detrimental genetic effects.

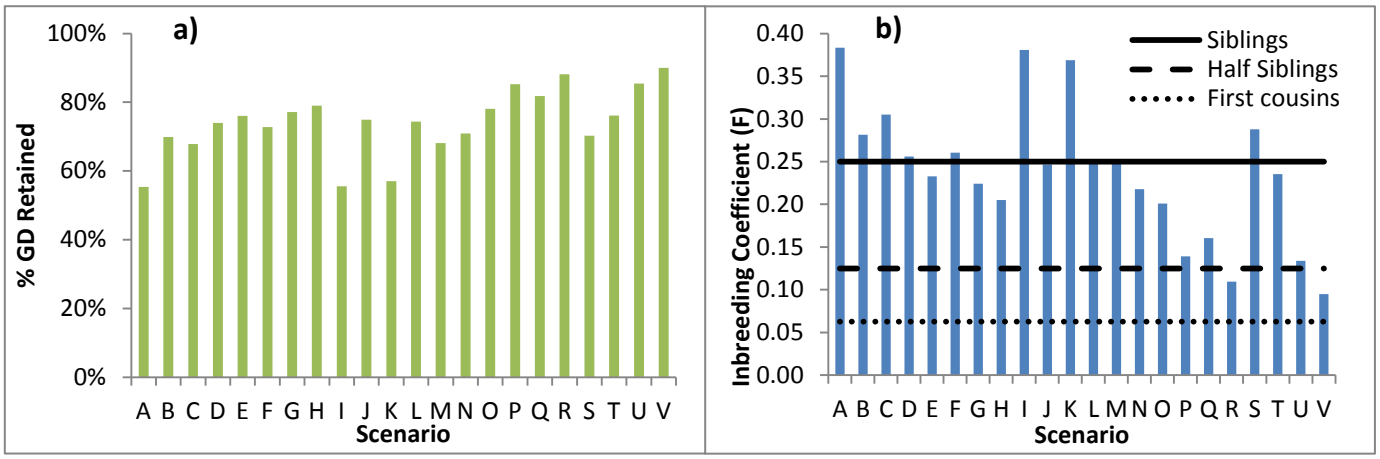


Figure 20. The mean genetic statistics at year 100 across 1000 iterations for each model scenario in Table 12, including a) gene diversity (GD) retained and b) inbreeding coefficient (F).

Table 12: Scenarios in figures 20a and 20b above.

| | | |
|---|---|---|
| A. AZA Baseline; p(B) = 17% | I. Decrease IM to 13%; p(B) = 17% | P. Import 24; p(B) = 33% |
| B. AZA + non-AZA Baseline; p(B) = 19% | J. Decrease IM to 13%; p(B) = 25% (AZA) | Q. Import 100; p(B) = 20% |
| C. p(B) = 20% (AZA) | K. Include Unpaired Females; p(B) = 17% | R. Import 100; p(B) = 33% |
| D. p(B) = 25% (AZA) | L. Include Unpaired Females; p(B) = 25% | S. Potential spaces = 100; p(B) = 20% |
| E. p(B) = 33% (AZA) | M. Import 4 indv. every 4 yrs, total 24 | T. Potential spaces = 100; p(B) = 33% |
| F. p(B) = 20% (AZA + non-AZA) | N. Import 4 indv. every 1 yr, total 100 | U. Potential spaces = 100; Import 100 indiv; p(B) = 20% |
| G. p(B) = 25% (AZA + non-AZA) | O. Import 24; p(B) = 20% | V. Potential spaces= 100; Import 100 indiv; p(B) = 33% |
| H. p(B) = 33% (AZA + non-AZA) | | |

# RISK RESULTS

ZooRisk also uses a standardized set of five risk tests which evaluate different aspects of a population's demography, genetics, and management that might put the population at risk, and summarizes them into a single Risk Score for each model scenario. A population under a given model scenario can be: Low Risk in captivity, Vulnerable in captivity, Critical in captivity, or Endangered in captivity (for a detailed description of risk categories see ZooRisk manual; Faust & Earnhardt, 2005). This approach standardizes assessments across species and allows managers to compare species programs using the same framework. For more details on what makes a scenario fall into a particular category, see Appendix G.

For the clouded leopard scenarios, the overall risk levels varied from Endangered to Critical in zoos depending on the model scenario (Table 13). The population is at risk mainly due to low reproduction and low genetic diversity in 100 years. The goal for managers should be to move the population from Critical/Endangered towards Vulnerable/Low Risk, utilizing some of the management tactics highlighted in the **model results.**

**Table 13. Overall risk results for each clouded leopard scenario (Low Risk is the most secure category, Critical the least secure).**

| **Baseline Scenario** | **Scenario's Risk Category (highlighted category = score)** | | | |
|---|---|---|---|---|
| A. AZA Baseline, p(B) = 17% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Including Non-AZA Institutions** | | | | |
| B. AZA + Non-AZA Baseline, p(B) = 19% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | |
| C. p(B) = 20% (AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| D. p(B) = 25% (AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| E. p(B) = 33% (AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | |
| F. p(B) = 20% (AZA + non-AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| G. p(B) = 25% (AZA + non-AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| H. p(B) = 33% (AZA + non-AZA) | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Decreasing Infant Mortality** | | | | |
| I. Decrease IM to 13%; p(B) = 17% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| J. Decrease IM to 13%; p(B) = 25% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Including Unpaired Females Over 9 Years Old** | | | | |
| K. Include Unpaired Females, p(B) = 17% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| L. Include Unpaired Females, p(B) = 25% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Imports** | | | | |
| M. Import 4 indiv. every 5 yrs, total 24 | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| N. Import 4 indiv. every 1 yr, total 100 | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Female p(B) + Imports** | | | | |
| O. Import 4 indiv. every 5 yrs, total 24; p(B) = 20% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| P. Import 4 indiv. every 5 yrs, total 24; p(B) = 33% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| Q. Import 2.2 every 1 years; total 100; p(B) = 20% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| R. Import 2.2 every 1 years; total 100; p(B) = 33% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Female p(B) + Potential Space** | | | | |
| S. Spaces = 100; P(b) = 20% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| T. Spaces = 100; P(b) = 33% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| **Alternate Scenarios: Varying Female p(B) + Imports + Potential Space** | | | | |
| U. Potential spaces= 100; Import 100 indiv; p(B) = 20% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |
| V. Potential spaces= 100; Import 100 indiv; p(B) = 33% | LOW RISK | VULNERABLE | ENDANGERED | CRITICAL |

# MANAGEMENT ACTIONS

The AZA Clouded Leopard Animal Program should apply several management strategies in combination with one another to counteract the projected demographic decline, low gene diversity and high inbreeding levels in the future, and to accommodate institutional interest.

- **Increase reproduction:** The Animal Program should focus on breeding more reproductively viable females to increase the number of offspring produced per year. Any number of births in excess of the current level (6 births per year) will assist the population in growing towards its potential space of 89. All breeding recommendations received are important to the long-term future of this population; institutions should work to get males and females into appropriate breeding situations quickly and work on husbandry to improve breeding success.

- **Importation of young, reproductively viable individuals:** In some cases importation could offset the decline the population is facing in the next several years and increase the long-term gene diversity (if the imported individuals are related to the current population or each other, which may be challenging for this population as the source of many of the imports is a population with some animals already related to the AZA population). In addition, it would increase the capacity of the population to produce offspring, which is limited currently by an aging population with many animals unable to breed for medical, behavioral, or age. Imports must be coupled with increased reproduction to successfully grow the population in the long-term and increase gene diversity. Even though modeled levels of imports assisted the population demographically, ultimately this population under most model scenarios had lower-than-desired levels of gene diversity in 100 years.

- **Recruit new institutions and allocate additional spaces:** Space and institutional interest are a main concern for this population if reproduction is increased. If additional spaces are not available it will complicate the placement of offspring or imported individuals. If reproduction and or/importation is successful in improving the population's trajectory, it will quickly be hampered by its small number of potential spaces. As a long-term goal, an increased number of potential spaces for the population will allow for a healthier age structure, a more stable population size, and better long-term genetic health.

- **Research pairing options**: Institutions should work to form alternate pairing situations to provide more flexibility in breeding opportunities, thus increasing the number of females available for breeding. Forming trios (1.2.0) at early ages could allow for the rotation of males between familiar females and may provide additional breeding opportunities for the AZA population. This management strategy could also provide more genetic variation and reduce the issue of long-term bonded pairs that are unable to be managed with other individuals.

# CONCLUSIONS

This model is a scientifically-sound comprehensive tool to be used by population managers for assessing future directions for the animal program. This PVA report is provided to the AZA community and others to integrate into management of the important species within our care. The PVA model results are intended to provide the necessary data to make science-based decisions.

These model results illustrate that if the AZA clouded leopard population continues on its current trajectory it will decline with an 27% probability of reaching the potential number of spaces (N = 82) in 100 years. With improvements in reproduction, the population is able to maintain its current population size or increase in 100 years. However, the population has difficulties maintaining desirable levels of gene diversity or relatedness unless increased reproduction is combined with large importations. Several potential management actions such as improving reproduction, strategically importing individuals, and adding space could help reverse this declining trend and improve the population's long-term demographic and genetic health. All efforts should be made to explore these possibilities as a way to set the clouded leopard population on the path towards long-term sustainability within AZA institutions.

# ACKNOWLEDGEMENTS

On July 17, 2012, the following attendees met in Salt Lake City, UT at Felid TAG meeting to discuss the AZA Clouded Leopard Animal Program Population Viability Analysis:

- **Katelyn Marti,** Population Biologist
  - Lincoln Park Zoo, kmarti@lpzoo.org
- **Bonnie Breitbeil**, Clouded Leopard SSP Coordinator
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This report was also reviewed by:

- Melissa Theis, Population Biologist, Lincoln Park Zoo
- Nicole Clausen, Population Biologist, Lincoln Park Zoo
- Sarah Long, Director, Population Management Center

If you have any questions about the report, please contact Lisa Faust at lfaust@lpzoo.org.

Analyses in this report utilized the North American Regional Clouded Leopard Studbook current to 29 June 2012 and were performed using PopLink 2.4 and ZooRisk 3.8.

Funding provided by Institute of Museum and Library Services (IMLS) LG-25-11-0185

Cover photo courtesy of Central Florida Zoo & Botanical Gardens.

**Citation:**
Marti, K., and Breitbeil, B. 2012. Clouded Leopard (*Neofelis nebulosa*) AZA Animal Program Population Viability Analysis Report. Lincoln Park Zoo, Chicago, IL.

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*The contents of this report including opinions and interpretation of results are based on discussions between the project team and do not necessarily reflect the opinion or position of Lincoln Park Zoo, Association of Zoos and Aquariums, and other collaborating institutions. The population model and results are based on the project team's best understanding of the current biology and management of this population. They should not be regarded as absolute predictions of the population's future, as many factors may impact its future status.*

# Appendix A. Literature Cited


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# Appendix B. Studbook Data Exports

| Studbook Information | |
|---|---|
| Studbook Currentness Date | 29 June 2012 |
| Studbook Keeper | Bonnie Breitbeil, Central Florida Zoo & Botanical Gardens |

| Studbook Extractions: | Start Date | End Date | Institution Filter |
|---|---|---|---|
| Fecundity Window | 01 January 1970 | 19 November 2012 | AZA |
| Mortality Window | 01 January 1970 | 19 November 2012 | AZA |
| Living Population | 19 November 2012 | - | AZA |

# Appendix C. ZooRisk PVA Model Setup

**Name of ZooRisk Project = Clouded Leopard 2012**

| Model Parameter | Parameter Value | Additional Setup Notes |
|---|---|---|
| **Species Biology** | | |
| Number of Males per Breeding Group | 1 | |
| Number of Females per Breeding Group | 1 | |
| Number of Years Between Pairing | 25 | |
| **Model Settings** | | |
| Number of Years | 100 | |
| Number of Iterations | 1000 | |
| Extinction Threshold | 0 | |
| Gene Diversity Threshold | 0.9 | |
| Target Population Size | 82 for AZA<br>96 for AZA + non-AZA | Approach TPS gradually over a number of 5 years; this value used in all scenarios |
| Genetic Management | Mean kinship pairing | |
| **Annual Number of Offspring** | **Model Frequency** | **Actual number of offspring (calculated by PopLink** |
| 1 offspring | 0.363 | 0.2514 (44) |
| 2 offspring | 0.4315 | 0.36 (63) |
| 3 offspring | 0.1712 | 0.2229 (39) |
| 4 offspring | 0.0274 | 0.08 (14) |
| 5 offspring | 0.0068 | 0.0629 (11) |
| **Birth Sex Ratio** | | |
| Birth Sex Ratio | 0.5649 | Is not significantly different from 0.5 (chi-square value = 6.2270, p>0.05) |

# Appendix D. Included Individuals

These individuals were included as the starting population in all scenarios in the ZooRisk model. Those animals with Allow Breed = NO hold space but are never eligible for reproduction. Individuals marked with * are only included in scenarios which included non-AZA institutions (B, F, G & H). Females 1176, 1177, 1182, 1179, and 1144 were included in scenarios K & L (Include unpaired females).

| ID | Allow Breed | Sex | % Known | Age | Institution | Reason for Exclusion |
|---|---|---|---|---|---|---|
| 995 | NO | Male | 100 | 18 | NZP-CRC | Age |
| 996 | NO | Female | 100 | 18 | LITTLEROC | Age |
| 1012 | NO | Male | 100 | 18 | METROZOO | Age |
| 1015 | NO | Male | 100 | 18 | NZP-CRC | Age |
| 1060 | NO | Male | 100 | 16 | ATLANTA | Age/Behavior |
| 1065 | NO | Male | 100 | 15 | OMAHA | Age |
| 1079 | NO | Male | 100 | 14 | TACOMA | Age |
| 1082 | NO | Female | 100 | 14 | TACOMA | Age |
| 1084 | NO | Female | 100 | 14 | SANDIEGOZ | Age |
| 1085 | NO | Female | 100 | 14 | SANDIEGOZ | Age |
| 1105 | NO | Female | 100 | 13 | AUDUB SSC | Age |
| 1109 | NO | Female | 100 | 13 | WILMINGTN | Age |
| 1110 | NO | Male | 100 | 13 | ALEXANDRI | Age |
| 1113 | NO | Female | 100 | 12 | SANFORD | Age |
| 1114 | NO | Female | 100 | 12 | AUDUB SSC | Age |
| 1115 | NO | Female | 100 | 12 | AUDUB SSC | Age |
| 1123 | NO | Female | 100 | 12 | NZP-CRC | Behavior |
| 1124 | NO | Female | 100 | 12 | NZP-CRC | Behavior |
| 1127 | NO | Female | 100 | 12 | ALEXANDRI | Medical |
| 1134 | YES | Male | 100 | 11 | SANFORD | |
| 1135 | NO | Female | 100 | 11 | DENVER | Age |
| 1136 | NO | Female | 100 | 11 | DENVER | Age |
| 1138 | NO | Female | 100 | 11 | CHICAGOBR | Medical |
| 1144 | NO | Female | 100 | 11 | OKLAHOMA | Unpaired female over 9 years old |
| 1176 | NO | Female | 100 | 10 | CINCINNAT | Unpaired female over 9 years old |
| 1177 | NO | Female | 100 | 10 | CINCINNAT | Unpaired female over 9 years old |
| 1179 | NO | Female | 100 | 10 | NZP-WASH | Unpaired female over 9 years old |
| 1180 | YES | Male | 100 | 10 | NZP-WASH | |
| 1181 | NO | Male | 100 | 10 | NZP-CRC | Behavior |
| 1182 | NO | Female | 100 | 10 | LUFKIN | Unpaired female over 9 years old |
| 1208 | NO | Male | 100 | 9 | NASHV ZOO | Neutered |
| 1209 | NO | Female | 100 | 9 | NASHV ZOO | Paired with neutered male |
| 1210 | NO | Female | 100 | 9 | CINCINNAT | Medical |
| 1211 | YES | Male | 100 | 9 | HOUSTON | |
| 1214 | YES | Female | 100 | 9 | NZP-CRC | |
| 1216 | NO | Male | 100 | 9 | CHICAGOBR | Behavior |
| 1218 | NO | Male | 100 | 8 | NZP-CRC | Behavior |
| 1226 | NO | Female | 100 | 9 | EVANSVLLE | Medical |
| 1227 | NO | Male | 100 | 8 | OKLAHOMA | Behavior |
| 1273 | YES | Female | 100 | 6 | NASHV ZOO | |
| 1276 | YES | Female | 100 | 6 | NZP-CRC | |
| 1278 | YES | Male | 100 | 6 | NZP-CRC | |

| ID | Allow Breed | Sex | % Known | Age | Institution | Reason for Exclusion |
|---|---|---|---|---|---|---|
| 1279 | YES | Male | 100 | 5 | NASHV ZOO | |
| 1295 | YES | Female | 100 | 5 | TACOMA | |
| 1433 | YES | Male | 100 | 3 | NZP-CRC | |
| 1434 | NO | Male | 100 | 3 | NZP-CRC | Behavior |
| 1436 | YES | Male | 100 | 3 | NZP-CRC | |
| 1441 | YES | Female | 100 | 3 | NASHV ZOO | |
| 1442 | YES | Male | 100 | 3 | NASHV ZOO | |
| 1443 | YES | Male | 100 | 3 | NASHV ZOO | |
| 1444 | YES | Female | 100 | 3 | NZP-CRC | |
| 1446 | YES | Female | 100 | 3 | TACOMA | |
| 1447 | YES | Male | 100 | 3 | TACOMA | |
| 1449 | YES | Female | 100 | 3 | NASHV ZOO | |
| 1454 | YES | Female | 100 | 3 | NZP-CRC | |
| 1460 | YES | Male | 100 | 2 | TACOMA | |
| 1477 | YES | Male | 100 | 1 | SANFORD | |
| 1478 | YES | Female | 100 | 1 | LOWRY | |
| 1501 | YES | Male | 100 | 1 | METROZOO | |
| 1502 | YES | Female | 100 | 1 | DENVER | |
| 1503 | YES | Male | 100 | 1 | LOWRY | |
| 1504 | YES | Female | 100 | 1 | METROZOO | |
| 1505 | YES | Male | 100 | 1 | DENVER | |
| 1506 | YES | Female | 100 | 1 | SANFORD | |
| 1577 | YES | Male | 100 | 1 | COLUMBUS | |
| 1587 | YES | Male | 100 | 0 | NASHV ZOO | |
| 1588 | YES | Female | 100 | 0 | NASHV ZOO | |
| 1589 | YES | Male | 100 | 0 | NASHV ZOO | |
| 1590 | YES | Female | 100 | 0 | NASHV ZOO | |
| 1591 | YES | Female | 100 | 0 | TACOMA | |
| 1592 | YES | Male | 100 | 0 | TACOMA | |
| 1593 | YES | Female | 100 | 0 | NASHV ZOO | |
| *1081 | YES | Female | 100 | 14 | FOUTS J | |
| *1093 | YES | Male | 100 | 13 | FOUTS J | |
| *1125 | YES | Male | 100 | 12 | FOUTS J | |
| *1137 | YES | Female | 100 | 11 | FOUTS J | |
| *1230 | YES | Female | 100 | 8 | FOUTS J | |
| *1479 | YES | Male | 100 | 3 | FOUTS J | |
| *1561 | YES | Female | 100 | 9 | FOUTS J | |
| *1562 | YES | Male | 100 | 7 | FOUTS J | |
| *1565 | YES | Male | 100 | 5 | FOUTS J | |
| *1566 | YES | Female | 100 | 5 | FOUTS J | |
| *1570 | YES | Female | 100 | 3 | FOUTS J | |
| *1571 | YES | Female | 100 | 3 | FOUTS J | |
| *1572 | YES | Female | 100 | 2 | FOUTS J | |
| *1574 | YES | Female | 100 | 1 | FOUTS J | |

# Appendix E. Male and Female Mortality Rates (Qx)

Male and female mortality rates used in scenarios most of the ZooRisk models are listed below. Scenarios (I & J) which incorporated decreased infant mortality; age class 0 was changed to 0.13 for both males and females. Each year, the model determines whether each individual lives or dies stochastically based on that individual's age- and sex-specific mortality rate.

**Male**

| Age(x) | Qx | @ Risk |
|---|---|---|
| 0 | 0.3227 | 282 |
| 1 | 0.0294 | 170 |
| 2 | 0.0255 | 157 |
| 3 | 0.0411 | 146 |
| 4 | 0.0284 | 141 |
| 5 | 0.0308 | 130 |
| 6 | 0.0833 | 120 |
| 7 | 0.0625 | 112 |
| 8 | 0.0566 | 106 |
| 9 | 0.0106 | 94 |
| 10 | 0.0889 | 90 |
| 11 | 0.038 | 79 |
| 12 | 0.1447 | 76 |
| 13 | 0.1935 | 62 |
| 14 | 0.2391 | 46 |
| 15 | 0.2571 | 35 |
| 16 | 0.2727 | 22 |
| 17 | 0.375 | 16 |
| 18 | 0.5714 | 7 |
| 19 | 0.3333 | 3 |
| 20 | 0 | 1 |
| 21 | 1 | 1 |

**Female**

| Age(x) | Qx | @ Risk (Qx) |
|---|---|---|
| 0 | 0.3415 | 246 |
| 1 | 0.0473 | 148 |
| 2 | 0.0144 | 139 |
| 3 | 0.0687 | 131 |
| 4 | 0.05 | 120 |
| 5 | 0.0364 | 110 |
| 6 | 0.0286 | 105 |
| 7 | 0.0187 | 107 |
| 8 | 0.0654 | 107 |
| 9 | 0.0521 | 96 |
| 10 | 0.0465 | 86 |
| 11 | 0.0811 | 74 |
| 12 | 0.1186 | 59 |
| 13 | 0.1176 | 51 |
| 14 | 0.2308 | 39 |
| 15 | 0.3103 | 29 |
| 16 | 0.4 | 20 |
| 17 | 0.1538 | 13 |
| 18 | 0.4 | 10 |
| 19 | 0.4 | 5 |
| 20 | 0.75 | 4 |
| 21 | 0 | 1 |
| 22 | 0 | 1 |
| 23 | 0 | 1 |
| 24 | 1 | 1 |

# Appendix F. Overall Results Table

Model results across all clouded leopard scenarios. Starting population = 72 (32 .40). Starting GD = 87.77%. Starting F = 0.0441.

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in the first 10 model years | Probability of reaching 82 or 96 individuals | Median time to 82 or 96 individuals (years)[3] | Probability of reaching Extinction | Median time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| **Baseline Scenario:** | | | | | | | | | |
| A. AZA Baseline, p(B) = 17% | 44 ± 20 | 30 ± 23 | 6.15 | 27% | 24 | 57% | 70 | 55% ± 14% | 038 ± 0.11 |
| **Alternate Scenarios: Including Non-AZA Institutions** | | | | | | | | | |
| B. AZA + Non-AZA Baseline, p(B) = 19% | 77 ± 19 | 68 ± 28 | 9.65 | 86% | 19 | 8% | 81.5 | 70% ± 8% | 0.28 ± 0.06 |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | | | | | | |
| C. p(B) = 20% (AZA) | 67 ± 17 | 64 ± 21 | 7.85 | 90% | 19 | 7% | 71 | 68% ± 8% | 0.31 ± 0.06 |
| D. p(B) = 25% (AZA) | 79 ± 7 | 80 ± 7 | 9.92 | 100% | 10 | 0% | - | 74% ± 2% | 0.26 ± 0.06 |
| E. p(B) = 33% (AZA) | 82 ± 4 | 81 ± 4 | 10.97 | 100% | 6 | 0% | - | 76% ± 2% | 0.23 ± 0.02 |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | | | | | | |
| F. p(B) = 20% (AZA + non-AZA) | 84 ± 15 | 79 ± 22 | 10.29 | 96% | 14 | 2% | 80 | 73% ± 6% | 0.26 ± 0.05 |
| G. p(B) = 25% (AZA + non-AZA) | 94 ± 6 | 94 ± 7 | 12.25 | 100% | 8 | 0% | - | 77% ± 2% | 0.22 ± 0.02 |
| H. p(B) = 33% (AZA + non-AZA) | 96 ± 4 | 95 ± 4 | 12.85 | 100% | 5 | 0% | - | 79% ± 1% | 0.21 ± 0.02 |
| **Alternate Scenario: Decreasing Infant Mortality** | | | | | | | | | |
| I. Decrease IM to 13%; p(B) = 17% | 47 ± 20 | 29 ± 23 | 6.21 | 31% | 24 | 53% | 75 | 56% ± 15% | 0.38 ± 0.12 |
| J. Decrease IM to 13%; p(B) = 25% | 82 ± 4 | 82 ± 5 | 8.42 | 100% | 6 | 0% | - | 75% ± 2% | 0.25 ± 0.02 |
| **Alternate Scenario: Including Unpaired Females Over 9 Years Old** | | | | | | | | | |
| K. Include Unpaired Females, p(B) = 17% | 48 ± 20 | 30 ± 23 | 6.58 | 32% | 21 | 50% | 71 | 57% ± 15% | 0.37 ± 0.12 |
| L. Include Unpaired Females, p(B) = 25% | 79 ± 7 | 79 ± 7 | 10.26 | 100% | 9 | 0% | - | 74% ± 2% | 0.25 ± 0.03 |
| **Alternate Scenarios: Varying Imports** | | | | | | | | | |
| M. Import 4 indiv. every 5 yrs, total 24 | 66 ± 15 | 32 ± 23 | 7.13 | 75% | 16 | 29% | 85 | 68% ± 14% | 0.25 ± 0.10 |
| N. Import 4 indiv. every 1 yr, total 100 | 81 ± 4 | 33 ± 24 | 6.06 | 100% | 7 | 22% | 87 | 71% ± 14% | 0.22 ± 0.09 |
| **Alternate Scenarios: Varying Female p(B) + Imports** | | | | | | | | | |
| O. Import 24; p(B) = 20% | 75 ± 9 | 65 ± 20 | 8.39 | 99% | 11 | 3% | 83 | 78% ± 7% | 0.20 ± 0.05 |
| P. Import 24; p(B) = 33% | 82 ± 4 | 82 ± 4 | 9.99 | 100% | 5 | 0% | - | 85% ± 1% | 0.14 ± 0.02 |
| Q. Import 100; p(B) = 20% | 82 ± 4 | 64 ± 21 | 6.18 | 100% | 6 | 2% | 84.5 | 82% ± 7% | 0.16 ± 0.05 |
| R. Import 100; p(B) = 33% | 82 ± 3 | 81 ± 4 | 6.28 | 100% | 5 | 0% | - | 88% ± 1% | 0.11 ± 0.02 |
| **Alternate Scenarios: Varying Female p(B) + Potential Space** | | | | | | | | | |
| S. Spaces = 100; P(b) = 20% | 76 ± 24 | 82 ± 24 | 7.96 | 84% | 27 | 7% | 72.5 | 70% ± 8% | 0.29 ± 0.06 |
| T. Spaces = 100; P(b) = 33% | 98 ± 8 | 98 ± 6 | 11.00 | 100% | 13 | 0% | - | 76% ± 2% | 0.24 ± 0.02 |
| **Alternate Scenarios: Varying Female p(B) + Imports + Potential Space** | | | | | | | | | |
| U. Potential spaces= 100; Import 100 indiv; p(B) = 20% | 100 ± 5 | 84 ± 22 | 9.08 | 100% | 9 | 1% | 77.5 | 85% ± 5% | 0.13 ± 0.04 |
| V. Potential spaces= 100; Import 100 indiv; p(B) = 33% | 100 ± 4 | 100 ± 5 | 9.61 | 100% | 6 | 0% | - | 90% ± 1% | 0.09 ± 0.02 |

[1] *All population sizes, GD retained and F are the mean value across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

# Appendix G. Risk Categories And Results

ZooRisk uses five, standardized tests to determine a scenario's risk level. The ZooRisk development team and members of the AZA Small Population Management Advisory Group (SPMAG) worked to develop the cutoffs for each category level during the development of ZooRisk.

The 5 tests and the cutoffs for each level are:

| # | Risk Tests | Low Risk | Vulnerable | Endangered | Critical |
|---|---|---|---|---|---|
| 1 | **Probability of extinction (P(E)) in 100 years, based on ZooRisk model** | 0-9% P(E) within 100 years | 10-19% P(E) within 100 years | 20-49% P(E) within 100 years | 50-100% P(E) within 100 years |
| 2 | **Distribution of breeding-aged, mixed-sex groups, based on current population** | >3 Zoos | 3 Zoos | 2 Zoos | 1 Zoo |
| 3 | **Current number of breeding-aged animals (m.f), based on current population** | More than 10.10 | 7.7 to 10.10 | 4.4 to 6.6 | 0.0 to 3.3 |
| 4 | **Reproduction in the last generation, based on historic studbook data** | Consistent success: >9 pairs reproducing | Inconsistent success: 6-9 pairs reproducing | Sporadic success: 3-5 pairs reproducing | Little success: 0-2 pairs reproducing |
| 5 | **Gene diversity of starting population or modeled population in 100 years, based on current population and ZooRisk model** | Starting GD >0.9 and modeled GD >0.9at 100 years | Starting GD <0.9 or modeled GD <0.9at 100 years | Starting GD <0.8 or modeled GD <0.75at 100 years | Starting GD <0.75 or modeled GD <0.5at 100 years |

For a given scenario, the overall risk level is based on the most severe score it achieved for any of the five tests. Tests 2-4 are based on the population's history, and are the same across all model scenarios:

| | Overall | Test 1 - Probability of extinction (P(E)) in 100 years | Test 2 - Distribution of breeding-aged, mixed-sex groups | Test 3 - Current number of breeding-aged animals (m.f) | Test 4 - Reproduction in the last generation | Test 5 - GD of starting population or modeled population in 100 years |
|---|---|---|---|---|---|---|
| **Baseline Scenario** | | | | | | |
| A. AZA Baseline, p(B) = 17% | CRITICAL | CRITICAL | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| **Alternate Scenarios: Including Non-AZA Institutions** | | | | | | |
| B. AZA + Non-AZA Baseline, p(B) = 19% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | | | |
| C. p(B) = 20% (AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| D. p(B) = 25% (AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| E. p(B) = 33% (AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| **Alternate Scenarios: Varying Female Probability of Breeding [p(B)]** | | | | | | |
| F. p(B) = 20% (AZA + non-AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| G. p(B) = 25% (AZA + non-AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| H. p(B) = 33% (AZA + non-AZA) | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| **Alternate Scenarios: Decreasing Infant Mortality** | | | | | | |
| I. Decrease IM to 13%; p(B) = 17% | CRITICAL | CRITICAL | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| J. Decrease IM to 13%; p(B) = 25% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| **Alternate Scenarios: Including Unpaired Females Over 9 Years Old** | | | | | | |
| K. Include Unpaired Females, p(B) = 17% | CRITICAL | CRITICAL | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| L. Include Unpaired Females, p(B) = 25% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| **Alternate Scenarios: Varying Imports** | | | | | | |
| M. Import 4 indiv. every 5 yrs, total 24 | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| N. Import 4 indiv. every 1 yr, total 100 | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| **Alternate Scenarios: Varying Female p(B) + Imports** | | | | | | |
| O. Import 4 indiv. every 5 yrs, total 24; p(B) = 20% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| P. Import 4 indiv. every 5 yrs, total 24; p(B) = 33% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| Q. Import 2.2 every 1 years; total 100; p(B) = 20% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| R. Import 2.2 every 1 years; total 100; p(B) = 33% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| **Alternate Scenarios: Varying Female p(B) + Potential Space** | | | | | | |
| S. Spaces = 100; P(b) = 20% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | ENDANGERED |
| T. Spaces = 100; P(b) = 33% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| **Alternate Scenarios: Varying Female p(B) + Imports + Potential Space** | | | | | | |
| U. Potential spaces= 100; Import 100 indiv; p(B) = 20% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |
| V. Potential spaces= 100; Import 100 indiv; p(B) = 33% | ENDANGERED | LOW RISK | LOW RISK | LOW RISK | ENDANGERED | VULNERABLE |

# Appendix H. Definitions

**Age Structure:** A two-way classification showing the numbers or percentages of individuals in various age and sex classes.

**Current Gene Diversity (GD)**: The proportional gene diversity (as a proportion of the source population) is the probability that two alleles from the same locus sampled at random from the population will not be identical by descent. Gene diversity is calculated from allele frequencies, and is the heterozygosity expected in progeny produced by random mating, and if the population were in Hardy-Weinberg equilibrium.

**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).

**Inbreeding Coefficient (F):** Probability that the two alleles at a genetic locus are identical by descent from an ancestor common to both parents. The mean inbreeding coefficient of a population will be the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population.

**Mean Kinship (MK):** The mean kinship coefficient between an animal and all animals (including itself) in the living, zoo born population. The mean kinship of a population is equal to the proportional loss of gene diversity of the descendant (zoo born) population relative to the founders and is also the mean inbreeding coefficient of progeny produced by random mating. Mean kinship is also the reciprocal of two times the founder genome equivalents: MK = 1 / (2 * FGE). MK = 1 - GD.

**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.

**Percent Known:** Percent of an animal's genome that is traceable to known Founders. Thus, if an animal has an UNK sire, the % Known = 50. If it has an UNK grandparent, % Known = 75%

**Population Viability Analysis (PVA):** A PVA is a computer model that projects the likely future status of a population. PVAs are used for evaluating long-term sustainability, setting population goals, and comparing alternative management strategies. Several quantitative parameters are used in a PVA to calculate the extinction risk of a population, forecast the population's future trajectory, and identify key factors impacting the population's future.

**Probability of Breeding [p(B)]:** Female p(B) is the age-specific probability that a female will have at least one offspring in a year. For example, p(B) = 25% is equivalent to females producing an offspring once every 4 years. Within the reproductively viable age classes, all p(B) were set at a hypothetical constant value corresponding with an interbirth interval, which varied depending on the model scenario. Using a constant value means that all reproductively viable females would have the same chance of reproduction regardless of age.

**Qx, Mortality**: Probability that an individual of age x dies during time period.

**Regional Collection Plan (RCP):** document developed by Taxon Advisory Group (TAG) to describe species managed under their TAG, level of management with explanations, and evaluation of Target Population Sizes for each managed species.

**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. The proportion of individuals that die during an age class 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").

**Stochastic Model:** A model that includes random chance and variation in model parameters (e.g. randomly select if an individual will breed). Stochastic models will produce many different outcomes each time the model is run due to this variation. Models are typically run for many iterations to fully explore the trajectory a population might take. ZooRisk is a stochastic model.

**Target Population Size (TPS):** In the context of a Regional Collection Plan, the 'target' size selected for each Program within the RCP, which may be based on available spaces for that species, desired spaces the TAG wishes to allocate, the size needed to maintain a viable population, or some combination of those factors. In the context of the ZooRisk modeling work, the TPS is a model parameter that can be set at any level, including the size listed in the RCP or a higher or lower size based on other criteria.

**Taxon Advisory Group (TAG):** There are several different TAGs and each oversees a broad group of animals (e.g. Antelope TAG, Small Carnivore TAG). Each TAG consists of several programs. The TAG contains experts including studbook keepers, program leaders, the TAG chair, and other advisors. TAGs evaluate the present conditions surrounding a broad group of animals (e.g., marine mammals) and then prioritize the different species in the group for possible captive programs.

Appendix B

# Thailand Clouded Leopard Consortium Population Viability Analysis (PVA) Report

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**15 July 2013**

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ASSOCIATION OF ZOOS & AQUARIUMS

# INTRODUCTION

This report summarizes the results of a Population Viability Analysis (PVA) conducted to assess the status of the clouded leopard breeding program in Thailand [specifically, the population at Khao Kheow Open Zoo coordinated by Thailand's Zoological Park Organization, Smithsonian National Zoo, Nashville Zoo, Point Defiance Zoo & Aquariums, and the AZA Clouded Leopard Species Survival Plan] A PVA is a computer model that projects the likely future status of a population and can be used for evaluating long-term sustainability, setting population goals, and comparing alternative management strategies.

# PVA MODEL SETUP

Due to the short history and small population size of the Khao Kheow Open Zoo there was not sufficient data to project the likely future status of this population based on the current rates at this institution. As a result, the AZA population's mortality rates and reproductive age classes were used as a surrogate to simulate likely demographic values for this population. Please see the full AZA Clouded Leopard Population Viability Analysis for full details on values used (Marti & Breitbeil, 2012).

## Starting Population:

At the time of analyses the total Thailand Clouded Leopard Consortium (CLC) population consisted of **36 animals (17 males, 19 females)** (Fig. 1). Population viability analysis software (ZooRisk) incorporates data on each individual's pedigree, age, sex, and reproductive status. The model assumes that any new animals (either births or imports) are potentially reproductively viable; this may be an optimistic assumption especially with this population which receives many rescue individuals.

There were 13 individuals excluded and designated as non-reproductive in the model due to age or behavior. With these individuals excluded, the potentially breeding population is comprised of 23 (11.12) individuals.

See Appendix D for a complete list of the individuals included in the model and their reproductive status.

## Age Structure:

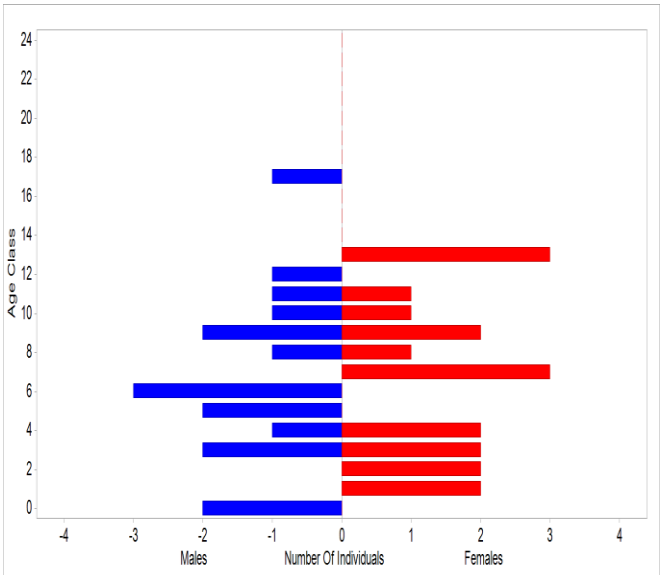


Figure 1. Age structure for total Thailand Clouded Leopard Consortium population 36 (17 males, 19 females).

**Current Demographics and Genetics**: All ZooRisk scenarios started with the population's current demographics and genetics (Table 1).

Table 1. Starting demographic and genetic statistics for the Thailand Clouded Leopard Consortium population.

| | Clouded Leopard Consortium Population |
|---|---|
| Starting population size (Males.Females.Unknown Sex) | 36 (17.19) |
| Potentially breeding population size | 23 (11.12) |
| Percentage of pedigree known | 100% |
| Gene diversity (GD) | 88.10% |
| Population mean kinship (MK) | 0.1190 |
| Mean inbreeding (F) | 0.0000 |

**Reproduction:** ZooRisk uses the following parameters to determine how offspring are produced in each model year:

- **Male and Female Reproductive Age Classes:** Male = Ages 1 – 14, Female = Ages 1 – 12, based on data from the AZA population.

- **Female Probability of Breeding [p(B)]:** Female p(B) is the age-specific probability that a female will have at least one offspring in a given year. Since it is difficult to determine from the studbook what a population could do if all individuals were in breeding situations, model scenarios utilize simplified hypothetical levels of p(B) to illustrate the impact of potential changes in birth rates. All female p(B) were set at a constant value across all the reproductively viable age classes. This constant p(B) can be thought of as an interbirth interval (e.g. p(B) = 25% is the equivalent of each female having an offspring every 4 years on average) or as the percentage of reproductive-aged females reproducing (e.g. 25% of eligible females breed in any given year). Using a constant value means that all reproductively viable females have the same chance of reproduction regardless of age. This probability of breeding is used in the model to stochastically determine whether a paired female produces offspring in any given model year. The model p(B) varies depending on the model scenario. To determine the p(B) used in the baseline scenario, we extracted the average number of births/year over the past decade from the studbook (5.3 births/year), and then identified a p(B) level in the model that would produce an equivalent average number of projected births annually over the first 10 years of the model. Alternate scenarios used higher or lower p(B) levels.

- **Annual Number of Offspring (ANO) and Birth Sex Ratio (BSR):** Used rates for the AZA Clouded Leopard population, see appendix or full Clouded Leopard Population Viability Analysis report (2012).

## Mortality:

- Mortality rates for adult and juvenile age classes were taken from the AZA clouded leopard population. See Appendix E for the male and female Qx rates used in the model.

**Space:** There is limited space available at the Khao Kheow facility. Currently the available space for the clouded leopards at Khao Kheow Zoo is 50. This is only true if we have multiple births with the dam and young occupying the same space. We also explored what would happen to the population's trajectory if the number of spaces available was increased to 100.

**Genetic Management:** ZooRisk can model genetic management by mean kinship pairings and other genetic criteria, mimicking the way that zoo populations are managed to maintain gene diversity (GD) (Ballou & Lacy, 1995). Pairing by mean kinship genetic management was used for all scenarios to more accurately project the amount of gene diversity retained if genetic management of the population continues.

**Inbreeding Depression:** One of the largest genetic threats to small populations is the potential detrimental effects of inbreeding, where breeding between close relatives results in decreased short-term and long-term fitness via reductions in fecundity or litter size, increases in infant mortality, and other detrimental effects (DeRose & Roff, 1999; Koeninger Ryan et al., 2002; Ballou & Foose, 1996; Reed & Frankham, 2003). This phenomenon, called inbreeding depression, has been observed in several ex situ species (Ralls & Ballou, 1982; Olech, 1987; Laikre & Ryman, 1991; Lacy et al., 1993), although effects vary between species (Lacy et al., 1993; Kalinowski et al., 1999). However, inbreeding depression is a concern in the zoo community as many populations have a limited number of founders, small population sizes, and a low chance of receiving additional founders in the future (i.e. they are closed populations) (Lacy, 1997). **In other words, inbreeding depression could put this population at higher risk of extinction, particularly if the population size decreases** (Gilpin & Soulé, 1986; Lacy, 1997).

At this time, inbreeding depression is not known to be affecting this population. There are several strategies that can delay the effects or lower the probability of inbreeding depression including pairing based on mean kinship and importing and breeding unrelated individuals (Ballou & Lacy, 1995). These strategies were modeled for all scenarios. **Readers should consider that model results may be optimistic if this species would be susceptible to inbreeding depression now or in the future.**

# BASELINE MODEL

## If Conditions Remain the Same

The baseline scenario describes what might happen to the Thailand Clouded Leopard Consortium (CLC) population if it experiences the mortality patterns observed in the AZA studbook and maintains a birth rate equivalent to that observed over the last decade (from 2003 – 2012). The CLC population produced an average of **5.3 births/year, which is equivalent to a female p(B) of 23%.** Imports and exports were not included in the baseline projections.

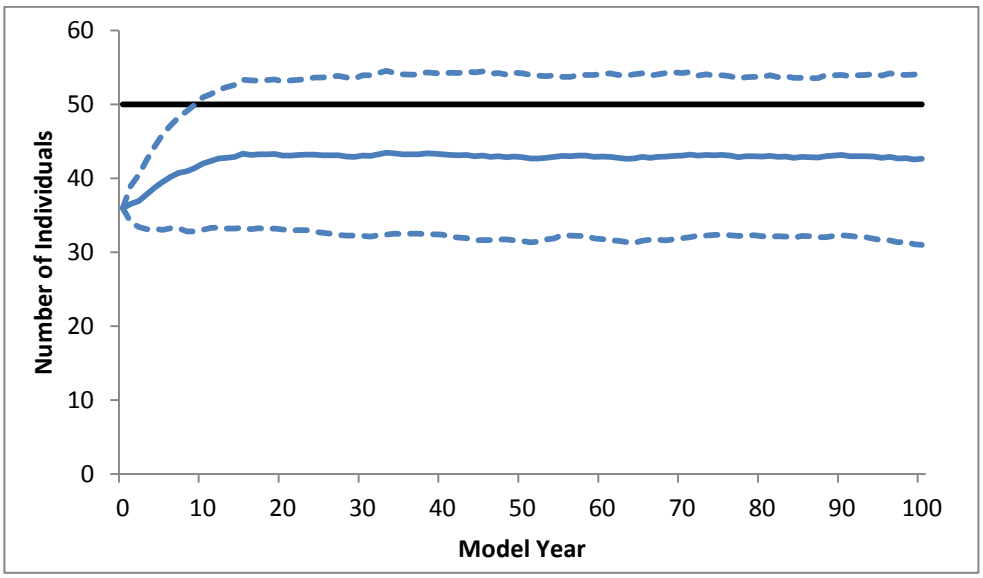


Figure 2. Thailand CLC projected total population size for the baseline model scenario (p(B) = 23%). Solid line is mean results across the 1000 iterations, and dashed line represent 1 standard deviation. Solid black line is the available space (50).

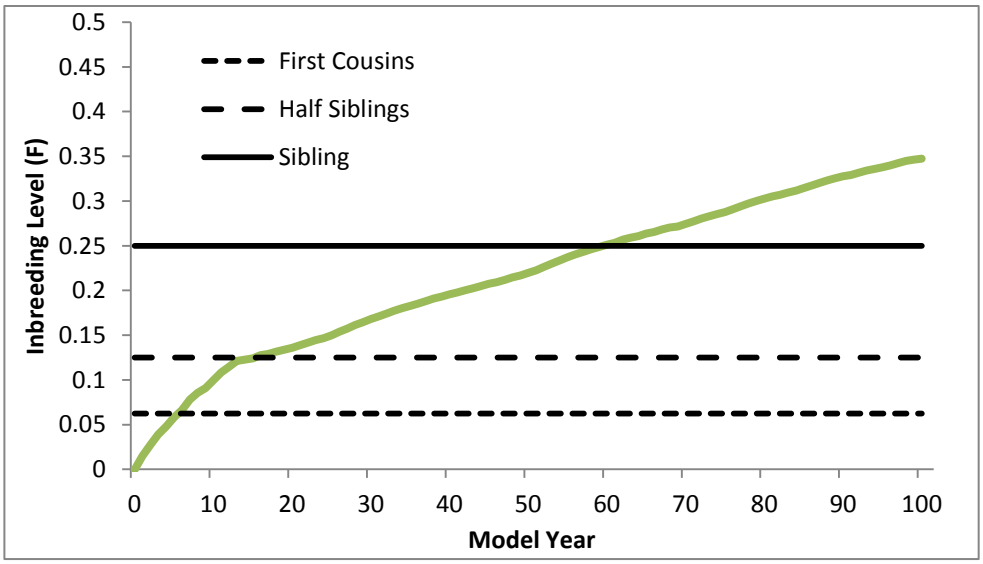


Figure 3. The Thailand CLC inbreeding levels over 100 model years under the baseline model scenario (p(B) = 23%).

Table 2. Baseline model results. Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 10 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*
[2] *One standard deviation.*

## Results for Baseline Scenario:

1. If no management changes are made (current reproduction, no imports or exports), the population is **predicted to increase over the next 10 years and then maintain a population size averaging 43 individuals** (Table 2).
    a. Note: This baseline model shows the population without any additional importations/animals entering the population from other sources over the next 100 years. This population has received, on average, one individual per year from an outside source and exported an average of 2 individuals per year; this is where the population can expect to be in 100 years if no additional imports/exports occur.

2. However, since the starting population is so small, there is still a chance that the population could decline to extinction (8% chance). This could occur if the population encounters several years of poor breeding or high mortality.

3. **At the end of 100 years, the population's gene diversity is predicted on average to be 63% and average inbreeding (F) is predicted to be high at 0.35.** This level of inbreeding is over the relationship of one's relation to a sibling or parent (0.25), so these levels are concerning for the health of the population.

4. It is likely that these projections are optimistic, as they do not incorporate any effects of inbreeding depression (lowered fecundity, increase mortality). The small, closed population, and high levels of mean inbreeding (F) that are predicted in this scenario create a situation where inbreeding depression is likely to occur in the future.

# ALTERNATE MODEL SCENARIOS

## Varying Female Probability of Breeding [p(B)]

We explored the effect of varying reproduction, which we model by increasing the probability of breeding [p(B)] for reproductive-aged females (ages 1 to 12).

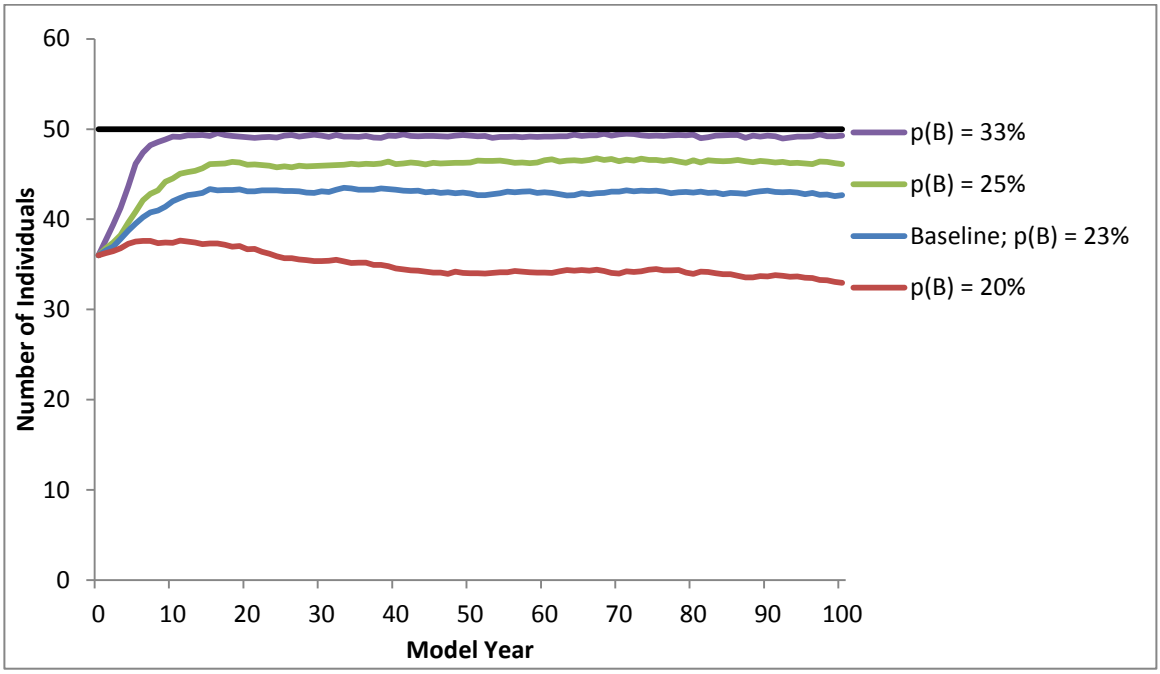


Figure 4. Projected mean total population size under varying female probability of breeding (p(B)) levels. The black line represents the potential space of 50 individuals.

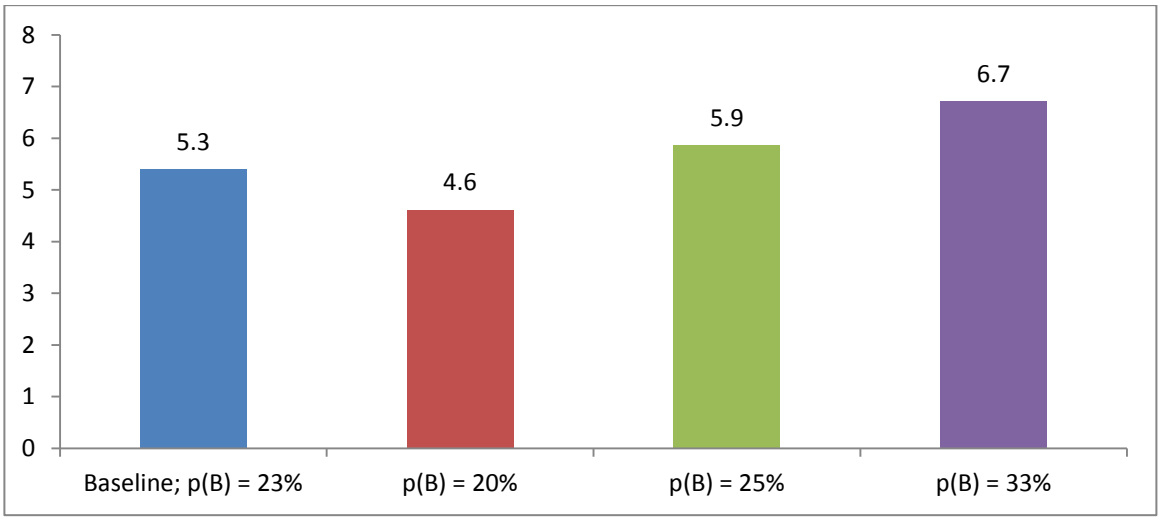


Figure 5. Projected mean total number of offspring per year (in the first 10 model years) that would need to be produced to reach the projections in Figure 4 above. Note that this is the total number of offspring produced before any infant mortality occurs – these would not have to be surviving births.

Table 3. Model results under varying probabilities of breeding (p(B)). Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |
| p(B) = 20% | 36 ± 14 | 33 ± 15 | 4.6 | 76% | 17 | 32% | 63 | 57% ± 11% | 0.39 ± 0.10 |
| p(B) = 25% | 46 ± 8 | 46 ± 8 | 5.9 | 99% | 10 | 2% | 66 | 66% ± 5% | 0.32 ± 0.05 |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% | 0.28 ± 0.03 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*
[2] *One standard deviation.*
[3] *A dash (-) indicates that extinction is never reached.*

## Results for Varying Female Probability of Breeding [p(B)] Scenarios:

1. If increased reproduction can be sustained, it is predicted to:
    a. Assist the population in reaching the available number of spaces (50) more quickly.
    b. Continue to create a strong foundation for future reproduction (producing young, reproductively viable individuals) in the age structure of the population.
    **c. Increase retention of gene diversity, as more individuals are breeding and population sizes over time are larger. However, inbreeding levels at the end of 100 years for all scenarios are still high.**

2. Alternatively, if the population decreases to about 4.6 births per year (female (p(B) = 20%), the population will only maintain itself for roughly 100 years.

# ALTERNATE MODEL SCENARIOS

## Decrease Infant Mortality

Infant mortality values used in all scenarios are based on historical data of the AZA clouded leopard population from January 1970 – July 2012 (males = 32% and females = 34%). However, over the past ten years at Khao Kheow Zoo, most clouded leopard cubs are being hand-reared. This practice has decreased the infant mortality in both male and female offspring. Over the last 10 years, the infant mortality for both sexes has been approximately 13% in the AZA population. We explored what would happen to the population if the infant mortality rates remain low; in this case we modeled infant mortality at 10%.

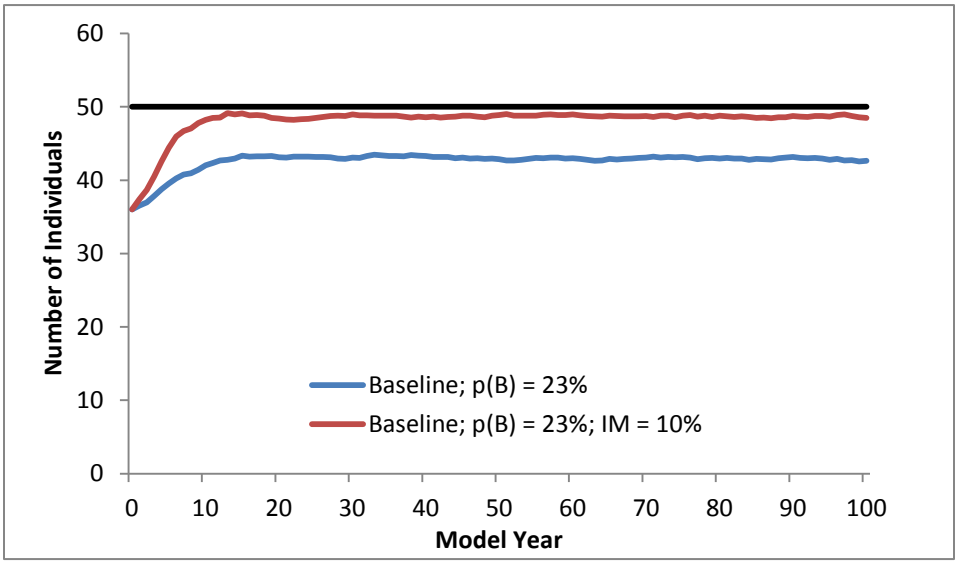


Figure 6. Projected mean total population size under decreased infant mortality levels. The black line represents the potential available space of 50 individuals.

Table 4. Model results under varying probabilities of breeding (p(B)). Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |
| Baseline; p(B) = 23%; IM = 10% | 48 ± 5 | 48 ± 5 | 4.9 | 100% | 7 | 0.1% | 98 | 67% ± 3% | 0.31 ± 0.04 |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% | 0.28 ± 0.03 |
| p(B) = 33%; IM = 10% | 50 ± 3 | 50 ± 3 | 5.2 | 100% | 5 | 0% | – | 71% ± 3% | 0.27 ± 0.03 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*
[2] *One standard deviation.*
[3] *A dash (-) indicates that extinction is never reached.*

### Results for Scenarios with Decrease Mortality:

1. If infant mortality can be maintained around 10% the population can expect to have a slightly higher population size throughout most model years. In addition, gene diversity retained may be increased in 100 years and inbreeding levels may be slightly decreased.
    a. This result can be assumed throughout all additional scenarios modeled below. If infant mortality remains low, the population is likely to reach its goal more quickly.

# ALTERNATE MODEL SCENARIOS

## Combining Multiple Management Actions – Varying Female Probability of Breeding [p(B)] and Imports

We simulated the impact of importing individuals from outside of the current managed population (i.e. from confiscations or the wild). In consultation with the modeling group, we modeled two importation strategies that were felt to be potentially realistic.

- 1 male and 1 female were imported every 10 years until year 50 – a total of 10 individuals imported.
- 1 male and 1 female were imported every 5 years until year 50 – a total of 20 individuals imported.

All imported individuals were between ages 0 and 1 (age is randomly assigned within this range) and had an even sex ratio. Imported individuals are assumed to be reproductively viable and unrelated (potential founders) to the current population. This may be optimistic, as not all animals that come into the Thailand CLC are able to breed due to age or behavioral issues.

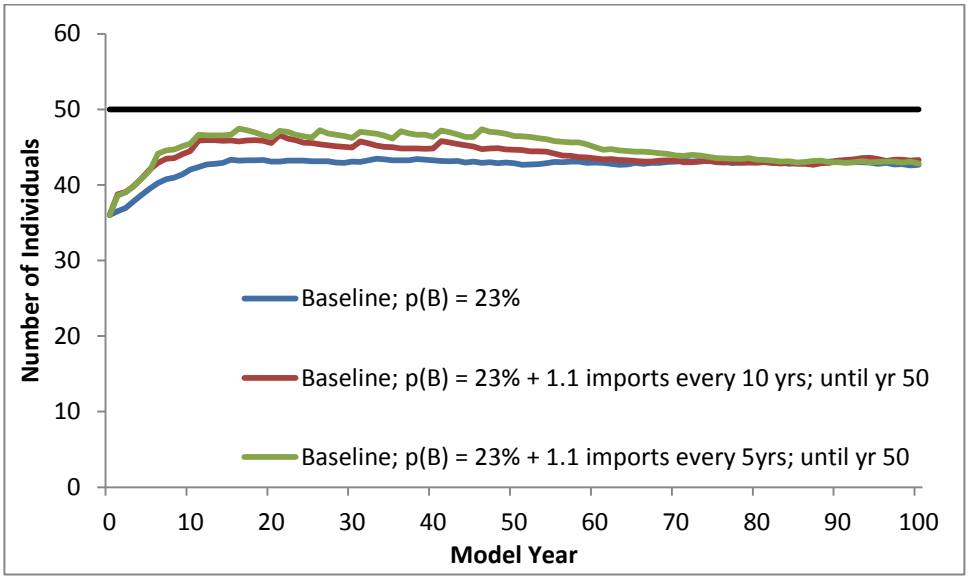


Figure 7. Mean projected population size under scenarios with increasing female probability of breeding with the addition of imports. Results are averaged across 1000 iterations. The black line represents the potential space of 50 individuals.

Table 5. Results under increasing female reproduction and addition of imports. Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |
| Baseline; p(B) = 23% + 1.1 imports every 10 yrs; until yr 50 | 46 ± 8 | 43 ± 11 | 5.6 | 99% | 10 | 5% | 85 | 71% ± 6% | 0.26 ± 0.06 |
| Baseline; p(B) = 23% + 1.1 imports every 5yrs; until yr 50 | 46 ± 7 | 43 ± 11 | 5.5 | 100% | 9 | 2% | 93 | 75% ± 6% | 0.22 ± 0.05 |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% | 0.28 ± 0.03 |
| p(B) = 33% + 1.1 imports every 10yrs; until yr 50 | 49 ± 4 | 49 ± 4 | 6.5 | 100% | 6 | 0% | – | 77% ± 3% | 0.21 ± 0.04 |
| p(B) = 33% + 1.1 imports every 5yrs; until yr 50 | 49 ± 4 | 49 ± 4 | 6.3 | 100% | 6 | 0.1% | 93 | 81% ± 2% | 0.17 ± 0.03 |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

**Results for Scenarios Combining Varying Female p(B) and Imports:**

1. Importing individuals under baseline breeding rates allows for the population size to increase to reach the available space of 50 individuals more quickly.
    a. There is an improvement in the gene diversity and inbreeding levels of the population at the end of 100 years compared to the baseline scenario. However, they still remain high (above or close to sibling level).
    b. If the breeding rates were increased and more space allotted, the population could breed more individuals and retain additional GD in the long-term.

2. Increasing the population's female p(B) to 33% and adding importations at either level allows the population to reach its allowed space more quickly than at the baseline level of breeding.
    a. The population's GD and F are also slightly improved with a higher level of female breeding and importations. This is due to the young, reproductively viable founder individuals being imported and bred at higher reproductive rates.

3. Levels of p(B) between 13% and 33% would be expected to yield population sizes and genetic results that are in between the results shown here.

# ALTERNATE MODEL SCENARIOS

## Varying Female Probability of Breeding [p(B)] and Space

We created scenarios to show how increasing space along with female reproduction could assist the population to increase more quickly or retain more gene diversity. Potential space was increased to 100.

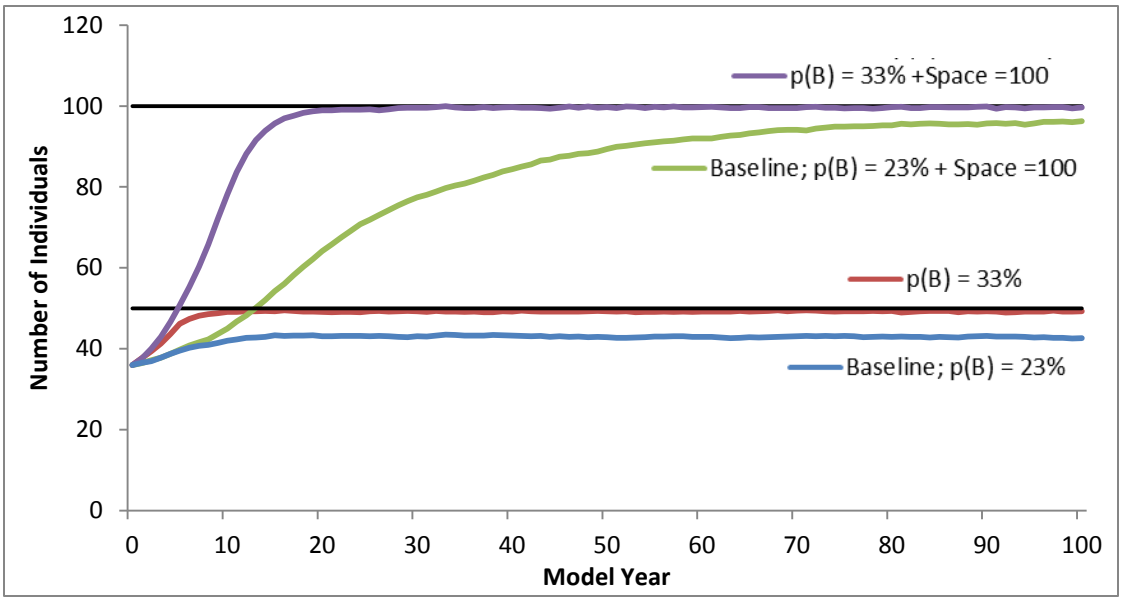


Figure 8. Mean projected population size under scenarios with increasing female probability of breeding with additional space. Results are averaged across 1000 iterations. The black lines represent the potential space of 50 or 100 individuals.

Table 6. Results under increasing female reproduction and additional space. Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |
| Baseline; p(B) = 23% + Space = 100 | 72 ± 29 | 96 ± 11 | 5.9 | 94% | 29 | 5% | 45 | 73% ± 7% | 0.26 ± 0.07 |
| **Baseline; p(B) = 23% + 1.1 imports every 5yrs;every 10 yrs + Space = 100** | **89 ± 19** | **97 ± 8** | **6.9** | **100%** | **22** | **0%** | **–** | **85% ± 2%** | **0.15 ± 0.03** |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% | 0.28 ± 0.03 |
| p(B) = 33% +Space =100 | 99 ± 5 | 100 ± 5 | 11.3 | 100% | 13 | 0% | – | 80% ± 2% | 0.20 ± 0.02 |
| **p(B) = 33% + 1.1 imports every 5yrs; every 10 yrs + Space =100** | **99 ± 5** | **100 ± 5** | **12.3** | **100%** | **12** | **0%** | **–** | **88% ± 1%** | **0.12 ± 0.02** |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

**Results for Scenarios Combining Varying Female p(B) and Increased Space:**

1. Increasing the amount of space available to the population allows for the population to increase at a faster rate, even under the current baseline breeding rates.
    a. With improved breeding rates (p(B) = 33%), the population would be able to reach 100 individuals in less than 20 years.

2. These results indicate that one of the main factors restricting the current population's growth is the number of spaces available. If space was increased for the population, it may result in a higher retention of genetic diversity and lower inbreeding levels in the future.
    a. However, inbreeding rates for these scenarios still remain high at the end of 100 years (F = .20 -.26).

3. Including imports with increased space could allow the population to breed the potential founders that would be imported more readily without the worry of a small space allotment. By the end of 100 years, the inbreeding levels could be much lower than if the breeding rates and space were increased only.

# ALTERNATE MODEL SCENARIOS

## Varying Female Probability of Breeding [p(B)] and Exports

We simulated the impact of exporting individuals from the current managed population (i.e. to AZA institutions). In consultation with the modeling group, we modeled two exportation strategies that were felt to be potentially realistic.

- 1 male and 1 female were exported every 5 years until year 50 – a total of 20 individuals exported.
- 2 males and 2 females were exported every 5 years until year 50 – total of 40 individuals exported.

All exported individuals were between ages 0 and 1 (age is randomly assigned within this range) and were randomly selected for export.

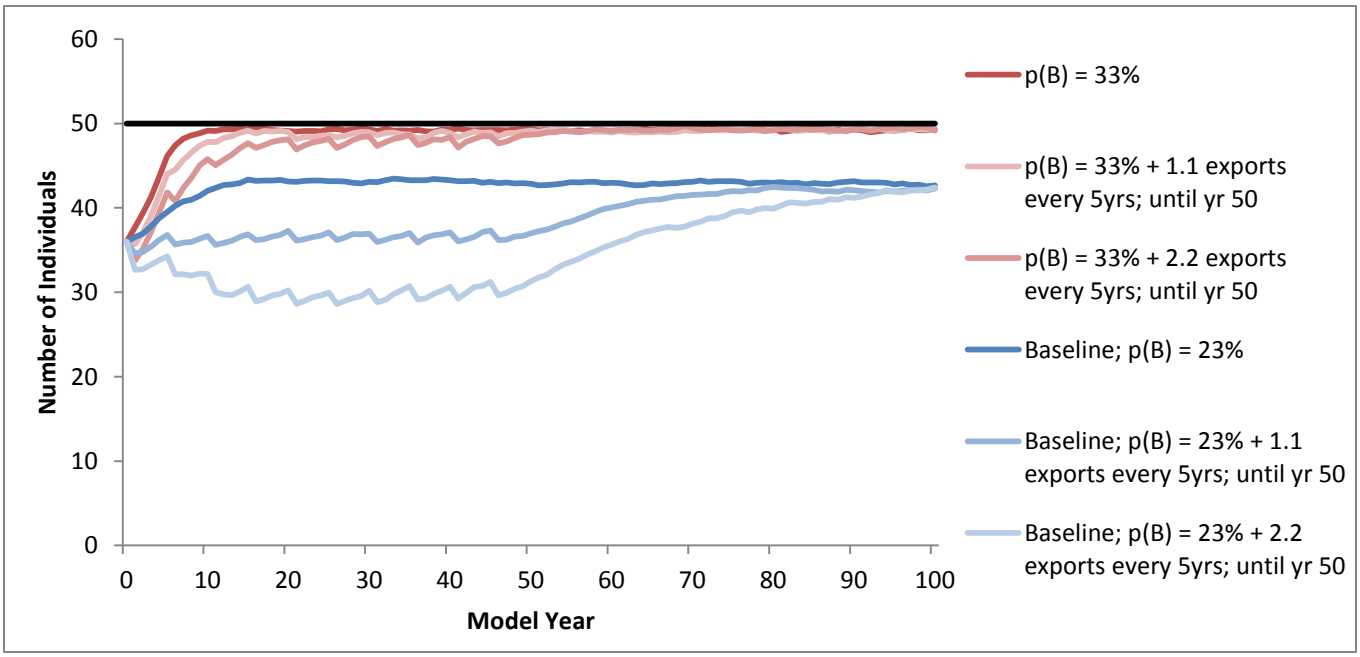


Figure 9. Mean projected population size under scenarios with increasing female probability of breeding and exports. Results are averaged across 1000 iterations. The black line represents the potential space of 50 individuals.

Table 7. Results under increasing female reproduction and additional space. Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in First 10 Model Years | Probability of Reaching Space | Median Time Space (years) | Probability of Reaching Extinction | Median Time to Extinction (years)[3] | Mean GD Retained[1] in Year 100 ± 1 SD[2] | Mean F Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|---|
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% | 0.35 ± 0.07 |
| Baseline; p(B) = 23% + 1.1 exports every 5yrs; until yr 50 | 37 ± 14 | 42 ± 11 | 4.9 | 80% | 18 | 25% | 52 | 60% ± 8% | 0.37 ± 0.08 |
| Baseline; p(B) = 23% + 2.2 exports every 5yrs; until yr 50 | 30 ± 16 | 42 ± 12 | 4.5 | 60% | 25 | 42% | 48 | 57% ± 11% | 0.41 ± 0.10 |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% | 0.28 ± 0.03 |
| p(B) = 33% + 1.1 exports every 5yrs; until yr 50 | 49 ± 5 | 49 ± 4 | 7.0 | 100% | 8 | 0.2% | 68 | 70% ± 3% | 0.29 ± 0.04 |
| p(B) = 33% + 2.2 exports every 5yrs; until yr 50 | 48 ± 6 | 49 ± 4 | 7.0 | 99% | 9 | 6% | 36 | 68% ± 3% | 0.30 ± 0.04 |

**Results for Scenarios Combining Varying Female p(B) and Exports:**

1. With the baseline breeding rate (p(B) = 23%) and exportations, the population has a difficult time recovering from the exportations as there are fewer animals breeding to replace those exports.
2. However, with the increased breeding rate of 33%, the population is able to maintain the target space of 50 individuals with either level of exportations.

3. An exportation strategy may be the best way for this population to maintain breeding rates, while also working within the confines of the small number of available spaces.
    a. Maintaining a higher breeding rate allows for improved gene diversity and inbreeding rates at the end of 100 years, however these rates remain extremely high and may lead to inbreeding depression or other complications in the population.

4. Without imports into the population in addition to exports (not modeled here), the population will remain closed and become more quickly inbred as animals are sent out of the population. If exports are considered at this level, imports may be important to the genetic health of the population over the short and long- term.

# MANAGEMENT ACTIONS

This model is a scientifically-sound comprehensive tool to be used by population managers for assessing future directions for the animal program. This PVA report is provided to the Thailand and AZA community to integrate into management of the important species within our care. The PVA model results are intended to provide the necessary data to make science-based decisions.

**The following strategies could assist the long-term genetic and demographic sustainability of the Thailand Clouded Leopard Consortium:**

- Bring in additional (unrelated, reproductively viable) individuals into the population for breeding to increase gene diversity and decrease inbreeding levels
- Increase the number of spaces available
- Export individuals to accredited institutions to increase available space and increase breeding rates
- Maintain or increase the current reproduction rates (as space allows)

# Acknowledgements

On June 20, 2013, the following attendees met via GoToMeeting to discuss the Thailand Clouded Leopard Consortium Population Viability Analysis:

- **Bonnie Breitbeil**, AZA Clouded Leopard SSP Coordinator and International Studbook Keeper
  - Central Florida Zoo & Botanical Gardens, bonnieb@centralfloridazoo.org
- **Janine Brown**, National Zoological Park
- **Ken Lang**, National Zoological Park
- **Sarah Long,** Lincoln Park Zoo
- **Katelyn Marti,** Population Biologist
  - Lincoln Park Zoo, kmarti@lpzoo.org

If you have any questions about the report, please contact Katelyn Marti (kmarti@lpzoo.org).

Analyses in this report utilized the International Clouded Leopard Studbook current to 2 August 2012 and were performed using PopLink 2.4 and ZooRisk 3.8.

**Cover photo courtesy of Bill Wood, Clouded Leopard Consortium.**

**Citation:**
Marti, K., and Breitbeil, B. 2013. Thailand Clouded Leopard (*Neofelis nebulosa*) Consortium Population Viability Analysis Report. Lincoln Park Zoo, Chicago, IL

# APPENDIX A. LITERATURE CITED


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# APPENDIX B. STUDBOOK DATA EXPORTS

| Studbook Information | |
|---|---|
| Studbook Currentness Date | 2 August 2012 |
| Studbook Keeper | Bonnie Breitbeil |
| Studbook Name | CLOUDED |

**All demographic data used for this analysis was the same as the data used in the AZA Clouded Leopard PVA Report**

| Studbook Extractions: | Start Date | End Date | Institution Filter |
|---|---|---|---|
| Fecundity Window | 01 January 1970 | 24 June 2013 | AZA |
| Mortality Window | 01 January 1970 | 24 June 2013 | AZA |
| Living Population | 24 June 2013 | - | THAILAND |

# APPENDIX C. ZOORISK PVA MODEL SETUP

**Name of ZooRisk Project = CloudedThai2013**

**All demographic data used for this analysis was the same as the data used in the AZA Clouded Leopard PVA Report**

| Model Parameter | Parameter Value | Additional Setup Notes |
|---|---|---|
| **Species Biology** | | |
| Number of Males per Breeding Group | 1 | |
| Number of Females per Breeding Group | 1 | |
| Number of Years Between Pairing | 25 | |
| **Model Settings** | | |
| Number of Years | 100 | |
| Number of Iterations | 1000 | |
| Extinction Threshold | 0 | |
| Gene Diversity Threshold | 0.9 | |
| Target Population Size | 82 for AZA<br>96 for AZA + non-AZA | Approach TPS gradually over a number of 5 years; this value used in all scenarios except "Increase TPS" |
| Genetic Management | Mean kinship pairing | |
| **Annual Number of Offspring** | **Frequency (N)** | |
| 1 offspring | 0.363 | |
| 2 offspring | 0.4315 | |
| 3 offspring | 0.1712 | |
| 4 offspring | 0.0274 | |
| 5 offspring | 0.0068 | |
| **Birth Sex Ratio** | | |
| Actual Birth Sex Ratio | 0.5625 | |
| Model Birth Sex Ratio | 0.5 | |

# APPENDIX D. INCLUDED INDIVIDUALS

These individuals were included as the starting population in all scenarios of the ZooRisk model; those with Allow Breed = No hold space but are never eligible for reproduction.

Sorted by Mean Kinship, most genetically valuable animals on top.

| ID | House Name | Allow Breed | Sex | % Known | Mean Kinship | Age | Institution | Reason for Exclusion |
|---|---|---|---|---|---|---|---|---|
| 1489 | SAAP | YES | Female | 100 | 0.0000 | 4 | KHAOKHEOW | |
| 1624 | Soi Dao | YES | Male | 100 | 0.0000 | 0 | KHAOKHEOW | |
| 1192 | No Name | YES | Male | 100 | 0.0125 | 11 | KHAOKHEOW | |
| 1457 | Gan-Gluey | YES | Female | 100 | 0.0250 | 7 | KHAOKHEOW | |
| 1265 | Mei | YES | Male | 100 | 0.0391 | 8 | KHAOKHEOW | |
| 1222 | Sakdaa Power | YES | Male | 100 | 0.0414 | 9 | KHAOKHEOW | |
| 1274 | Suk Jai | YES | Female | 100 | 0.0922 | 7 | KHAOKHEOW | |
| 1277 | Maximus | YES | Male | 100 | 0.1047 | 6 | KHAOKHEOW | |
| 1219 | Nok | YES | Female | 100 | 0.1063 | 9 | KHAOKHEOW | |
| 1428 | Dawk Mai | YES | Female | 100 | 0.1313 | 4 | KHAOKHEOW | |
| 1298 | Bissah | YES | Male | 100 | 0.1313 | 5 | KHAOKHEOW | |
| 1458 | Sen Yai | YES | Female | 100 | 0.1367 | 3 | KHAOKHEOW | |
| 1459 | Senlek | YES | Female | 100 | 0.1367 | 3 | KHAOKHEOW | |
| 1440 | Po-Yuu | YES | Male | 100 | 0.1367 | 4 | KHAOKHEOW | |
| 1469 | Lai Thai | YES | Male | 100 | 0.1367 | 3 | KHAOKHEOW | |
| 1623 | Yan | YES | Male | 100 | 0.1367 | 0 | KHAOKHEOW | |
| 1275 | Jao Nai | YES | Female | 100 | 0.1438 | 7 | KHAOKHEOW | |
| 1475 | Gra Ding | YES | Female | 100 | 0.1438 | 2 | KHAOKHEOW | |
| 1476 | Gra Dum | YES | Female | 100 | 0.1438 | 2 | KHAOKHEOW | |
| 1594 | Left Arm | YES | Female | 100 | 0.1438 | 1 | KHAOKHEOW | |
| 1595 | Not Marked | YES | Female | 100 | 0.1438 | 1 | KHAOKHEOW | |
| 1294 | Jao Chai | YES | Male | 100 | 0.1500 | 6 | KHAOKHEOW | |
| 1299 | Kelly | YES | Male | 100 | 0.1563 | 5 | KHAOKHEOW | |
| 1159 | Manow | NO | Female | 100 | --- | 13 | KHAOKHEOW | Spayed |
| 1165 | Numfun | NO | Female | 100 | --- | 13 | KHAOKHEOW | Age |
| 1185 | Ken | NO | Male | 100 | --- | 17 | KHAOKHEOW | Age |
| 1187 | SOMSRI | NO | Female | 100 | --- | 11 | KHAOKHEOW | Age |
| 1189 | Gian | NO | Female | 100 | --- | 13 | KHAOKHEOW | Age |
| 1213 | Rick | NO | Male | 100 | --- | 10 | KHAOKHEOW | Behavior |
| 1217 | Wanchai | NO | Male | 100 | --- | 9 | KHAOKHEOW | Age |
| 1221 | Mini | NO | Female | 100 | --- | 10 | KHAOKHEOW | Age |
| 1223 | Mesa April | NO | Female | 100 | --- | 9 | KHAOKHEOW | Age |
| 1232 | Songkla | NO | Male | 100 | --- | 12 | KHAOKHEOW | Age |
| 1251 | Thap-Thim | NO | Female | 100 | --- | 8 | KHAOKHEOW | Behavior |
| 1285 | Tuk Tuk | NO | Male | 100 | --- | 6 | KHAOKHEOW | Age |
| 1448 | Sila | NO | Male | 100 | --- | 3 | KHAOKHEOW | Behavior |

# APPENDIX E. MALE AND FEMALE MORTALITY RATES (QX)

Male and female mortality rates used in all scenarios of the ZooRisk model. Each year, the model determines whether each individual lives or dies stochastically based on that individual's age- and sex-specific mortality rate.

**Male**

| Age(x) | Qx | @ Risk (Qx) |
|---|---|---|
| 0 | 0.3227 | 282 |
| 1 | 0.0294 | 170 |
| 2 | 0.0255 | 157 |
| 3 | 0.0411 | 146 |
| 4 | 0.0284 | 141 |
| 5 | 0.0308 | 130 |
| 6 | 0.0833 | 120 |
| 7 | 0.0625 | 112 |
| 8 | 0.0566 | 106 |
| 9 | 0.0106 | 94 |
| 10 | 0.0889 | 90 |
| 11 | 0.038 | 79 |
| 12 | 0.1447 | 76 |
| 13 | 0.1935 | 62 |
| 14 | 0.2391 | 46 |
| 15 | 0.2571 | 35 |
| 16 | 0.2727 | 22 |
| 17 | 0.375 | 16 |
| 18 | 0.5714 | 7 |
| 19 | 0.3333 | 3 |
| 20 | 0 | 1 |
| 21 | 1 | 1 |

**Female**

| Age(x) | Qx | @ Risk (Qx) |
|---|---|---|
| 0 | 0.3415 | 246 |
| 1 | 0.0473 | 148 |
| 2 | 0.0144 | 139 |
| 3 | 0.0687 | 131 |
| 4 | 0.05 | 120 |
| 5 | 0.0364 | 110 |
| 6 | 0.0286 | 105 |
| 7 | 0.0187 | 107 |
| 8 | 0.0654 | 107 |
| 9 | 0.0521 | 96 |
| 10 | 0.0465 | 86 |
| 11 | 0.0811 | 74 |
| 12 | 0.1186 | 59 |
| 13 | 0.1176 | 51 |
| 14 | 0.2308 | 39 |
| 15 | 0.3103 | 29 |
| 16 | 0.4 | 20 |
| 17 | 0.1538 | 13 |
| 18 | 0.4 | 10 |
| 19 | 0.4 | 5 |
| 20 | 0.75 | 4 |
| 21 | 0 | 1 |
| 22 | 0 | 1 |
| 23 | 0 | 1 |
| 24 | 1 | 1 |

**Actual Mortality Rates for the Khao Kheow Zoo Population:**

**Male**

| Age(x) | Qx | @ Risk (Qx) |
|---|---|---|
| 0 | 0.1842 | 38 |
| 1 | 0.1333 | 30 |
| 2 | 0.0800 | 25 |
| 3 | 0.1600 | 25 |
| 4 | 0.0000 | 20 |
| 5 | 0.0000 | 20 |
| 6 | 0.0588 | 17 |
| 7 | 0.0000 | 12 |
| 8 | 0.0000 | 12 |
| 9 | 0.0000 | 11 |
| 10 | 0.1250 | 8 |
| 11 | 0.3333 | 6 |
| 12 | 0.0000 | 3 |
| 13 | 0.0000 | 1 |
| 14 | 0.0000 | 1 |
| 15 | 0.0000 | 1 |
| 16 | 0.0000 | 1 |
| 17 | 0.0000 | 1 |

**Female**

| Age(x) | Qx | @ Risk (Qx) |
|---|---|---|
| 0 | 0.075 | 40 |
| 1 | 0.000 | 35 |
| 2 | 0.033 | 30 |
| 3 | 0.039 | 26 |
| 4 | 0.174 | 23 |
| 5 | 0.063 | 16 |
| 6 | 0.000 | 14 |
| 7 | 0.000 | 13 |
| 8 | 0.000 | 10 |
| 9 | 0.000 | 10 |
| 10 | 0.000 | 7 |
| 11 | 0.333 | 6 |
| 12 | 0.000 | 4 |
| 13 | 0.000 | 4 |
| 14 | 1.000 | 1 |

# APPENDIX F. PEDIGREE ASSUMPTIONS

No pedigree assumptions were created for these analyses

# APPENDIX G. OVERALL RESULTS TABLE

The table below shows the overall model results for each scenario. The starting population size, gene diversity, inbreeding levels, and percent known for each scenario is listed below.

Current GD = 88.10 and current inbreeding = 0.000

| SCENARIO | Mean Population Size[1] in Year 25 ± 1 SD[2] | Mean Population Size[1] in Year 100 ± 1 SD[2] | Mean # of Offspring in the first 10 model years | Probability of reaching Space | Median time to Space (years)[3] | Probability of reaching Extinction | Median time to Extinction (years) | Mean GD Retained[1] in Year 100 ± 1 SD[2] |
|---|---|---|---|---|---|---|---|---|
| **Baseline Scenario:** | | | | | | | | |
| Baseline; p(B) = 23% | 43 ± 11 | 43 ± 12 | 5.4 | 95% | 13 | 8% | 65 | 63% ± 8% |
| **Alternate Scenario: Varying Female Probability of Breeding [p(B)]** | | | | | | | | |
| p(B) = 20% | 36 ± 14 | 33 ± 15 | 4.6 | 76% | 17 | 32% | 63 | 57% ± 11% |
| p(B) = 25% | 46 ± 8 | 46 ± 8 | 5.9 | 99% | 10 | 2% | 66 | 66% ± 5% |
| p(B) = 33% | 49 ± 4 | 49 ± 4 | 6.7 | 100% | 6 | 0% | – | 70% ± 3% |
| **Alternate Scenarios: Decreased Infant Mortality (IM)** | | | | | | | | |
| Baseline; p(B) = 23%; IM = 10% | 48 ± 5 | 48 ± 5 | 4.9 | 100% | 7 | 0.1% | 98 | 67% ± 3% |
| p(B) = 33%; IM = 10% | 50 ± 3 | 50 ± 3 | 5.2 | 100% | 5 | 0% | – | 71% ± 3% |
| **Alternate Scenarios: Importing Individuals +Varying p(B)** | | | | | | | | |
| Baseline; p(B) = 23% + 1.1 imports every 10 yrs; until yr 50 | 46 ± 8 | 43 ± 11 | 5.6 | 99% | 10 | 5% | 85 | 71% ± 6% |
| Baseline; p(B) = 23% + 1.1 imports every 5yrs; until yr 50 | 46 ± 7 | 43 ± 11 | 5.5 | 100% | 9 | 2% | 93 | 75% ± 6% |
| p(B) = 33% + 1.1 imports every 10yrs; until yr 50 | 49 ± 4 | 49 ± 4 | 6.5 | 100% | 6 | 0% | – | 77% ± 3% |
| p(B) = 33% + 1.1 imports every 5yrs; until yr 50 | 49 ± 4 | 49 ± 4 | 6.3 | 100% | 6 | 0.01% | 93 | 81% ± 2% |
| **Alternate Scenarios: Increase Space** | | | | | | | | |
| Baseline; p(B) = 23% + Space = 100 | 72 ± 29 | 96 ± 11 | 5.9 | 94% | 29 | 5% | 45 | 73% ± 7% |
| p(B) = 33% +Space =100 | 99 ± 5 | 100 ± 5 | 11.3 | 100% | 13 | 0% | – | 80% ± 2% |
| Baseline; p(B) = 23% + 1.1 imports every 5yrs;every 10 yrs + Space = 100 | 89 ± 19 | 97 ± 8 | 6.9 | 100% | 22 | 0% | – | 85% ± 2% |
| p(B) = 33% + 1.1 imports every 5yrs; every 10 yrs + Space =100 | 99 ± 5 | 100 ± 5 | 12.3 | 100% | 12 | 0% | – | 88% ± 1% |
| **Combining Scenarios: Exports + Varying p(B)** | | | | | | | | |
| Baseline; p(B) = 23% + 1.1 exports every 5yrs; until yr 50 | 37 ± 14 | 42 ± 11 | 4.9 | 80% | 18 | 25% | 52 | 60% ± 8% |
| Baseline; p(B) = 23% + 2.2 exports every 5yrs; until yr 50 | 30 ± 16 | 42 ± 12 | 4.5 | 60% | 25 | 42% | 48 | 57% ± 11% |
| p(B) = 33% + 1.1 exports every 5yrs; until yr 50 | 49 ± 5 | 49 ± 4 | 7 | 100% | 8 | 0.2% | 68 | 70% ± 3% |
| p(B) = 33% + 2.2 exports every 5yrs; until yr 50 | 48 ± 6 | 49 ± 4 | 7 | 100% | 9 | 6% | 36 | 68% ± 3% |

[1] *All population sizes, gene diversity, and inbreeding are the mean values across 1000 iterations.*

[2] *One standard deviation.*

[3] *A dash (-) indicates that extinction is never reached.*

# APPENDIX H. DEFINITIONS

**Age Structure:** A two-way classification showing the numbers or percentages of individuals in various age and sex classes.

**Current Gene Diversity (GD)**: The proportional gene diversity (as a proportion of the source population) is the probability that two alleles from the same locus sampled at random from the population will not be identical by descent. Gene diversity is calculated from allele frequencies, and is the heterozygosity expected in progeny produced by random mating, and if the population were in Hardy-Weinberg equilibrium.

**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).

**Inbreeding Coefficient (F):** Probability that the two alleles at a genetic locus are identical by descent from an ancestor common to both parents. The mean inbreeding coefficient of a population will be the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population.

**Mean Kinship (MK):** The mean kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. The mean kinship of a population is equal to the proportional loss of gene diversity of the descendant (captive-born) population relative to the founders and is also the mean inbreeding coefficient of progeny produced by random mating. Mean kinship is also the reciprocal of two times the founder genome equivalents: MK = 1 / (2 * FGE). MK = 1 - GD.

**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.

**Percent Known:** Percent of an animal's genome that is traceable to known Founders. Thus, if an animal has an UNK sire, the % Known = 50. If it has an UNK grandparent, % Known = 75

**Population Viability Analysis (PVA):** A PVA is a computer model that projects the likely future status of a population. PVAs are used for evaluating long-term sustainability, setting population goals, and comparing alternative management strategies. Several quantitative parameters are used in a PVA to calculate the extinction risk of a population, forecast the population's future trajectory, and identify key factors impacting the population's future.

**Probability of Breeding [p(B)]:** Female p(B) is the age-specific probability that a female will have at least one offspring in a year. For example, p(B) = 25% is equivalent to females producing an offspring once every 4 years. Within the reproductively viable age classes, all p(B) were set at a hypothetical constant value corresponding with an interbirth interval, which varied depending on the model scenario. Using a constant value means that all reproductively viable females would have the same chance of reproduction regardless of age.

**Qx, Mortality**: Probability that an individual of age x dies during time period.

**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. The proportion of individuals that die during an age class 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").

Appendix C

Mr. John Houck
Point Defiance Zoo & Aquarium
5400 N. Pearl Street
Tacoma, WA 98407

Mr. Rick Schwartz
Nashville Zoo at Grassmere
3777 Nolensville Pike
Nashville, TN 37211

Steve Monfort
Center for Species Survival
Smithsonian Conservation Biology Institute
1500 Remount Road
Front Royal, VA 22630

February 14, 2016

Dear John, Rick and Steve,

The Association of Zoos & Aquariums (AZA) Clouded Leopard Species Survival Plan (CL SSP) is in support of the importation of 16 clouded leopards (*Neofelis nebulosa*) from the Khao Kheow Open Zoo in Chonburi, Thailand to the Point Defiance Zoo & Aquarium (PDZA), the Nashville Zoo at Grassmere (NZ) and the Smithsonian Conservation Biology Institute (SCBI). The importation of these zoo-born cats will enhance the AZA CL SSP population with the influx of genetic lines that are unrepresented in the AZA zoo population.

The CL SSP is appreciative of the ongoing work of the PDZA, NZ and SCBI and the years of support your facilities have provided on behalf of clouded leopards in the U.S. as well as in Southeast Asia. Each facility has continuously served as champions of this species and institutions such as these make a true difference in the lives of our animals.

Please contact me if you should have questions or need further assistance with this importation.

Sincerely,

Jilian Fazio, Ph.D.
Research Fellow
Smithsonian National Zoo and Conservation Biology Institute
AZA Clouded Leopard SSP Coordinator
International Studbook Keeper
fazioj@si.edu
908-447-6921

ASSOCIATION OF ZOOS & AQUARIUMS

Species Survival Plan

Clouded Leopard section begins on page 29.



# ASIAN FOREST SANCTUARY

# INTERPRETIVE TRAINING MANUAL

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# ASIAN FOREST SANCTUARY – KEY MESSAGES

## KEY MESSAGES

- Asian forests contain an incredible variety of habitats and have a high level of biodiversity.
- Sanctuaries are places wildlife take refuge. Zoos and aquariums can be sanctuaries.
- We all have a role to play in protecting wildlife

## MAJOR ISSUES FACING THE ANIMALS & HABITAT

- Habitat destruction
- Wildlife trade

## ACTIONS TO HELP THE ANIMALS & HABITAT

- Be informed consumers
    - Choose shade grown coffee
    - Choose sustainable palm oil
    - Choose FSC certified products
- Support conservation organizations
    - PDZA



## EXHIBIT FACTS

- Opened in July 2004
- Designed to replicate natural environment
- Only the the third inter-species rotation exhibit in the country
- Cost $10 million
- Paid for by the 1999 Zoo Bond
- All of the exhibit pools can be heated at the discretion of the keepers; when they are heated, water temperatures are between 62°F - 67°F
- The pool in the Waterfall Panarama exhibit is 14 feet deep and is drained about once a year for cleaning. It is freshwater.

# SOUTHEAST ASIA MAP

Asian Elephant - Range: India, Sri Lanka, southern China and Indonesia

Sumatran Tiger - Range: Sumatra

White-cheeked Gibbon - Range: Laos, Vietnam, Hainan, southeastern China and eastern Cambodia

Siamang - Range: Sumatra and the Malay Peninsula

Malayan Tapir - Range: Southern Burma, Malay Peninsula, southeastern Thailand and Sumatra

Lowland Anoa - Range: northern part of the Indonesian island of Sulawesi (Celebes)

Asian Small Clawed Otter - Range: southeast Asia, southern China, Indonesia and the Philippines

Crested Porcupine - Range: India, southeast Asia, Sumatra, Java and neighboring islands

Wrinkled Hornbill - Range: Sundaic lowlands of Thailand, Brunei, Sumatra, Indonesia and Malaysia

**How does this help?** Check and see which of our Asian animals inhabit the same ranges. For example the Sumatran tigers are only found in Sumatra – so in its natural environment the tiger may encounter siamangs, tapirs, and crested porcupines.

# SOUTHEAST ASIAN FORESTS

**There are three types of forest depicted in the Asian Forest Sanctuary Exhibit:**

1) **Bamboo forests**
2) **Broadleaf forests (a type of tropical rainforest)**
3) **Scrubland forests**

## BAMBOO FORESTS

Bamboo is classified as a giant grass and some species have been found to grow taller than 90 feet. Of the 1600 species of bamboo worldwide, over 1000 species are found in Southeast Asia. It is known to be the fastest growing, most versatile woody plant in the world and is annually renewable. Most of the tropical species are considered to be "clumpers" and are important to the forest community by helping to prevent soil erosion. Bamboo's leaves and tender shoots provide food while the remainder of the plant provides shelter to numerous species in the forest. The flexibility, yet rigidity provided by the nature of its hollow stem allows for the versatility of this plant. It is used by native peoples in almost every aspect of their lives: from building materials for homes and bridges to musical instruments.

### FAST FACTS:

- There are about 1,000 species of bamboo.
- Unlike trees, all bamboos grow to full height and girth in a single growing season of 3–4 months.

### SPECIES COUNTS:

According to the World Wildlife Fund, select bamboo habitat in Asia contains around 100 mammal species, over 200 bird species, at least 20 reptiles, and at least 14 amphibians.

## TROPICAL BROADLEAF FORESTS (TROPICAL RAINFOREST)

### MOST TROPICAL RAINFORESTS ARE FOUND IN FOUR REGIONS OF THE WORLD:

1) Africa (including Madagascar)
2) Australia, New Guinea, and the Pacific Islands
3) South America, Central America, and Caribbean islands
4) India, Sri Lanka, mainland Asia and Southeast Asia (This region, which our exhibit highlights, contains some of the oldest rainforests on Earth)

### WHAT MAKES A RAINFOREST A RAINFOREST?

1) Abundant, year-round rainfall
2) An enclosed canopy
3) High species diversity
4) Complex communities- considered to be the richest natural environments on Earth.

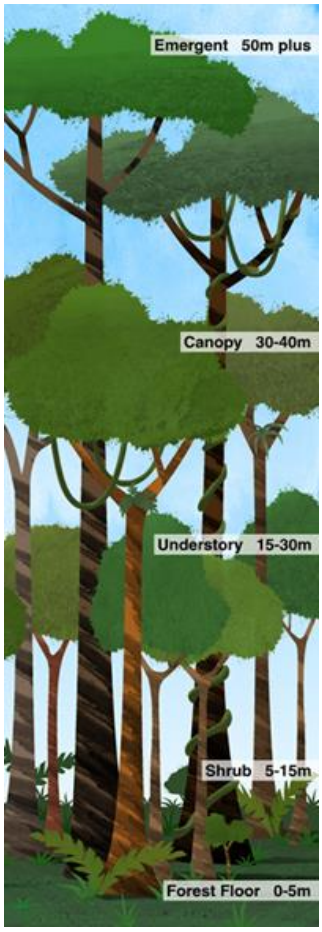
### FAST FACTS:

- Found near the equator with elevations below 3000 ft.
- Average 78 inches (6.5 feet) of rainfall annually (Here in Tacoma, we average around 36 inches per year).
- Minimal variation in seasons.
- Hours of sunlight are constant year round.

### SPECIES COUNTS:

Throughout the rainforests of Southeast Asia, more than 3000 species of trees are found, including numerous broadleaf species, highly prized teak and mahogany, dipterocarps (2-wing seeded trees), bamboo, legumes and strangler figs. Many of the trees are also characterized by very thin bark and large fleshy fruits or flowers, which develop directly from the trunk.

### HABITAT LAYERS: EACH VERTICAL LAYER OF THE FOREST HAS ITS OWN COMMUNITY:




- The ***upper canopy*** (also called the emergent layer or over story) is an umbrella-like canopy composed of small leafed trees and extends up to 250ft above the forest floor.
- Just below the upper canopy layer is the ***lower canopy***, where sturdier, "smaller" trees rise 100-150ft above the forest floor. Treetops do not touch one another, but neatly interlock. Here in the canopy, sunlight is readily available above, but greatly reduced below. Temperature and humidity remain relatively unchanged within this level. Epiphytes (air plants which support themselves on tree branches) collect rainwater which arboreal animals drink.
- The ***under story*** is comprised of a shrub/sapling layer where young trees must wait for a gap to form in the canopy for there to be enough light for them to grow.
- The ground layer, or ***forest floor***, is characterized by sparse plant growth due to the lack of sunlight and moisture. Many of the tree species have huge above-the-ground roots known as buttresses. These structures aid in dispersing the weight of huge trees while also capturing what minimal nutrients are available from the forest floor. Less than 1% of the light that strikes the canopy penetrates to the forest floor, and 1/3 of the precipitation is intercepted before it reaches the ground. Tropical forest soils typically are nutrient poor (which makes them unsuitable for long-term farming).

## TROPICAL SCRUBLAND

This habitat is drier and is composed of widely-spaced trees, which are low to the ground and scraggly. Thick grasses grow in this habitat because the sun is able to reach the forest floor. Fewer plant types are found in this kind of habitat, therefore fewer types of animals exist here.

### SCRUBLAND DEVELOPS BECAUSE OF:

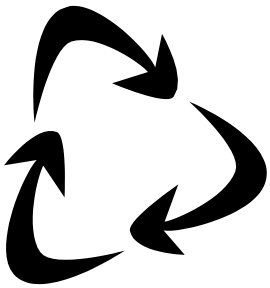
1) Decreased rainfall
2) Abandoned agricultural land attempting to re-grow native plants
3) Larger hardwood trees are taken from the area, leaving undesirable smaller trees.

## TODAY'S ASIAN FORESTS

Today's Asian forests look very different than they did in years past. Forests once covered a much greater area in Asia, but centuries of tremendous population pressure have greatly contributed to the region's substantial forest loss. Today, only scattered fragments remain. Protecting forestland is absolutely critical if we are to preserve the biodiversity of Asia.

# ROTATIONAL ASPECT OF EXHIBITRY

### WHAT IS IT?



The Asia Forest Sanctuary (AFS) is the section of the Zoo that focuses on animals from Southeast Asia. It is a sanctuary for rare and endangered species, which opened in July of 2004. The AFS staff is involved with and helps manage breeding programs for all of the animals, except the elephants. These animals can rotate to different exhibits within the AFS.

### HOW DOES IT WORK?

The animals usually only rotate to a different enclosure once per day, in the morning (they do not freely move from one exhibit to the other throughout the day). Sometimes the staff will shift them during the day to another exhibit.

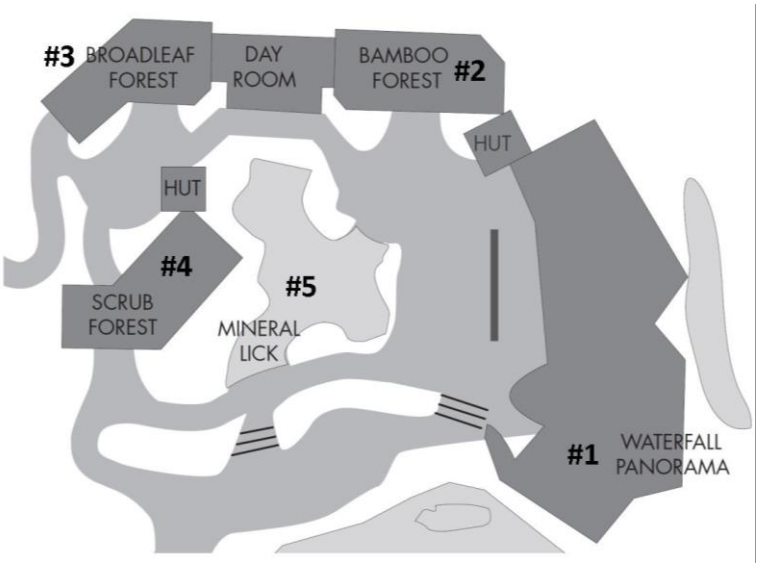
All of the animals are housed inside at night in the building to the west of the AFS in their "bedrooms". Each morning the staff decides who is going where and with whom for the day. All of their "bedrooms" are connected to the exhibits through a network of underground shoots and tunnels. As the animals move through these passages, the keepers open and close different doors to control which way they go, leading them to the designated exhibit. Each exhibit has food waiting within to entice the animals to move completely through the passages.

### WHY?

It is designed to increase the animals' activity levels and promote natural behaviors by allowing them to experience multiple habitats and interspecies interactions. By having the animals share space they are also able to smell each other, stimulation not ordinarily possible in zoo exhibits.

The rotational aspect keeps the experience fresh for both visitors and the animals. The animals are not always in the same exhibit doing the same thing every day.

## WHO CAN GO WHERE AND WITH WHOM?




Most of the animals can be exhibited together. As you can imagine, the tigers cannot go in with any other animal, they will always be by themselves. The two types of primates (Siamangs & White-Cheeked Gibbons) cannot be together as they would each have their own territory in the wild. Neither the Siamangs nor Gibbons go in with the otters (they play a little too roughly with them).

Asia staff refers to the exhibits by their number, not by their name. In the mornings/evenings you'll hear them on the radio calling out which animal is moving to/from a numbered exhibit. It is useful to know what number goes with which exhibit (see map on previous page). These numbers are for internal use only; visitors are unaware of the numbers.

Obviously, the primates cannot go into an exhibit without a mesh top, so they are restricted to exhibits 2, 3, & 4. The tigers can go everywhere except #5.

The Day Room is the only exhibit that does not have a number. The Day Room's primary function is to provide a heated space so that some animals would be on exhibit during really cold and really rainy days. However, since shelters have been added to #2, #3, and #5, we are able to utilize more of the exhibits on almost a year-round basis.

## WHAT IS SPECIAL ABOUT IT?

The rotational concept is a new one in the world of zoo exhibit design. This inter-species rotational design is only the 3rd in North America; the first was the Louisville Zoo in Kentucky, the 2nd was Denver Zoo's Predator Ridge exhibit. Quite a few zoos have had a rotational exhibit, but these three were the first to have inter-species rotating (meaning, more than one species of animal in the exhibit at a time, such as the tapir in the exhibit with the primates).

## HOW TO INTERPRET IT:

Visitors often don't know or realize that the animals can rotate. You can point this out by first talking about an animal, then say, "and these animals are not always in the same exhibits, they rotate. Do you

see the animal ID tags at each exhibit? Any one of those animals, sometimes two, could be in there on any given day. The animals in the Asian Forest Sanctuary can be rotated from one exhibit to another."

There are also now signs with the ID tags to help visitors learn about what they are looking at. These signs say, "Look Closely. Any of these animals may use this habitat today. Which one do you see?"

You may get questions from visitors asking why they saw a particular animal in one place the last time they visited and now there's something different there. Also, people will comment on the ropes in the Day Room when there's a non-primate in there. They often think that because there are ropes in there that it must be the "monkey room". Truth is, any of the animals could be in there (except the tigers and the porcupines, they would tear up the matted floor).

Feel free to point out what is special about the rotational aspect of this part of the zoo. People enjoy hearing how we try to make the lives of our animals better.

# STORIES BEHIND THE ASIAN ARTIFACTS

## RAIN DRUMS

Rain drums originated between 600-700 AD in South East Asia. The agricultural tribes of Burma, Cambodia, and Thailand believed that a spirit inside the drums would summon a successful harvest, bring them good luck, health and a long life. The drums are decorated with frogs, representing a good harvest and fertility; circles, symbolizing the universe, stability and harmony; and elephants, to signify the hard labor of the family and respect for the animals that help them.

The rain drums are to the left of the elephant pool.

## DRAGONS

The most complex and most powerful creature in mythology, dragons of the Far East, in contrast to the West, are good natured and usually are associated with the emperor, king, or the power of the heavens. Dragons have, in legend, the ability to shrink to the size of a silkworm or swell to fill the space between heaven and earth. Dragons are believed to protect the

most beautiful and valuable possessions, as well as the secret knowledge of eternity.

Dragons can be found depicted throughout traditional Asian art.

## CRANES

The crane is one of the ten symbols of longevity. It is also considered to be a symbol of wisdom; the upward flying crane expresses the "desire" to rise high. In many legends, the crane is an emissary from heaven; hence the crane or stork carries children for waiting couples. In the early morning mist, people from South East Asia, China, and Burma gather in parks to "walk" their birds. Housed in elaborate hand made cages of bamboo or wire, their small occupants are urged to sing and show off the tricks their owners have taught them. Many birds are then escorted to special tea houses that cater to bird owners, where they spend the rest of the morning. On hot summer days, bird owners give their cherished pets a bath and hand feed them treats.

The cranes can be found on top of a large rock at the edge of the elephant yard.

## QUAN YIN (GUAN YIN)

Known throughout Asia as the Goddess of Mercy, her original name in Sanskrit is Padma-pani, meaning "Born of the Lotus". She is believed to answer prayers and protect travelers of the Southern Seas. Quan Yin is often depicted riding on a tiger, symbolizing her reign over the forces of nature and kindness to all living creatures.

The statue is located above the waterfall panorama exhibit, on top of the ruins.

## MONKEY KING

The Monkey King is best known from the novel of the Song Dynasty, "The Journey to the West". In this humorous tale, the monkey, who has a very high opinion of himself, accompanies a Buddhist monk on his travels from China to India and back. After the long pilgrimage he learns that though he has many talents that help his fellow travelers along the way, his companions are also unique and he arrives at the end a much humbler and happier being.

The Monkey King can be found above the waterfall panorama, near the Quan Yin statue.

## ANTIQUE COURTYARD PLAQUES

Antique courtyard plaques decorated the elaborate interior and exterior entrances and receiving halls of prominent Asian officials. The thickness and length of the wood, as well as the depth of the carving, convey the social status and importance of the owner. They often tell stories of valor and family history, or convey benevolent wishes and harmony on the household. Carved, lacquered or gilt panels were popular in India, South East Asia and the Far East until the end of the nineteenth century. The few that remain in existence are usually found in ancient palaces and temples.

The plaque is suspended above the waterfall panorama sheltered viewing area.

## LONGEVITY SCREENS

Longevity screens are rich in symbolism and have stood behind the imperial thrones of kings and emperors in many Asian countries for centuries. They bestow wishes for the ruler to enjoy a long, happy, and healthy life, so that he would govern justly. Hopefully, this would ensure blessings from heaven and a peaceful existence for his subjects. The ten symbols of longevity are the sun, clouds, mountains, rivers, pine trees, fungus (herbs), turtles, cranes, deer, and the peach of immortality.

The screens can be found in the dayroom, above the indoor animal holding windows.

## FU-LION

The lion became a popular symbol of protection in the Far East with the spread of Buddhism from India, in the seventh century. Fu-Lions were used at the entrances to all government buildings of importance, temples, villages, gardens, and in homes. Being sacred to Buddhism and empowered with super-natural powers of wisdom, demon-repelling valor, and energy, the lion's domain would have to be on high ground. The Fu-Lion became regarded as the natural habitat for the beast that embodied spiritual loyalty and protection. Being part Lion and part Dog, his loyalty is assured. Fu-Lions are generally present in pairs – one male and one female. The male has his right paw on a globe representing his "feeling the pulse of the earth". The female has a single cub under her left paw. Symbolically, the male Fu-Lion guards the structure, while the female protects those dwelling inside. 'Fu' means happiness in Chinese.

There are two Fu-Lions, one on either side of the indoor animal holding area windows in the dayroom.

# ELEPHANT KEY MESSAGES:

## A LONG HISTORY IN TACOMA AND A SUPPORTIVE COMMUNITY

Elephants have been a part of Point Defiance Zoo & Aquarium for half a century, and have a special place in the hearts of people in our community.

## SUKI AND HANAKO ARE HEALTHY AND THRIVING

They are 50 and 51 years old and receive excellent daily care from our zoological and veterinary teams.

## A STAFF OF LONG EXPERIENCE

The staff who care for Suki and Hanako know them well. Senior staff biologist Craig Wilcox has more than 20 years of elephant care experience and has worked with Suki and Hanako since they arrived at Point Defiance Zoo. Staff biologist Shannon Smith has cared for elephants for the past 18 years.

## PIONEERING PROGRESSIVE PROTECTED CONTACT

Point Defiance Zoo & Aquarium was a pioneer in the philosophy and introduction of protected contact (now called restricted contact). This elephant management system keeps the animals and staff members safe while providing space for keepers and veterinarians to monitor the elephants' health and provide necessary care. Suki and Hanako participate in their care and receive rewards for that participation. The zoo's $2.3 million elephant barn opened in 1992. Many zoos now employ the same kind of protected contact systems.

## OUR COMMITMENT

Suki and Hanako came to Point Defiance Zoo as dangerous elephants and were ideally suited to the new system of elephant management. We pledged to care for them and they have responded. Our plan is to have them live out their lives here, in their home.

## AMBASSADORS FOR ELEPHANTS IN THE WILD

Suki and Hanako are outstanding ambassadors for elephants in the wild and play a vital role in advancing our mission of conservation and education. They inspire our visitors to care about elephants to take action to protect them.

## A COMMITMENT TO CONSERVATION

Point Defiance Zoo & Aquarium continues to partner with accredited zoos and international conservation organizations to promote the well-being of elephants.

We've joined the 96 Elephants campaign to publicize the plight of African elephants, which are being brutally slaughtered for their tusks. We're partnering with Woodland Park Zoo to pass a state law banning the sale of elephant ivory within state borders. And, in partnership with The Zoo Society, we've distributed $86,000 in grants to protect elephants in the wild and to advance elephant care.

# ASIAN ELEPHANT – FACT SHEET

**Common Name:** Asian Elephant

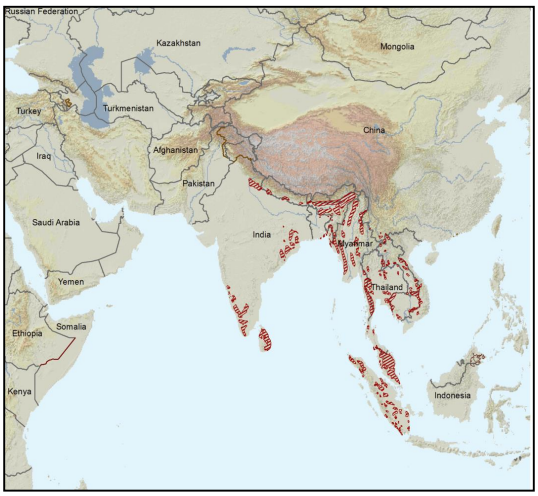
**Scientific Name:** *Elephas maximus*

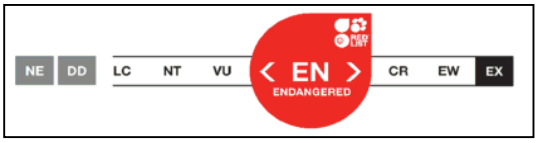
**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Proboscidea |
| Family: | Elephatidae |

**Description:** **Height**: 8-11 feet at the shoulder

**Weight**: 5,000 to 12,000 pounds




**General**: Males are visibly larger than females, and only male Asian elephants have long tusks. The females have short protrusions called "tushes" which rarely extend below the lip. In contrast to an African Elephant, the Asian has an arched back, smaller ears, one "finger" on the tip of the trunk (as opposed to two on the African) and is generally smaller in size. Asian elephants also have two large bumps on their head. Some individuals lose the pigment in partial areas of the body, especially around the face, ears, and trunk, giving the skin a pinkish appearance.

**Range:** Indochina, India, Sri Lanka, Indonesia, and southern China. Their range has decreased sharply with increased human populations and development. Because of this, and because of the ivory trade and poaching, the Asian elephant is an endangered species.

**Habitat:** They inhabit forests and grassy plains.

**Status:** IUCN Status Endangered, CITES Appendix I

**Diet:** Asian elephants are herbivores and consume grasses; their favorite foods include bamboo, small trees, some bark, shrubs, and fruit. Adult Asian elephants can consume about 300 pounds of food in the wild per day. Our elephants get about 75-80 pounds per day. Our elephants can eat much less because the nutritional content is much better than what they would find in the wild.

**Reproduction:** Females go into estrus 2-3 times a year (approximately every 16 weeks). During this period the cow is only receptive to mating for about a 24-hour period. Males can smell a cow in estrus from miles away. This is the only time the herd will tolerate their presence. Following a 20-22 month gestation, one calf is born. Twins are rare. A calf weighs about 200 pounds at birth, can stand within a half an hour, and nurse for 2-3 years. Aunts within the herd serve as midwives, protecting the baby,

removing the fetal membrane, and even helping the baby to stand. Females are sexually mature at 10-13 years, while in a zoological setting have been recorded to reach sexual maturity between 10-17 years. Males mature at around 10-15 years.

**Life Span:** 40-60 years. Elephants have 6 sets of teeth in their lifetime, which replace each other on a sort of conveyor belt system. When the last teeth are lost, usually between 50-60 years of age, the elephant starves. The stories of "Elephant graveyards" may have arisen from the fact that elephants which had lost their teeth would generally gravitate to particular areas which offered softer food sources, and die there, creating concentrations of elephant bones.

**Behavior:** As with the African Elephant, Asian elephant herd structure is a matriarchal society. The herd is a highly developed social system in which related females are led by a dominant cow, the matriarch. In herds in human care this may not be the oldest or largest female—but the one that has the attitude to be the boss. Males are displaced form the natal herds at 10-15 years of age, and they generally roam solitary or in briefly formed bachelor groups. Between the ages of 15-18, the growth of the elephant slows or stops, except in males, who will have another growth spurt between 20-30 years. In the wild, Asian elephants generally travel about 20 miles a day in search of food and water, which means they require a great deal of open territory. They are vocal and make a variety of sounds, including trumpets, roars, purrs, and squeaks.

## PDZA ELEPHANTS:

**Suki** (female)

- Born in the wild in about 1964.
- Belonged to a private owner as a calf & was sold to a circus when she grew too large.
- Spent several years at Dickerson Park Zoo before being transferred to PDZA in 1996.
- Due to a history of aggressive behaviors, Suki does best in a restricted contact program.
- She is the dominant elephant.
- She is shorter in height than Hanako & her tail is longer than Hanako's.

**Hanako** (female)

- Born at the Washington Park Zoo in Portland in 1963.
- Came to PDZA in 1997.
- High-strung since birth, Hanako has responded well to our restricted contact training program.
- She is taller and hairier than Suki & the tops of her ears are folded over.

# ELEPHANT INTERPRETATION

## HOW DOES AN ELEPHANT USE ITS TRUNK?

An elephant uses its trunk as a human uses its hands, arms and nose. The trunk is divided into 2 nostrils, and used for breathing, smelling, touching, caressing, defense, and getting water and food into the elephant's mouth. Elephants use the trunk to spray themselves down with water or dust. Newborns and young elephants use their mouths to suckle, not their trunks. The elephant's trunk combines both nose and upper lip and transforms them into a single powerful organ that is able to touch, grasp and smell. It is strong enough to uproot a tree, sensitive enough to pick up a pea-sized fruit from the ground, and long enough to reach foliage high in the trees. The trunk is also used to drink by sucking up water and squirting it into the mouth. The trunks are also useful for greeting, caressing, threatening, and throwing dust over the body. The elephant's trunk has about 15,000 muscles and it takes baby elephants quite some time to learn to master its use.

## BIOFACT: ASIAN ELEPHANT TAIL HAIRS (REAL)

Asian elephants are more closely related to the now-extinct mammoth than other elephants. Asian elephants are sparsely covered with coarse hair, with the thickest strands at the tail. Depending on the individual, the amount of hair may lessen with age. These hairs come from our elephants.

Newborns are covered with yellow and brown hair. After a few months, the hair on the head and upper torso grows as long as that of the extinct mammoth, several inches. This disappears after the first few years of life. Apart from the hairs at the end of their tail, adults only have stubble on their head and upper back.

## BIOFACT: ASIAN ELEPHANT TOOTH-PARTIAL (REPLICA)

Elephant teeth are the largest teeth of any living animal. Asian elephants possess four molars (one on the top and one on the bottom on both sides of the mouth). Each massive molar is used to grind highly fibrous food (grasses, bark, leaves). The smooth outer coating of a new tooth wears down over time, uncovering ridges. When outgrown or worn out, the molars will be replaced by newer teeth, up to 6 sets of molars in a lifetime. This replica tooth clearly shows the exposed ridges and root structures, and is painted to match the subtle coloration of the original. (The flat surface is the exposed, grinding surface of the tooth and the pointy part is the root structure.) Only about ½-inch of the tooth is above the gums, the rest lies beneath.

All elephants are born with teeth which are located far to the rear of their mouth.

## BIOFACT: ASIAN ELEPHANT TOOTH PIECE (REAL)

Elephant teeth grow slowly and continuously forward and away from the jaw bone like they are on a conveyer belt. Each tooth grows away from the jaw to be slowly replaced by another. Instead of losing a whole tooth, like us, their teeth break off in chunks. This is a chunk from one of our girls as her teeth were shifting. Our elephants act much like teething human babies when they are about to lose a piece or have recently lost a piece of tooth. They get cranky, they won't eat, and they like to chew on things (mostly big chunks of wood).

## BIOFACT: ASIAN ELEPHANT 6TH TOOTH (REPLICA)

This is a mold of a 6th tooth. Notice its rounded back side. If it were a first, second, or any other tooth, the back would be worn flat due to another tooth coming up behind it. This is much larger than the other replica. This is thought to be a replica of a whole, unworn tooth, which is something you would not normally see.

You can compare the weight of this large tooth with the smaller, real piece of tooth. They weigh about the same. If this were a real tooth it would weigh 8 to 12 pounds. Teeth are the hardest organic material, harder than bone.

## BIOFACT: ASIAN ELEPHANT PIECE OF TUSK (REAL)

This is merely a piece of a tusk, a whole tusk in an Asian Elephant averages 7.5 feet in length. Only male Asian elephants (or bulls) grow tusks and not all males have them. Female Asian elephants grow tushes (greatly reduced tusks). Both male and female African elephants grow tusks.

Tusks are modified teeth, primarily composed of dentine. The tip of the elephant's tusk is solid, becoming hollow towards the mouth, where nerves connect it to the brain.

Elephants use their tusks as multipurpose instruments. They use their tusks for digging up grasses, salt, and water, for clearing debris, ripping off tree bark, and as weapons. They often prefer one tusk over the other (like humans are right or left-handed).

The elephants that you see here are female Asian elephants, so they don't have tusks; instead they have tushes. A tush is a very small version of a tusk. Tushes sit in gaps in the upper lip and can only be seen when the mouth is open and even then are barely visible.

Elephants have been relentlessly hunted for their tusks, even though the tusks are made of dentine–the same as our teeth. 2011 saw the highest levels of poaching and illegal ivory trade in at least 16 years. Poverty and corruption, as well as increasing demand from Asia are the principle drivers of poaching and the illegal ivory trade.

## EXAMPLE CONVERSATION:

"Do you know what this is? It's a piece of elephant ivory! Ivory is actually just a big tooth that grows continuously over an elephant's lifetime. As I'm sure you're aware, elephants are sometimes poached for their ivory. But did you know that there is something called "vegetable ivory" that looks just like the real thing? Tagua nuts come from a tree that grows in the rainforest. Purchasing products made from renewable sources can help to protect endangered species, like elephants, and create income for native people."

## BIOFACT: ELEPHANT FOOT MODEL (REPLICA)

This model shows a cross-section of an elephant's foot. They actually stand on their toes! The large cushion under the heel is a thick pad that scientists believe has two main functions. One, they think it cushions the weight of the animals, putting less strain on their foot bones and it more evenly distributes the weight. Two, scientists believe this is one of the ways elephants pick up those low frequency sound waves that travel at least a mile through the ground when elephants communicate over long distances.

## BIOFACT: ASIAN ELEPHANT FOOT SHAVING (REAL)

The pads of elephant's feet are like a thick calloused area. This padded area helps them in the wild because they must walk many, many miles on a daily basis searching for food and water. In the wild, they wear these pads down, in human care they get nice soft sand to stand on and do not have to walk for miles for their food, so they do not wear down these calluses. The keepers keep their feet in good shape by shaving and rounding off these calloused areas regularly to keep their feet free from infection.

### DO ELEPHANTS SWIM?

Elephants bath to cool and clean themselves; they can also swim. They have been known to swim in the sea, holding their trunk above the water much like a periscope, and diving/surfacing like a very slow dolphin.

### DO ELEPHANTS MAKE SOUNDS?

Elephants make many different sounds; humans cannot hear some of these sounds, as their frequency is too low for our ears. Elephants use these sounds to communicate with each other over long distances. Have you ever had your stomach growl at an unfortunate moment? Well, stomach growls are a welcome sound in elephant society; a stomach that makes loud rumbling and growling noises seems to signal to others that everything is "okay." The low, resounding calls elephants make can be heard by another elephant up to 5 miles (8 kilometers) away.

### CAN ELEPHANTS LIE DOWN? HOW DO THEY SLEEP?

Elephants don't sleep much, only about 4 hours a day, and they will generally do this while standing on all four legs. Elephants can physically lie down, but usually only for short periods of time. If an

elephant were to stay in a prone position for too long, it could actually crush its internal organs. For the elephants here at PDZA, Suki is usually the only elephant that you will see lying down in the yard because she is the matriarch.

## WHY IS HANAKO SWAYING?

Hanako has been described as being "high-strung" since her birth at the Oregon Zoo in 1963 (then known as the Washington Park Zoo). Part of being so high-strung is her tendency to fidget, much like people who tap their feet or twirl their hair. For Hanako, a lot of this fidgeting is translated into swaying.

## HOW MUCH SPACE DO ELEPHANTS NEED?

Elephants in the wild must roam long distances to forage enough scarce food to sustain their massive bodies. When food is plentiful, they tend to stay put.

## HOW ARE THE ELEPHANTS TRAINED?

At PDZA we work with our elephants through a restricted contact method. This method has been pioneered by PDZA staff and has become a national model for working with elephants. Restricted contact is a gentle method of working with large animals that uses barriers between keepers and animals. The barriers keep humans and elephants safe. When working with the elephants, the keepers ask for certain behaviors and the elephants are rewarded for cooperating in their own care through positive reinforcement (see discussion of positive reinforcement and operant conditioning under Rocky Shores for more information). If the elephant doesn't cooperate or makes a mistake, the keeper simply doesn't reward them. Punishment is never used and an animal's primary diet is never withheld. We can't and don't make animals do anything they don't want to do.

## WHAT'S THE DIFFERENCE BETWEEN AN ELEPHANT'S LIFESPAN AND LIFE EXPECTANCY? WHAT IS THE AVERAGE FOR ELEPHANTS IN HUMAN CARE AND IN THE WILD?

Maximum lifespan is the longest any individual has lived. Only one elephant has lived to be 70, and it is nothing more than an interesting factoid, like one human lived to be 120 years old. Life expectancy is how long the typical individual will live. Half the individuals will live less, and half will live longer. In general, we say that elephants live 50-60 years. Elephants in AZA accredited zoos live at least as long as elephants in the wild, according to a recent study published in the journal Zoo Biology by Dr. Robert J. Wiese and Kevin Willis. The study shows that the average life spans of female Asian and African elephants in professionally managed zoos are comparable with those of free ranging elephant populations for which data are available. Elephants in the wild face more challenges that their zoo counterparts, including parasites, predators, habitat destruction, starvation, drought, and disease.

Do you know how long you will live? You can take a guess, but there will be many factors, including heredity, lifestyle, and just plain luck!

## WHAT ARE THE GREATEST THREATS TO ELEPHANTS?

The greatest threats to elephants in the wild are habitat destruction, the continued illegal trade in ivory and the increase/encroachment of human populations. Elephant conservation is extremely complex and must take into account both human and animal needs. Negative elephant/human

interactions include crop loss, human fatalities, and damage to houses and other constructions. Positive interactions include ecotourism, especially when the local community benefits from the tourist revenues. Seeing elephant in their natural environment may create inspirational experiences that foster positive attitudes towards elephants. Creative solutions to human/elephant conflicts must involve the local people and benefit them as well as elephants.

## HOW CAN WE HELP ELEPHANTS?

- Learning as much as possible about elephants and sharing this information with friends.
- Choosing not to buy ivory, or other products that harm elephants.
- Purchase products that use only sustainable palm oil and encouraging companies to join the RSPO (Roundtable on Sustainable Palm Oil).
- Contributing to wildlife organizations that study elephants and protect their habitat.
- Writing letters that influence decision-makers about elephant conservation issues.
- Buying lumber from sustainable sources to protect Asian forest habitats.

## WHAT'S THE DIFFERENCE BETWEEN AN AZA ZOO AND A PRIVATE SANCTUARY?

Private elephant sanctuaries are not AZA accredited zoos and are not held to the same rigorous standards of care and education. These private sanctuaries are not open to the public, and therefore the elephants there are not able to serve as ambassadors for their species. Another disadvantage to the private sanctuaries is their lack of full-time veterinary staff. We are not opposed to these private sanctuaries, and in fact, we consider PDZA to be an important sanctuary for animals.

## DOES THE AMERICAN PUBLIC SUPPORT HAVING ELEPHANTS IN ZOOS?

According to a Harris Poll survey (an independent organization) in May 2005, 95% of US adults agree that visiting accredited zoos and seeing elephants helps people appreciate them more and encourages people to learn more about them. Another finding shows that 86% of respondents agree that visiting zoos and aquariums encourages people to donate money or time to animal conservation efforts.

# ASIAN ELEPHANTS VS. AFRICAN ELEPHANTS - ACTIVITY

## GOALS:

- To encourage visitors to use their observation skills and gain an appreciation for our elephants.
- To help visitors gain an understanding of how our elephants are suited for living in SE Asian forests as opposed to the savannahs of Africa.

## AUDIENCE:

This activity is designed for just about anyone! It is great for groups. It gives them a chance to use their collective knowledge and observation skills and work toward a common goal.

## MATERIALS:

- Magnetic white board & easel
- Rolling black cart
- Pouch with answer key and magnetic, laminated images
- Models of Asian and African elephants

## PROCEDURE:

- Set up materials so that visitors can see what activity you have. Title at the top, skinny black magnet as the divider between the two sides.
- Set magnetic image cards on the black cart, unordered
- As visitors approach your station, ask them if they know some of the differences between African and Asian elephants.
- Have visitors stick the images on the side of the white board under which type of elephant they think that characteristic matches.
- Once they are done, check their answers and give them a stamp if you wish.
- Continue to talk about elephants and let them discover how our elephants are suited for living in forests, not savannahs. You could have some elephant biofacts that you can show at this point.

## BACKGROUND INFO:

Elephants are large and gray and have big ears and long trunks, right? If all elephants seem the same to you, take a closer look. There are two elephant species that are usually recognized: the African elephant and the Asian elephant. There is some ongoing debate about how many subspecies may exist, or whether some of these might, in fact, be species in their own right. Here are a few ways to tell them apart:

**African elephants** have large ears that are shaped like the continent of Africa, both males and females have visible tusks, their skin is very wrinkly, their back is swayed, and the end of their trunk works as if they have two fingers there to help them pick things up. African elephants are the largest mammals on land.

**Asian elephants** have smaller ears, usually only the males have visible tusks, their skin is not as wrinkly as African elephants', they only have one "finger" at the ends of their trunk, and their back is dome-shaped.

| | **African Elephants**<br><br>Subspecies *Loxodonta africana* - savanna elephant, (and to some degree, 58%) Subspecies *Loxodonta cyclotis* - forest elephant | **Asian Elephants**<br>*Elephas maximus* |
|---|---|---|
| **Ears** | Larger than Asian and shaped somewhat like Africa. Living in hotter climates, their larger ears provide more skin/blood vesel exposure for cooling/thermoregulation | Smaller than African. Live in somewhat cooler climates and are more tolerant of cold. |
| **Trunk** | Has two "fingers" at end of trunk | Has one "finger" at end of trunk |
| **Head Bump** | Single dome | Dented forehead has two lumps on top |
| **Back** | Back is concave or saddle-shaped, dips like a valley (think: Rift Valley) | Sometimes flat; sometimes convex, it arcs upwards like a mountain range (think: Himalayan Mts.) |
| **Range** | Once found throughout sub-Saharan Africa, now broken into many patches over about 1/3 of Africa and mostly on reserves. | India through SE Asia to southern China, mostly in large forest reserves near water. Formerly from Iraq south of Himalayas to southern China. |
| **Habitat** | Forest elephants are found in dense equatorial rainforests of Central Africa. The savanna, or bush elephant is found more widespread in drier semi-deciduous forest and savanna. | Found in a variety of tropical forests from moist evergreen lowland to dry semi-deciduous teak forests to cooler mountain forests up to 10,000 ft. |
| **Tusks** | Males and females both have tusks of equal length. | Males have somewhat smaller tusks than Africans; females have much smaller, often not visible tushes |
| **Toenails** | Foreleg: generally 4 Hind leg: generally 3 | Foreleg: 5 Hind leg: 4 |
| **Skin** | More wrinkled | Smoother, occasional light patches |
| **Belly** | Slopes downward to hind legs | Almost straight or sagging in the middle |

# TIGER SUBSPECIES POPULATIONS - ACTIVITY

## GOALS

To give a clear understanding of the few remaining tigers left in the wild and those tigers that have gone extinct in recent decades. Also, which tigers are being closely managed in zoos both in the United States through SSP's or by zoos and preserves in their respective native countries.

## MATERIALS

Individual labeled bottles (9) containing colored beads attached to an educational card.

Educational laminated cards (9) each containing data briefly explaining about each particular tiger sub-species and its historical-to-current population.

## ACTIVITY

This activity is meant to be visual and to give awareness and spark discussion of the plight we are facing managing tiger populations both in the wild and in zoos or preserves. With declining numbers of tigers in the world, protecting those in the wild and in zoos is extremely important.

## ACTIONS TO TAKE:

- Support AZA Accredited Zoos and Species Survival Plans that protect the genetic diversity of populations.
- Donate to the Tiger Conservation Campaign to fund anti-poaching efforts.
- Contact companies and encourage them on a journey to using only responsible palm oil in their products.

## BACKGROUND INFORMATION

A healthy wild population of Sumatran tigers would be more than 1,000. The island of Sumatra used to sustain this size of a population before human encroachment.

There are about 250 Sumatran tigers in zoos in the world, approximately 70 of those live in zoos in North America.

There are many sites out there that claim different numbers of wild Sumatran tigers. The fact is, we really don't know for sure how many there are. We can only make educated guesses based on real research. Our number for tigers in the wild comes from IUCN and is based on the most recent research done in each area the Sumatran tiger is known to inhabit. Our number for tigers in zoos comes from the International Tiger Studbook, maintained at the Leipzig Zoo in Germany.

NOTE: There is very little historical data on population sizes of the various tiger subspecies. Best estimates are listed.

| Tiger Subspecies | Wild Population | Length | Weight | Status | Comments |
|---|---|---|---|---|---|
| **Amur (Siberian) Tiger** *Panthera tigris altaica* | Less than 500 | 8.5-11 ft | 300-600 lbs | EN | The coat is lighter in color than other tigers and it has large paws which act like snow shoes. |
| **Bengal Tiger** *Panthera tigris tigris* | 2,370 | 9-10 ft | 300-500 lbs | EN | |
| **Malayan Tiger** *Panthera tigris jacksoni* | Less than 500 | 7.5-9.5 ft | 220-300 lbs | EN | Recognized as a subspecies in 2004. |
| **IndoChinese Tiger** *Panthera tigris corbetti* | Less than 350 | 8-9.5 ft | 220-430 lbs | EN | |
| **South China/Amoy Tiger** *Panthera tigris amoyensis* | 100 in human care | 7-9 ft | 200-400 lbs | CR | "Functionally" extinct in the wild (EW) |
| **Sumatran Tiger** *Panthera tigris sumatrae* | 250-300 | 7-8 ft | 200-300 lbs | CR | The smallest of the tiger subspecies and has the darkest coat. |
| **Javan Tiger** *Panthera tigris sondaica* | 0 | 7-8 ft | 200-300 lbs | EX | Extinct since 1980's |
| **Caspian Tiger** *Panthera tigris virgata* | 0 | 8-10 ft | 300-500 lbs | EX | Extinct since 1970's |
| **Bali Tiger** *Panthera tigris balica* | 0 | 6.5-7.5 ft | 200 lbs | EX | Extinct since 1940's |

# SUMATRAN TIGER – FACT SHEET

**Common Name:** Sumatran Tiger

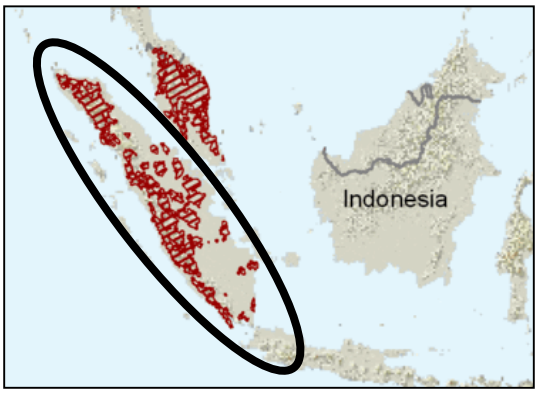
**Scientific Name:** *Panthera tigris sumatrae*

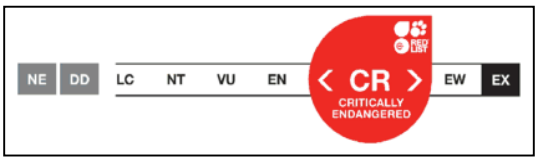
**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Carnivora |
| Family: | Felidae |

**Description:** **Length:** Males average 8 feet from head to tail, females average 7 feet

**Weight:** Males average 275-300 pounds, females 190-215 pounds




**General:** The Sumatran tiger has the darkest coat of all tigers. Its broad, black stripes are closely spaced and often doubled. Tigers are the largest member of the cat family. There are five remaining subspecies of tiger. They are as follows: Amur tiger, Bengal tiger, Indochinese tiger, Malayan tiger and Sumatran tiger. The Sumatran tiger is the smallest tiger subspecies.

**Range:** The Sumatran tiger is found only on the Indonesian island of Sumatra

**Habitat:** Lowland forest to submontain and montain forest with some peat-moss forest

**Status:** IUCN status Critically Endangered. CITES Appendix I. The wild Sumatran tiger population is estimated at 250 to 300. There are about 75 Sumatran tigers that live in zoos in North America, and a total of about 375 in zoos around the world. Major threats are loss of habitat and poaching.

**Diet**: The Sumatran tiger prey on wild pig, big deer called Rusa, and small deer such as Muntjak or Barking deer. Plus, just about anything they can catch, including fish.

**Predator:** When young, tigers can fall prey to other tigers, leopards and snakes. As adults, tigers do not have much to fear except humans.

**Reproduction:** Females can reach sexual maturity by 3 years of age; males can take a bit longer. Breeding will last up to 5 days with the male leaving after the female is no longer in estrus. Gestation lasts 102-112 days. Litter size ranges from 1-6, average litter size is 2 to 4 cubs. Cubs weigh a little over 2 pounds at birth. Cubs nurse for 6-10 weeks. By 18 months of age the cubs should be making kills without mothers help. This is the time when juvenile tigers will usually head out on their own.

**Life Span:** 10-15 years in the wild; around 18-20 years in zoos

**Behavior:** Tigers are generally solitary animals. Both male and female tigers map out their own territory by spraying urine on trees, bushes and the ground. Basically they are leaving their "calling cards" for other tigers to find. The specific range size of the Sumatran tiger is not known, however the population density is approximately 4-5 adult tigers per 40 square miles in optimal lowland rainforest. Tigers are very inactive most of the time. They can sleep from 18-20 hours a day. Tigers are also a cat that enjoys the water and will take to the water for cooling down in the hot jungle.

## PDZA SUMATRAN TIGERS:

**Jaya** (female)

- Born at Woodland Park Zoo on December 16, 2002.
- Arrived at PDZA in May 2004.
- Mother of PDZA's first tiger cubs (Bima & Mali).
- No stripes on her front legs.

**Dumai** (male)

- Born at PDZA August 22, 2012
- Offspring of Jaya and Malosi

**Kali** (female)

- Born at PDZA April 17, 2013
- Offspring of Jaya and Malosi

**Dari** (female)

- Born at PDZA October 8, 2014
- Offspring of Jaya and Malosi

**Indah** (female)

- Born at PDZA October 8, 2014
- Offspring of Jaya and Malosi

**Kirana** (female)

- Born at PDZA October 8, 2014
- Offspring of Jaya and Malosi

# TIGER INTERPRETATION

## BIOFACT: TIGER SKULL (REPLICA)

This replica is technically a skull of the Siberian subspecies. It is essentially the same as a Sumatran tiger skull, just larger. People will ask you what that is in the nasal cavity. You can actually see the nasal conchae (the branching/curling of fragile bone inside the nose that would be covered in tissue; it is responsible for animal's ability to smell). Cats have a much better sense of smell than we do, our conchae is very short/small.

Notice the shape of the teeth (triangular), with a large base and small point, typical of carnivores. The long, sharp canine teeth help tigers to seize and kill their prey. The incisors between the canines are used to help the cat grip onto its prey, and then to pull open the tough hide of the animal. The shear-like "carnassials" on the sides where our molars would be act like built-in scissors to cut off pieces of meat. These pieces are then swallowed whole. (Cats can only use one set of carnassials on one side of their jaw at a time, which is why they are often seen feeding with their head tilted to the side). Carnassials can also crush bone. The gap between the canines and the carnassials allows the cat to sink its canine teeth fully in without being blocked by neighboring teeth.

Cats are excellent examples of predators that use forward facing eyes when hunting their prey. (Animals with eyes that are located on the side of its head would suggest a prey animal.) The large spaces in the skull for the eyes give away the fact that cats have excellent vision, particularly night vision.

You can also see the small holes between the teeth and the eye sockets. This is where a nerve attaches to each whisker. Whiskers are excellent sensory tools to help cats, as well as other nocturnal animals, navigate and hunt in the dark. When hunting, the whiskers and the eyes function together to help the cat locate the best location to bite their prey.

## BIOFACT: TIGER BALL – CHEW TOY (REAL)

This is a "boomer" ball, a common toy for our large animals. This was one of the first balls our tigers ever played with. This tough plastic ball used to be completely smooth. They only had this ball for a couple of hours before demolishing it. Most of the marks were made with their sharp teeth, not their claws, although they used their claws to hold on to it while they chewed it up.

This ball represents what we do to enrich the lives of our animals. This ball is "played" with in a way that allows the tigers to replicate natural behaviors. Tigers are sneak attackers, once they get close to their prey, they pounce. Many prey animals flee to water for safety, and since most large cats do not willingly go into water, prey animals are fairly safe. But tigers have filled a niche by hunting in water. They use their powerful jaws and claws to hold prey underwater, drowning the animal and then dragging it onto the shore to eat it. You can see this natural behavior exhibited in our animals when they receive enrichment toys like this one.

## BIOFACT: TIGER TOOTH (REPLICA)

This is a replica of a canine tooth, not as sharp as the real thing of course. You can see how about half of this tooth would be on the surface, used for hunting; and the other half of the tooth would be below the gums. This sturdy, well-rooted tooth helps support the massive force this animal can inflict with a bite.

## BIOFACT: SABER-TOOTHED CAT CANINE TOOTH (REPLICA)

This canine tooth has a massive root to support the force this animal had in its bite. Though it is a model, it is painted to look like a fossil. This dark coloration is different from all the other biofacts because it's the only fossil. Saber means *curved blade*. The tiger is believed to be a descendant of the Saber-Toothed Cat (previously known as a Saber-Tooth Tiger). The clouded leopard is nicknamed the "modern day saber-toothed cat" because it has the longest canines in proportion to its size of any species of cat.

## BIOFACT: LION CLAW (REPLICA)

Though it is cast from a lion claw, it is very similar to a tiger claw. These claws retract, just like domestic cats. The curvature of the claw helps the animal hunt, snag, and pull food toward the mouth.

## BIOFACT: TIGER WHISKERS (REAL)

Since these animals are nocturnal, they have special adaptations for like in the dark. These big hairs act like little fingers on the tiger's face. They help the animal feel its way around. This is particularly helpful when their pupils are fully dilated, making it difficult to focus in on close objects. They also help a tiger hunt their prey (see further information in the tiger skull section).

### DIET & HUNTING:

- Tigers are built to kill large prey. Their hind limbs are longer than their forelimbs, enabling the tiger to jump long distances. Tigers have heavily muscled forelimbs and shoulders, and paws equipped with long, retractable claws, which enable them to grab prey and drag it to the ground. A killing bite is delivered with powerful jaws and long canines.
- Tigers are the largest land-living mammals whose diet consists entirely of meat. The tiger's closest relative is the lion. Without the fur, it is difficult to distinguish a tiger from a lion but the tiger is the only cat with striped fur.
- Tigers require large areas with forest cover, water, and suitable prey such as deer and swine.
- Tigers depend less on smell and more on keen eyesight and acute hearing to ambush and capture prey, primarily between dusk and dawn, making them crepuscular.
- Unlike lions that hunt in prides in open country, the solitary tiger prefers to hunt in the cover of dense foliage. Tigers can travel from 6-20 miles in a night in search of prey.

- A wild tiger eats 30-40 pounds of meat in an average night, and must kill about once per week. Catching a meal is not easy; a tiger is successful only once in 10-20 hunts. They can eat up to 80lbs in one sitting.
- Zoo Diet: Every day they get a raw meat diet formulated for carnivores called Nebraska and/or chunk meat. They are fasted one day a week, getting just bones on that day, which are good for their teeth.

## TERRITORY:

- An adult tiger defends a large area from all other tigers of the same sex. The primary resource of this territory is food. A female's territory must contain enough prey to support herself and her cubs. A male's territory, additionally, must offer access to females with which to mate; it overlaps with that of one to seven females. Male territories are always larger than those of females. But territory size varies enormously and is directly related to the abundance of prey in a given habitat. Once a territory is established, it will remain with that tiger until its death.
- Tigers can communicate with one another by rubbing heads, roaring, purring and grunting. Scent marks and visual signposts, such as scratch marks, allow tigers to track other tigers in the area, and even identify individuals. A female tiger knows the females whose territories abut hers; in many cases, a neighbor may be her daughter. Females know their overlapping males (and vice versa) and probably know when a new male takes over. All tigers can identify passing strangers.

## OTHER INFO:

- Only half of all cubs survive to independence from their mother. Only 40 percent of these survivors live to establish a territory and begin to produce young. The risk of mortality continues to be high even for territorial adults, especially males, who must defend their territories from other males.
- Like a human fingerprint, no two tigers have the same pattern of stripes on their coats.
- Tigers are excellent swimmers and can easily cross rivers and lakes five miles (8 km) wide.

## EXAMPLE CONVERSATION:

"Did you know you could help tigers by eating candy? Many different candy bars, and other foods, contain palm oil. Palm oil is becoming so widely used that forests in Sumatra are being cut down to make room for palm oil plantations, which decreases the Sumatran tiger's already limited habitat. But you can help tigers every time you go to the grocery store! By purchasing products that are palm-oil free or come from sustainable-yield plantations, you can help protect vital tiger habitat!"

The Sumatran tiger, one of six remaining tiger subspecies, is considered to be critically endangered. Their numbers and habitat have dwindled 95% over the past 100yrs. Currently, it is estimated that there are between 200-400 wild Sumatran tigers, which primarily exist in 5 national parks on an island roughly the size of California. Worldwide, there are about 200 Sumatran tigers in zoos and about 73 of those are in North America.

# TIGER CONSERVATION

### TIGER NUMBERS HAVE DECREASED DUE TO NUMEROUS REASONS:

1. Increase in human population which has in turn caused loss of habitat (over the last 50 yrs, Sumatra's human population has quadrupled from 15 million to 60 million).
2. Fragmentation of habitat makes it difficult for wild tigers to find one another, therefore leading to inbreeding.
3. Besides loss of habitat, a more immediate problem is lack of sufficient food supply, which tigers prey on (ex: wild pigs, small deer aka muntjak, large deer aka rusa). People also desire venison & pork, so the tiger must compete for food (Refer to Bushmeat Crisis info).
4. Demand for tiger parts, mostly bone, in traditional Asian medicine has intensified poaching activities.

Globally, the International Union for the Conservation of Nature (IUCN) oversees many of the conservation efforts that help to ensure the Sumatran tigers' future. Proper management of land, protection of prey, anti-poaching measures, continued field research and monitoring will all assist in Sumatran tiger preservation. With successful tiger conservation, an "umbrella effect" occurs in which numerous other declining species that share the same habitat such as Asian elephants, Sumatran rhinos, and other flora and fauna, are protected also.

In addition to these measures, natural and assisted reproductive techniques (i.e. artificial insemination and in vitro fertilization) have been established by the IUCN. Worldwide, breeding programs are managed to preserve genetic diversity to reinforce both captive and wild populations. The North American Species Survival Plan (SSP) has assisted in the development of training in veterinary medicine, husbandry, reproduction and data management in Indonesia, China and Thailand.

### EDUCATION IS A KEY COMPONENT OF TIGER CONSERVATION PROGRAMS!

TO LEARN MORE ABOUT SUMATRAN TIGER CONSERVATION, VISIT THESE WEBSITES:

www.wwf.org www.aza.org www.5tigers.org

# CLOUDED LEOPARD – FACT SHEET

**Common Name:** Clouded Leopard

**Scientific Name:** *Neofelis nebulosa*

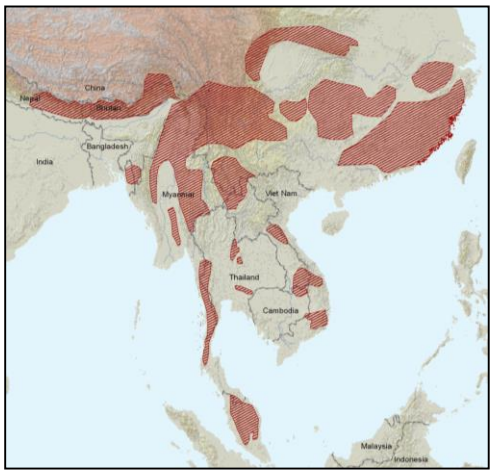
**Classification:**

**Phylum:** Chordata
**Class**: Mammalia
**Order:** Carnivora
**Family**: Felidae

**Description:**

**Length:** 6 feet long (body 3 feet; tail 3 feet), females are somewhat smaller

**Weight:** 25-35 lbs, males can be up to 50lbs




**General**: The clouded leopard has a long, narrow body, a long tail, relatively short legs and large broad paws. It is the most strikingly marked of all cats. Its side pattern consists of some large, narrow, brown blotches, edged in black and pale areas separating the blotches. On their backs, clouded leopards have a series of large open-centered spots and their undersides are pale with few spots. They have long canines for stabbing prey and have been compared to the extinct saber-tooth cats in this regard. The snout is rather broad, the head quite narrow and the pupils yellow.

**Range:** Inhabits Nepal, the Indian state of Sikkim, southern China and south through Thailand, Vietnam, Cambodia, Laos, Myanmar, and peninsular Malaysia. A closely related species, the Sunda clouded leopard (*Neofelis diardi*) inhabits Sumatra as well as Brunei and the Indonesian and Malaysian states on Borneo.

**HABITAT:** Clouded leopards prefer the deep forest away from human settlement.

**STATUS:** IUCN status Vulnerable. CITES Appendix I. US Fish & Wildlife status Endangered. Major threats are habitat destruction through logging, the production of palm oil, and advancing human population pressure; hunting for its pelt; and hunting as a predator on livestock.

**DIET:** The chief prey of the clouded leopard is monkeys, small deer, and wild pigs, which it stalks on the ground and may ambush from the trees. It may also take birds, rodents or domestic poultry.

**BEHAVIOR:** Largely arboreal, clouded leopards excellent tree climbers; they use their long heavy tails for balance. While research indicates they may be active at any time of day or night, they are thought to be most active at night or during dawn and dusk. They are very secretive animals and are rarely seen. Nothing is known of the social organization of the clouded leopard.

**LIFE SPAN:** Unknown in the wild; the clouded leopard has lived 17 years in zoos.

**REPRODUCTION:** Solitary except during breeding period. The gestation period is 80 days; the litter consists of 2-4 cubs. Eyes are open after 10-12 days, and cubs are active after 5 weeks.

## PDZA CLOUDED LEOPARDS:

**Nah Fun** (male)

- Born at the Khao Kheow Open Zoo in Thailand on July 16, 2009.
- Came to PDZA in March 2010.
- Paired with Chai Li.
- Larger, with more spots on his face.
- Father of Taji & Sumalee in 2011, Chan sung & Suksn in 2012, Tien in 2013, and Teak/Banyan/Orchid/Kapok in 2015

**Chai Li** (female)

- Born at the Khao Kheow Open Zoo in Thailand on July 12, 2009.
- Came to PDZA in March 2010.
- Paired with Nah Fun
- Smaller, lighter in color.
- Mother of Taji & Sumalee in 2011, Chan sung & Suksn in 2012, Tien in 2013, and Teak/Banyan/Orchid/Kapok in 2015

**Chee Wit** (male)

- Born at the National Zoo on February 14, 2010.
- Came to PDZA in July of 2010.
- Paired with Jao Ying

**Jao Ying** (female)

- Born at the Khao Kheow Open Zoo in Thailand on May 30, 2007.
- Came to PDZA in March 2010.
- Paired with Chee Wit

**Josie** (female)

- Born at the Cleveland Zoo on July 11, 1998.
- Came to PDZA in November 1998.
- Lives behind the scenes at Wild Wonders Outdoor Theater.
- Previously paired with Raja, gave birth to Kwan Jai (female) & Rama (male) on April 3, 2003.

**Tien** (male)

- Born at PDZA May 1, 2013
- Offspring of Chai Li and Nah Fun.
- Paired with Sang Dao

**Sang Dao** (female)

- Born March 27, 2013 at Tanganyika Wildlife Park near Wichita, Kansas
- Arrived at PDZA September 2013
- Paired with Tien

**Orchid** (female)

- Born May 12, 2015 at Point Defiance Zoo & Aquarium
- Offspring of Chai Li and Nah Fun in the same litter as Banyan
- Lives behind the scenes at Wild Wonders Outdoor Theater

**Banyan** (male)

- Born May 12, 2015 at Point Defiance Zoo & Aquarium
- Offspring of Chai Li and Nah Fun in the same litter as Orchid
- Lives behind the scenes at Wild Wonders Outdoor Theater

# CLOUDED LEOPARD INTERPRETATION

## BIOFACT: CLOUDED LEOPARD SKULL (REPLICA)

Clouded leopards have the longest upper canine teeth for its skull size of any modern carnivore. This has caused some people to compare the cat with the extinct saber-toothed cat. There are similarities in the skulls of clouded leopards and primitive saber-tooth cats, which suggests a common ancestor. Clouded leopards can also open their mouths much wider than other cats. These adaptations are important for hunting and catching prey.

## BIOFACT: DOMESTIC CAT SKULL (REAL)

You can actually see the nasal conchae (the branching/curling of fragile bone inside the nose that would be covered in tissue; it is responsible for animal's ability to smell). Cats have a much better sense of smell than we do, our conchae is very short/small. This skull looks almost exactly like the cougar skull, but smaller.

## BIOFACT: CLOUDED LEOPARD PELT (REAL)

Clouded leopards are a medium-sized cat named for the cloud-like spots on its coat. These provide camouflage in the dappled light of its forest habitat. Because of their shy nature, nocturnal tendencies and excellent camouflage, clouded leopards are rarely seen by people. The unique fur pattern has led to poaching as is the case of this pelt that was taken from a garment.

### CLOUDED LEOPARD CLASSIFICATION

- While all species of cats are closely related and classified as one family, the Felidae, genetic research has shown the clouded leopard to be more closely related to the large cat species than smaller cats. Thus, clouded leopards are considered a member of the Pantherinae - a subfamily of the Felidae family that also includes lions, tigers, jaguars, leopards, and snow leopards. While they are known as clouded leopards, cloudies are not directly related to normal leopards.
- Until 2006, there was thought to be a single clouded leopard species. However, recent genetic and morphological research has shown that there are two distinct species. The cats on mainland Asia and Taiwan kept the traditional species name (*Neofelis nebulosa*) while the cats from Borneo and Sumatra took the name the Sunda clouded leopard (*Neofelis diardi*). Furthermore, this also changed the number of subspecies. All *nebulosa* subspecies have been combined into one group, while the *diardi* populations seem to be split into two subspecies: *N. diardi borneensis* on the island of Borneo and *N. diardi diardi* on Sumatra.

## REPRODUCTION

Clouded leopards usually give birth to a litter of 2-4 cubs after a gestation period of just under 3 months; each kitten weighs less than half a pound! Kittens are born with solid spots that will lighten with age and can climb trees as early as six weeks old. Young clouded leopards will stay with their mothers for about 10 months.

## EXCELLENT CLIMBERS

These cats are expert climbers and spend the majority of their time in trees. Their sharp claws, short legs and flexible joints allow them climb headfirst down trees and hang upside down from branches. A clouded leopard's long tail is important for balance. It can be the same length as its body - up to 3 feet!

## SIGNIFICANT THREATS

- Clouded leopards face many significant threats in their Southeast Asian homeland. Their forest habitat is experiencing rampant degradation due to industrial logging and the development of agricultural areas, including vast palm oil plantations in Malaysia and Indonesia. These degraded areas cannot support prey species nor provide habitat for clouded leopards.
- In addition to habitat disturbance, the clouded leopard and its prey are targeted by both commercial and subsistence hunters. Because larger wild cat species such as tigers and leopards have mostly been hunted out of their range, clouded leopards are increasingly becoming the targets of commercial poachers seeking their skins, bones, and meat. In one Myanmar market monitored by the conservation group Wildlife Alliance, the number of clouded leopard pelts has increased by 200% in just two years. Many of these products end up being purchased by consumers seeking traditional medicines and exotic fashions in the booming economy of China. Live clouded leopards are also sought by wildlife traders, destined to become pets or join the exotic zoos of wealthy collectors.
- Wild clouded leopard numbers are thought to be in decline, however scientists have no accurate estimate of true population numbers since they are so difficult to study and research efforts have so far been fairly limited. Further study is crucial for determining the extent of their populations. The new classification schema of the Sunda clouded leopard as a separate species has resulted in greater research efforts, especially in Borneo and Sumatra. These islands face some of the highest deforestation rates in the world, making field research and conservation efforts all the more valuable and timely.
- To ensure the long-term survival of clouded leopards it is essential that there are enough protected areas in which they and their prey can live. Equally important is the development and enforcement of strict wildlife protection laws to eliminate poaching of clouded leopards and their prey.

**LEARN MORE ABOUT CLOUDED LEOPARDS FROM THE CLOUDED LEOPARD PROJECT AT CLOUDEDLEOPARD.ORG**

# CAT FUR MATCHING - ACTIVITY

## GOALS:

- To encourage visitors to use their observation skills.
- To help visitors gain a better understanding and appreciation of the variety of cat species that exist.

## AUDIENCE:

This activity is designed for just about anyone. It is good for those who have some time to spend looking at the activity.

## MATERIALS:

- Laminated title for activity, "Match the cat to the fur"
- Laminated cat fur images and corresponding names
- Magnetic white board
- Easel
- Either a table or the black cart

## PROCEDURE:

- You can line up either the fur or the names on one side of the white, magnetic board, or across in rows. Put the other set of cards to match laying down on the black cart top.
- As families approach you at the station, ask them if they would like to earn an animal trading card or simply ask them if they'd like to try guessing what kind of cat each fur belongs to.
- Give them a chance to get them all matched. If needed, help them notice subtle differences in the images. Most guests (especially children) will need help. Walk guests through the different cats using leading questions.
    - Example: (for the snow leopard) The base color of a cat's fur usually matches their habitat. What color is this fur? That's right, it's white! So do you think this animal lives in the jungle? Or does it live in the snow? Great job- this cat does live in the snow. So let's take a look at the names of these cats and see which one we think lives in the snow… Lion? Jaguar? How about a snow leopard? You're right!
    - Example: In the rainforest/jungle, there are large trees that block a lot of the sunlight. Light usually shines down in patches. Cats that live in the jungle often have spots to help them blend in with this dappled light.
- Once they are done you can check their answers by flipping over the fur images to reveal the correct name.
- Give them praise once the activity is complete!

## CAT FUR HAS TWO MAIN PURPOSES:

1. To protect against the environment - In general, cats in colder climates have soft, long fur. Cats in warmer climates have bristly, short fur.
2. Camouflage - Many species rely on camouflage for protection and hunting
    - The base color of the fur usually matches the habitat (ex. lions in grasslands and snow leopards in snowy and rocky areas)
    - In habitats that are less uniform, the fur tends to have more pronounced markings.
    - Stripes are often found in grasslands
        - Fun Fact: Like a human fingerprint, no two tigers have the same pattern of stripes on their coats.
    - Spots are often found in woodland and forest habitats
    - Some cats (leopards, lynx, wildcat) show variation in coat pattern and varying intensities depending on the region they are in.
    - Many species have more pronounced spots when young for extra camouflage (lions)

## EXAMPLE MESSAGES:

Children - Many species of large cats are endangered; one of the main reasons is loss of habitat. You can help save tiger habitats by practicing your 3 R's: reduce, reuse and recycle. By reducing the amount of things we use, like paper, we can save resources like trees and forests. That will help protect the habitats of many animals. What are some things you can reuse or recycle?

Adults – One of the most serious threats that tigers and clouded leopards face is loss of habitat. A lot of habitat loss in Southeast Asia is due to the destruction of forests to make way for palm oil plantations. Palm oil is used in an incredible amount of products, from food to soaps, detergents and toiletry products. Indonesia and Malaysia both have prime wild cat habitat, but these two countries account for over 80% of global production of palm oil.

The great news is that you can help wild cats by making your everyday purchases. By reading the labels of your favorite products, you can find out if it contains palm oil. You can visit the Roundtable on Sustainable Palm Oil's website (www.rspo.com) to find out if the company uses sustainable palm oil, which helps to protect tiger and clouded leopard habitat. If they do, write to them and share your support and ask them to put a sustainable palm oil label on their product. If they don't, write to them and encourage them to join the RSPO. As a consumer, you have the power to tell businesses what you want. Those actions can help to save tigers and clouded leopards.

Adults - Overharvesting of tropical hardwoods, such as teak and mahogany, can lead to the loss of habitat for tigers and other inhabitants of the rainforest. Before purchasing new furniture, check for certification from the Forest Stewardship Council to help ensure the wood you purchase comes from a sustainable source. Forest Stewardship Council http://www.fscus.org/

| | | | |
|---|---|---|---|
| **Bobcat**:<br><br>Black-brown coat with spots; helps camouflage against brush, rocks, and other dense vegetation. | | **Lion**:<br><br>Tawny brown to black; blends in well with desert areas and savanna where they tend to live. | |
| **Cheetah**:<br><br>Tawny to orange color with small round black spots; blends in well with brownish background filled with small vegetation casting small shadows. | | **Lynx**:<br><br>Plain, brownish grey coat; camouflages well with "background of dense, moss-laden coniferous forests and swamps" (Encyclopedia of Mammals, p 51) | |
| **Clouded Leopard**:<br><br>Dark brown to grey, have pale rings of fur on back enclosing dark brown to grayish ring, paler, spotted center (giving a "clouded" look, hence the name); they have the spotted coats typical of forested cats. | | **Ocelot**:<br><br>Yellowish in forests, greyer in drier areas, have markings akin to stripes on front and spots on back – black outlines with brownish interior; helps them hide in forest shadows. | |
| **Cougar**:<br><br>Tawny brown to black, no spotting except as kittens; cougars live in a wide range of habitats. | | **Serval:**<br><br>Tawny to orange color with small irrelgular black spots. Blends in with tall savannah grasslands. | |
| **Jaguar**:<br><br>Orange-brown with black spots becoming rosettes on back (like spots that are hollow in the center); camouflages in dappled forest shadows. | | **Snow Leopard**:<br><br>Grey shading to white with black spots in front, white/grey blotches on back surrounded by black, long and woolly coat to protect against cold; tend to live in snowy and/or rocky areas. | |
| **Leopard**:<br><br>Brown spots surrounded by black spots (black is not continuous); camouflages in dappled forest shadows. | | **Tiger**:<br><br>Orange-brown coat with black stripes; blends in well in tall grasses and bushes, which tend to cast striped shadows. | |

# PALM OIL TALKING POINTS

One of the most serious threats that wild elephants, tigers, and clouded leopards face is loss of their tropical forest habitat. In Southeast Asia these forests are rapidly being cut down to make way for palm oil plantations.

Palm oil is a form of vegetable oil, produced from the fruit of the oil palm tree, that you likely eat or use every day. It is a common ingredient in thousands of foods, household cleaners, cosmetics, and other personal care products. Most commercial palm oil is grown in Southeast Asia, primarily in the countries of Malaysia and Indonesia where clouded leopards, elephants, and tigers live.

Palm oil is in everything from toothpaste and shampoo to cookies and crackers. It's pretty much impossible to avoid. To show how many things have palm oil, let's walk thru your day. [Ask visitors a series of questions that lead them through their day and when they get to a topic associated with a magnet, have them place the magnet where they use it in the house.]

- What do you do first thing in the morning? Brush your teeth? Wash your face? Many popular shampoo, conditioning and soap products contain palm oil. It is what makes things frothy and soft. Most brands of toothpaste also utilize palm oil. *(Colgate toothpaste, Dove soap, Suave shampoo, Lever 2000)*
- What do you have for breakfast? Oatmeal, some cereals, breakfast bars, and donuts often contain palm oil. *(Chex Mix, Tricks, Nature Valley & Fiber One snack bars, Starbucks pastries)*
- Do you have any pets? Some of the food we fed our pets can contain palm oil. *(Goodlife Pet Food, Alpo Dog Food, Beneful Pet Food, Purina)*
- Adults – do you shave/use cosmetics? Palm oil can be found in body lotions, deodorants, shaving products, and cosmetics. *(Suave, Clinique, Dove, Caress, Degree & Axe deodorants)*
- What kinds of foods do you have for lunch? Whether it's a salad, chips, or a side of fries, palm oil is on the lunch menu. *(Lunchables, sandwiches from Starbucks, Kraft Macaroni & Cheese, Slimfast, Kraft dressings)*
- How about dinner? Many sauces and rolls are made with ingredients that contain palm oil. Quick frozen meals have it too. *(Ragu spaghetti sauce, Stove Top Stuffing, Knorr Pesto Sauce Packet, Smart Balance buttery spread)*
- Good kids always do their chores, right? [Adults – an unfortunate part of life is doing daily chores] We keep our houses clean with sprays, dishwashing liquids, detergents, and other household cleaners that can contain some form of palm oil. *(Method, Spray & Wash, Woolite, AirWick, Desitin Diaper Rash Ointment, Easy-Off, Jet Dry)*
- The best time of day is dessert time, right?! Many candy bars, crackers, cookies, and ice cream are frequently made with palm oil. *(Ben & Jerry's, Breyers, Klondike, Jell-O, Cool Whip, Pillsbury, Betty Crocker, Oreos, Kit Kat, Nutella)*

But the good thing about a problem that's caused by humans is that it can be solved by humans. We can take action to save wild cats and other forest creatures by asking companies to commit to producing and using palm oil responsibly.

Some companies produce palm oil in ways that are less damaging to forests and wildlife and better support the economy and needs of local people. Known as sustainable palm oil, this product is more forest friendly and provides lasting income for farmers in Asia.

You don't have to wait until you get home to protect wild cats and elephants! You can take action today, right now! You can do that by asking companies to join the RSPO if they haven't already, and to commit to using sustainable palm oil.

These 4 companies are at varying points on their journey to using sustainable palm oil. Kraft hasn't started their journey, while Starbucks has just gotten on the path by joining the RSPO. General Mills has made a commitment to using responsible palm oil, and Unilever is even further along by committing to using only deforestation-free palm oil, but all have room for growth.

We will take all of the signatures to the companies and discuss with them ways they can continue helping wild cats and other animals. We will share with you the progress of the company you chose. Thank you for raising your paw to help wild cats!! Enjoy your day!

### EXAMPLE CONSERVATION

Asian elephants are herbivores and consume grasses; their favorite foods include bamboo, small trees, some bark, shrubs, and fruit. Suki and Hanako… [Insert facts here]… Adult Asian elephants in the wild consume about 300 pounds of food in the wild per day. Because of their tremendous need for food, Asian elephants generally travel about 20 miles a day in search of food and water, which means they require a great deal of open territory.

One of the most serious threats that wild elephants face is loss of habitat. A lot of habitat loss in Southeast Asia is due to the destruction of forests to make way for palm oil plantations. Palm oil is used in an incredible amount of products, from food to soaps, detergents and toiletry products. Indonesia and Malaysia both have prime elephant habitat, but these two countries account for over 80% of global production of palm oil.

The great news is that you can help elephants by making your everyday purchases. By reading the labels of your favorite products, you can find out if it contains palm oil. You can visit the Roundtable on Sustainable Palm Oil's website (www.rspo.com) to find out if the company uses sustainable palm oil, which helps to protect elephant habitat. If they do, write to them and share your support. If they don't, write to them and encourage them to join the RSPO. As a consumer, you have to power to tell businesses what you want. Those actions can help to save wild elephants.

# SIAMANG – FACT SHEET

**Common Name:** Siamang

**Scientific Name:** *Symphalangus syndactylus*

**Classification:**

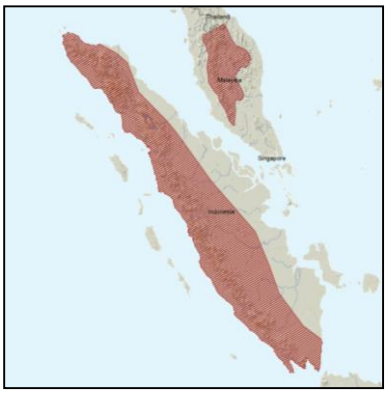
| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Primates |
| Family: | Hylobatidae |

**Description:**

Height: 29-35 inches

Weight: 17-35 pounds

**General:** Siamangs are the largest of the gibbon species, and are lesser apes. Males and females are about the same size. They have a stocky build and a broad chest. Both sexes have a long, shaggy black coat all over their body, except for some pale hairs around the mouth and chin. The crown hair lies flat and swirls laterally above the brow. Males have a longish tuft of hair in the genital region. Infants are the same color as the parents. Siamangs have a grayish or pinkish throat sac, which they inflate during vocalizations. They have longer arms and broader hands and feet than all other gibbon species. Their arms are longer than their legs, spanning up to five feet in a large adult. There is slight webbing between their second and third toes which is another characteristic that sets the siamang apart physically from the other species of gibbons.



**Range:** Sumatra and the Malay Peninsula

**Habitat:** Rain forests, monsoon forests, and tropical forests

**Status:** IUCN Status Endangered. CITES Appendix I. Major threats are habitat destruction and collection for the pet trade.

**Diet:** Equal amounts of leaves and fruit, also flowers, insects, bird eggs, and small vertebrates. They consume a larger proportion of leafy matter than most other gibbons. They often suspend by one hand while eating.

**Reproduction:** The siamang gives birth to a single offspring after a gestation period of about 7 months, and babies are usually born every 2-3 years. Infants cling to their mother's belly constantly for the first 3-4 months. Baby siamangs are born hairless, but are soon covered with soft, dark hair. They will not grow their long, adult hair until 2-3 years old. Youngsters are weaned by their second year. The father does his share of raising the baby and takes over their daily care of the youngster when it is about one year old. This is unusual for most other primates. Young siamangs stay with their families for approximately 5-7years at which time they reach maturity. Then they venture out on their own to establish their own family groups. A female rarely gives birth to more than 10 offspring in her lifetime.

**Lifespan:** 25-30 years

**Behavior:** Siamangs are monogamous and highly territorial, living in family units consisting of a mated pair and up to four offspring. Siamangs are active during the day. The life of a siamang follows a daily pattern or routine. They wake at sunrise and perform their morning "concert". Then they set out in search for food with family members remaining close together. It usually takes a siamang about 5 hours to eat its fill. After 8-10 hours of activity they return to their sleeping place. Like most primates, one of the most important social activities of a siamang is grooming. Grooming is a display of dominance; the more dominant receives more grooming than it gives. Unlike the great apes, which build sleeping nests or platforms, siamangs sleep sitting upright high in the trees, with arms folded and head between their knees. The call of a siamang exceeds that of other gibbons because of the animal's sound amplifying throat sac that expands close to the size of a human head! Vocalization strengthens the pair bond and defends the territory. Siamang calls include booms, barks and hoots. Paired males and females sing duets to one another, and each pair creates a unique song. The set calls are repeated, one after another, starting off slowly and increasing in speed.

## SIAMANG FACTS:

- Almost all vocalization occurs in the morning.
- Siamangs have relatively smaller ranges than white-cheeked gibbons, about 60 acres. They seem to travel about half as much daily, which may be because they consume a greater percentage of a more common food, leaves. They defend about 60 percent of their range as their group territory. It is harder to determine boundaries for siamang groups as their loud calls seem to create more space between groups and confrontations are very rare.
- Both sexes have long canine teeth, opposable thumbs, and a great toe that is deeply separated from the other toes.
- Like other primates, siamangs have a highly developed brain.
- When on the ground they are usually bipedal. In the trees, they move by acrobatic hand-over-hand swinging through the branches, a process called brachiating. When moving slowly, they swing much like a pendulum as they grab one branch before grabbing the next, so that the body is freely projected through the air. Flights of 25 to 32 feet (8 to 10 m) have been witnessed.
- Siamangs are notable for having more coordination and contact during daily activities.
- Adults groom on average 15 minutes per day.
- Just as in the white-cheeked gibbons the adult female is the dominant animal in the group. When sit vocalizes, it can produce two different kinds of notes using this sac: a deep “boom” (when it sings into the sac with its mouth closed) and a loud “wow” (when it sings into the sac with its mouth opened). The deep boom sound carries farther in the forests than the high-pitched wow sound (because lower sounds have less steep waves). There is also a bark-like vocalization. The set calls are repeated, one after another, starting off slowly and increasing in speed. Calls are often accompanied by behavioral acrobatics.
- Zoo Diet: Canned primate diet, monkey chow biscuits soaked in water or juice, leafy greens (about ½ of diet), veggies, and a few fruits. They cannot eat citrus or cabbage due to their delicate digestive systems. They receive a variety of protein items, such as chicken, mealworms, crickets, eggs, and nuts. They also get a daily multi-vitamin and vitamin C supplements.
- Siamangs and White-cheeked Gibbons, both very territorial, would not share space in the wild; therefore they are not exhibited together in the same space.

## PDZA SIAMANGS:

**Dudlee** (female)

- Born at the Gibbon Conservation Center in Santa Clarita, CA on November 18, 1994.
- Arrived at PDZA in May 2004.
- Larger of the pair.

**Cho Cho** (male)

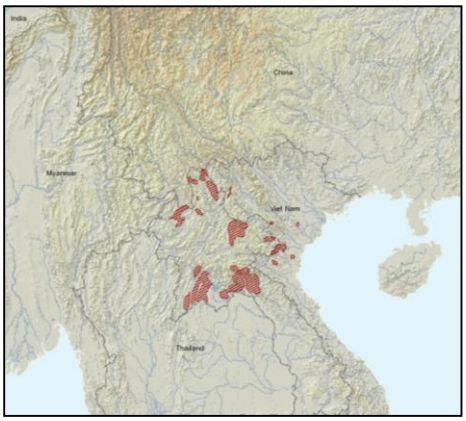
- Born in the wild in 1968. He is the oldest Siamang in human care.
- Came to PDZA from the Oregon Zoo in October 2009.
- Smaller of the pair.

# WHITE CHEEKED GIBBON – FACT SHEET

**Common Name:** White-cheeked Gibbon

**Scientific Name:** *Nomascus leucogenys*

**Classification:** Phylum: Chordata
Class: Mammalia
Order: Primates
Family: Hylobatidae



**Description:**

**Height:** 18-25 inches

**Weight:** 12.5 pounds (females can be slightly heavier than males)

**General:** White-cheeked gibbons have a small, lightly-built body, and their arms and hands are long which helps them gain a secure grip as they grasp one branch and then another as they branchiate through the forest. Males and females are strikingly different in color. Females are buff or a cream-colored fur, with a tiny patch of black on the top of their head. Males are all black except for the white patches on their cheeks. When baby gibbons are born, their fur is the same buff color as their mom's, which is an effective camouflage. By the time they are about one year of age they turn all black. Then, as they become young adults, female infants turn back to the buff color, while males remain black.

**Range:** Laos, Vietnam, southeastern China, and eastern Cambodia

**Habitat:** High canopy of tropical forests

**Status:** IUCN status Critically Endangered. CITES Appendix I. Major threat is habitat destruction.

**DIET:** Mainly fruits, but also leaves, buds, flowers, and occasionally insects, eggs, and birds

**Reproduction:** The menstrual cycle of a female white-cheeked gibbon is 28 days and the gestation period is 7-8 months. White-cheeked gibbons give birth to a single offspring every 2-3 years. Infants cling to their mother from birth. Youngsters are weaned early in their second year. Once the offspring reach full maturity at 5-8 years old they usually leave the family group and search for a territory and mate of their own, though they may spend up to 10 years with their family group.

**Life Span:** 25-30+ years

**Behavior:** Like all gibbons, white-cheeked gibbons live in small, monogamous families composed of a mated pair and up to four offspring. Gibbons are one of the few apes where the adult female is the dominant animal in the group. The hierarchy places her female offspring next followed by the male offspring and finally by the adult male. Mated pairs of gibbons are very territorial. They mark their territory primarily through loud vocal displays, the sounds of which travel hundreds of yards

throughout the forest. In advertising their ownership of a territory and to strengthen the bond between them, male and female gibbons perform a sort of duet. The male hoots, squeals, and whistles, while the female makes a rising twitter note. Gibbons are active during the day. Grooming is an important social activity along with infant centered play behavior.

## WHITE-CHEEKED GIBBON FACTS:

- Gibbons have a home range of about 75 to 100 acres and travel about one mile per day through this range.
- They defend approximately three-quarters of their range as their group territory. Defense takes the form of calls from the center of the territory, calls from the boundaries, confrontations across the boundaries, chasing across the boundaries, and rarely, physical contact between males.
- Gibbons are arboreal and spend most of their time in the canopy. They rarely stay on the ground for very long.
- Both sexes have long, dagger-like canines.
- The basic pattern of vocalization is an introductory sequence where both male and female "warm up". This is followed by alternating sequences of male and female calls and of female great calls, usually with a male coda at the end. Calls are often accompanied by behavioral acrobatics.
- They move and feed mainly in the upper and middle levels of the canopy and almost never come down to the ground. Families often feed together in the trees.
- The species is managed in North America as part of a Species Survival Plan (SSP).
- Zoo Diet: They are fed once daily a diet of canned primate diet, monkey chow biscuits soaked in water or juice, leafy greens and green veggies. They also get plenty of fruits as training treats. They also get a multi-vitamin daily.

## PDZA WHITE-CHEEKED GIBBONS:

**Bobby** (male)

- Born at the Bronx Zoo in New York on March 8, 1998.
- Arrived at PDZA in November 2003.
- Black fur with white cheeks.

**Sunisa** (female)

- Born at the National Zoological Park in Washington D.C. on September 22, 1996.
- Arrived at PDZA in December 2003.
- Uterus removed in January 2011 for medical reasons; she can no longer reproduce.
- White/tan fur with black on her face and head.

# APE INTERPRETATION

Visitors are not as familiar with gibbons as they are with gorillas and orangutans (other apes). Help visitors get to know these fascinating and acrobatic apes. The social structure of gibbons, including monogamy and large paternal investment (rare among primates), is an interesting and appealing topic for families and couples.

Active, brachiating gibbons are easy to interpret. Point out their adaptations for life in the trees, including long arms and hands. An exciting fact to share is that gibbons in mid-swing have been seen catching flying birds!

Vocalizing gibbons are also an exciting experience. Wild gibbons, and the Zoo's gibbons, typically sing in the early morning; however, the Zoo's gibbons will sing at other times, and you may hear them on your shift. Let visitors enjoy the music, and then explain the purpose of singing.

Finally, the age-related color changes in the white-cheeked gibbons are captivating. Give visitors clues so that they can puzzle out the probable gender of individuals in the groups.

A good way to discuss the collection of gibbons is to play a "Who's Who" game with visitors. You can have them decide which species (white-cheeked or siamang) are visible in the mesh exhibits. Then, for the white-cheeked gibbons, visitors can draw on coloration and size to determine gender and age.

*(Adapted from a National Zoo fact sheet, 2004)*

There is no need to get hung up on the fact that people want to call them monkeys. You can explain the differences if you feel it is necessary or lightly mention that we don't have any monkeys here at PDZA, but we do have other primates (the two types of gibbons who are apes, and the lemurs in Kids' Zone who are prosimians—which are all the other primates who are not apes or monkeys).

## MONKEYS VS. APES FACTS:

- Apes lack tails
- Apes have a mobile, rotary shoulder joint which allows them to brachiate and hang from their arms (monkeys are quadrupeds that jump & run along the tops of branches or on the ground)
- Apes a have wider torso and shorter lumbar region
- Apes generally have a higher cognitive ability than monkeys, and are capable of language, tool use, problem solving, and culture
- Monkeys have more snout-like noses, as opposed to the short broad noses of apes

<u>Common Traits of Apes</u>: Color vision, loss of acute senses of smell and hearing, relatively large brains overall

## BIOFACT: SIAMANG/GIBBON SKULL (REPLICA)

Our siamangs and white-cheeked gibbons are in the same family, so their skulls are nearly identical. This skull can represent either animal. Notice the forward facing eyes; this is thought to give them depth perception needed to swing and leap in their tree top habitat.

You can also notice the striking similarity between their teeth and our own. They too are omnivores; therefore have grinding teeth and sharp, pointed teeth.

**Monkey Biscuits** = this is what the primates are fed, often soaked in fruit juice, along with Monkey Chow (a canned diet) and various fruits and vegetables

## BIOFACT: SIAMANG/GIBBON HANDS (REPLICA)

Our Siamangs and White-Cheeked Gibbons are in the same family, so their hands are nearly identical. Siamangs are slightly larger, though these hands can represent either animal. Their long arms and fingers allow them to make graceful, almost ballet-like movement as they swing from branch to branch (a form of movement known as *brachiating*). Gibbons are known for their remarkable gymnastic ability.

# LESSER APE CONSERVATION

Gibbons, belonging to the family Hylobatidae, are restricted to deciduous monsoon and evergreen rainforests throughout Southeast Asia. They play a vital role in their habitat in that they help to disperse seeds, yet also serve as natural prey for large snakes, birds of prey, and cats. Unfortunately, all gibbon species are on IUCN Red List and also listed as Appendix I by CITES.

Gibbon numbers have been steadily decreasing due to many factors:

1. Habitat loss and fragmentation due to increase in human population
2. Excessive logging of teak, ironwood, ebony, sandalwood
3. Mining
4. Conversion of land for livestock with “slash and burn” technique
5. Bush fires
6. Hunting and capture for food, sport, pet trade, and traditional Asian medicine
7. Exposure to disease due to human expansion and ecotourism.

The designation of protected areas is unlikely to offer much increased protection in the near future due to a lack of funds, trained personnel and conservation infrastructure. The main focus of gibbon research by international scientists over the last 30 years has increasingly been shifting towards ecology, conservation biology and protection. Much further attention, both in research, funding and education needs to be brought to the countries of Southeast Asia if primate populations are to be protected.

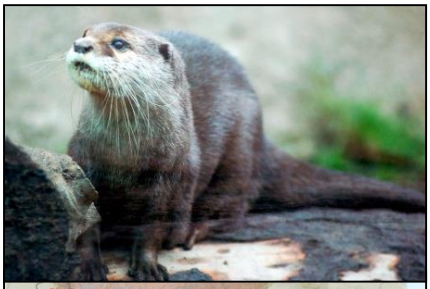
### TO LEARN MORE ABOUT GIBBONS, CHECK THESE WEBSITES:

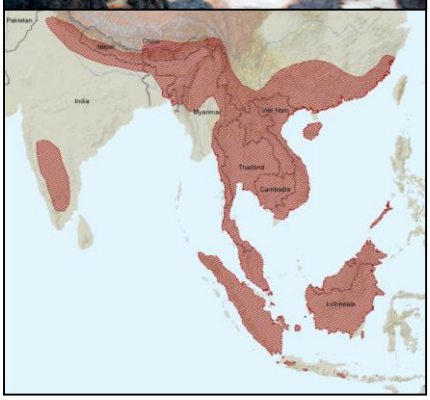
www.aza.org
www.IPPL.org
www.cambodiaswildlife.org
www.conservation.org
www.primate.org
www.gibboncenter.org
www.asb.org

### EXAMPLE CONVERSATION:

"Do you think these animals would make good pets? Gibbons and siamangs aren't only endangered because of habitat loss, they are also captured and sold illegally as pets. They require very special care, including a special diet and lots of space. It's always a good idea to research your pets before you buy them, not only to make sure you can properly care for them, but to also make sure they weren't taken from the wild."

# ASIAN SMALL CLAWED OTTER – FACT SHEET





**Common Name:** Asian Small Clawed Otter, Oriental Small Clawed Otter

**Scientific Name:** *Aonyx cinerea*

**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Carnivora |
| Family: | Mustelidae |

**Description:**

Length: 24 inches

Weight: 5-10 lbs

**General:** The Asian Small-Clawed Otter is the smallest otter in the world. Their hair is fairly short and dark brown in color with a lighter patch of hair on the throat. Their feet are partially webbed and end in small blunt claws.

**Range:** Found throughout Southeast Asia, Southern China, Indonesia and the Philippines.

**Habitat:** Live in freshwater wetlands and mangrove swamps.

**Status:** IUCN status Vulnerable, CITES Appendix II

**Diet:** Fish, crabs, mollusks, and small aquatic mammals

**Reproduction:** These otters are monogamous and both parents are involved in raising young. Gestation lasts 60-64 days and results in up to 6 pups per litter. Females can give birth to up to 2 litters per year. Young are born quite small and helpless and are unable to swim until 9 weeks old. The pups may continue to live with their parents in a small group of up to 12 individuals.

**Life Span:** Up to 12 years in the wild

Up to 21 years in captivity

**Behavior:** The Asian Small Clawed Otter is a social animal and can be found in groups ranging from 4 to 12 animals. They spend more time on land than any other otter and use their feet to catch prey rather than their mouths like other otters. They build burrows along the water with an exit tunnel that leads to about 3 feet under the water's surface. The female is dominant over the male who will hunt for her and the pups when they are young. These otters are sometimes utilized in Southeast Asia to herd small shoals of fish for fisherman utilizing a long lead and harness.

## PDZA ASIAN SMALL CLAWED OTTERS:

**Sven** (male)

- Born July 24, 2007 at Minnesota Zoological Garden
- Arrived at PDZA October 2015 from Bronx Zoo

**Blossom** (female)

- Born July 21, 2009 at Bronx Zoo
- Moved to PDZA September 2013
- Large in size, pretty otter face

**Ed** (male)

- Born October 25, 2005 at the Bronx Zoo
- Moved to Columbus Zoo September 2007. Moved to PDZA June 2011
- Whitest face around his whiskers compared to brother. Sharpest pointed tail compared to brother.
- Paired with Bubbles

**Bubbles** (female)

- Born October 24, 2008 at Bronx Zoo
- Moved to PDZA September 2013
- Very dark in color
- Paired with Ed

# ASIAN SMALL CLAWED OTTER – INTERPRETATION

## BIOFACT: SMALL CLAWED OTTER SKULL (REPLICA)

This member of the weasel/mink family is the smallest of all the otters and so is its skull. The small sharp teeth act like shears to cut up fish and small amphibians and the molars are broad and strong to crush shells of crustaceans and mollusks.

### FUN FACTS:

- Asian small clawed otters (ASCO) are the smallest of all otter species worldwide (13 total) and spend the most time on land of any otter. However, they still spend about half their day in the water.
- ASCO have a vocabulary of a dozen or more calls, including a distress call for when they're in trouble and need help. They also make vocalizations that resemble a squeaky toy.
- Their body is adapted for diving, in that their heart rate and oxygen consumption are reduced while submerged. The otter can also seal its nose and ear canals while underwater.
- Whiskers help them to detect changes in water current and pressure.
- Feet are only webbed to the last joint and are tipped with short, blunt claws. This structure aids in swimming, and still allows considerable dexterity.
- Tail is very thick and muscular at the base, and is gradually tapered to a thin tip. Lateral motions of the tail help to propel the otter while diving.
- Foraging is done mainly at the shoreline or in shallow water, and is done almost entirely with the front paws.
- ASCO tend to wash their food like raccoons.
- The ASCO are not exhibited with the gibbons nor siamangs, as the apes play too roughly with them.
- Zoo diet: They are fed 3 times per day a diet of mackerel, capelin, sardines & canned diet.
- Although these otters are not listed as endangered, they are seriously threatened by rapid habitat destruction (logging & mining), hunting (pet trade & pelts), and pollution. Not enough research has been done to find exact numbers, but they are declining. Scientists consider them an indicator species—their population indicates the general health of their habitat and the health of other species in their habitat.
- Baby ASCO can be called either kits or pups.
- Rice farmers are tolerant of small-clawed otters since the otters feed on crayfish that can damage rice fields. Fishermen train otters to drive fish into nets.

### EXAMPLE CONVERSATION:

"Do you know what otters like to eat? Crabs! Asian small-clawed otters can be helpful to farmers in Asia because they eat small crabs that are considered pests in rice paddies. By relying on natural predators, rice farmers are helping the environment by cutting down on pesticides. You can do the same thing by using natural predators, such as lady bugs, in your backyard."

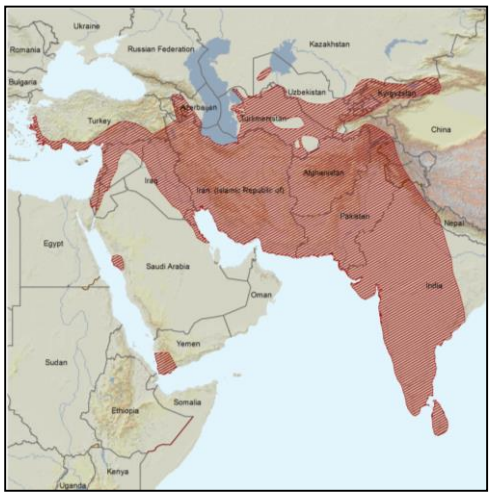
# INDIAN CRESTED PORCUPINE – FACT SHEET

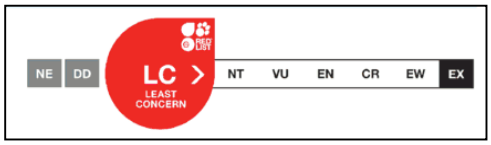
**Common Name:** Indian crested porcupine

**Scientific Name:** *Hystrix indica*

**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Rodentia |
| Family: | Hystricidae |




**Description:**

Body length: 2-3 feet, including their short tail

Weight: 24-45 pounds

The porcupine's hair is highly modified to form multiple layers of quills with longer, thinner ones on top and shorter, thicker ones beneath. Each quill is brown or black in color, with alternating bands of white. These quills can be up to 12 inches in length.The tail is covered with shorter spines that appear white in color. Among these, are longer, hollow, rattling quills that are used to alarm potential predators. Each quill has a muscle at its base. These long, pliable quills act as guard hairs and form a "skirt." When the porcupine is excited or scared, those muscles squeeze to make the quills stand up so the porcupine looks bigger. The feet and hands are broad, with long claws that are used for burrowing. They also have a crest of long coarse hair on their head that they can raise up. The belly is covered with short, coarse black hair. Males and females look alike.

**Range:** The Indian porcupine is found throughout southeast and central Asia and in parts of the Middle East, including such countries as India, Nepal, Bhutan, Bangladesh, Sri Lanka, Pakistan, Israel, Iran and Saudi Arabia

**Habitat:** The Indian porcupine is highly adaptable to multiple environments. Although they usually favor rocky hill sides, the species can also be found in tropical and temperate scrublands, grasslands, and forests. They are also found throughout the Himalayan Mountains, reaching elevations of up to 7900 feet.

**Diet:** Crested porcupines eat a variety of fruits, nuts, bark, bulbs, roots and other succulent vegetation. On a rare occasion, they may also eat carrion, lizards, bugs or frogs. The species utilizes both natural plants and agricultural crops as food sources.

**Behavior:**

Indian porcupines live in pairs or small family groups but usually forage alone. They are nocturnal, and seek shelter in caves, between rocks, or in a burrow during the day. The burrow is usually self-

constructed, with a long entrance tunnel, multiple exits and a large inner chamber. Gnawed bones and most of the excavated dirt are usually left at the entrance.

When irritated or alarmed, the Indian porcupine raises its quills and rattles the hollow spines on its tail. If the disturbance continues, the species launches a backward attack and clashes its rear against the offending animal. This action drives the spines deep into the enemy, often leading to severe injury or death. The majority of the damage is done by the short quills that are hidden beneath the longer, thinner spines on the tail and back. Quite often, these quills become dislodged and remain in the victim.

**Predators:** Large cats and humans

**Reproduction:**

Gestation for the species, on average, lasts 118 days. Young are born with their eyes open, and the body is covered by short soft quills. The Indian porcupine is usually monogamous, with both parents being found in the burrow with their offspring throughout the year. Females can have up to two litters per year.

**Life span:** 15-20 years in the wild; up to 27 years in captivity

**Status:** IUCN Status: Least Concern. CITES not listed.

**Population Trend:** Stable

**Threats:** Porcupines are considered agricultural pests by locals who trap and use them for food.

## PDZA INDIAN CRESTED PORCUPINES:

**Whitie** (female)

- Born at Buffalo Zoo in 1998.
- Came to PDZA in February 1999.
- Has white tips on the ends of her “mohawk".

**Josephine** (female)

- Born March 19, 1998 at Buffalo Zoo
- Came to PDZA in January 2015
- Whitie’s twin, Mother of Ralph and Elsey

**Ralph** (male)

- July 28, 2004 at Bronx Zoo
- Came to PDZA in January 2015
- Son of Josephine, brother of Elsey

**Elsey** (female)

- July 28, 2004 at Bronx Zoo
- Came to PDZA in January 2015
- Daughter of Josephine, sister of Ralph

# PORCUPINE INTERPRETATION

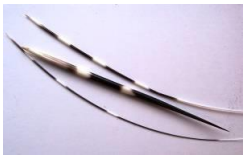
## BIOFACT: CRESTED PORCUPINE SKULL (REPLICA)

This species of porcupine is much larger than its N. American cousin. It also has a much longer snout (the length between the eyes and the nose) which is apparent in this skull. This herbivore feeds primarily on shoots, fruit, and bark. They belong to the Rodent family so their front teeth too continuously grow. Constant gnawing is necessary to keep their incisors from growing too long.

Zoo Diet: They are fed once a day a diet of herbivore chow, monkey chow, fruits and vegetables (apples, carrots, yams, leafy greens, etc.)

**Herbivore Chow** = This is what the anoa, porcupines and tapirs and are fed along with a variety of fruits and vegetables (the elephants are fed a different kind of biscuit, much larger)

## BIOFACT: INDIAN CRESTED PORCUPINE QUILLS (REAL)



This kind of porcupine does *not* have barbs at the end of its quills, unlike our N. American species. Contrary to popular belief, they cannot shoot their quills. All porcupines have loosely attached quills that come out easily if something touches them. When porcupines feel threatened they will raise and rattle their quills, thereby doubling their apparent size and hopefully scaring away any predators. These quills show the variety of size and shape these quills can take. The shorter, stouter quills are located toward their rears. The skinny, longer quills are on their back and neck.

The bigger, more round quills are like Styrofoam on the inside.

## BIOFACT: NORTH AMERICA PORCUPINE QUILLS (REAL)

This kind of porcupine *does* have tiny, microscopic barbs at the end of its quills [so PLEASE do not let visitors touch the actual quills]. Contrary to popular belief, they cannot shoot their quills. All porcupines have loosely attached quills that come out easily if something touches them. When porcupines feel threatened they will raise and rattle their quills, thereby doubling their apparent size and hopefully scaring away any predators. There are also long thick hairs that cover their bodies. There are more quills are located toward their rears. Use these quills as a comparison when you have the Indian Crested porcupine quills out.

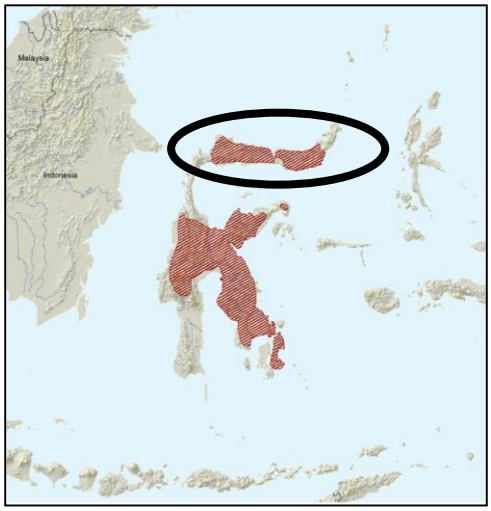
# LOWLAND ANOA – FACT SHEET

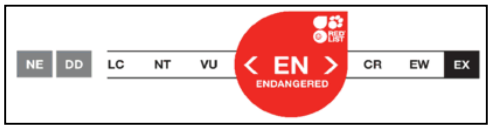
**Common Name:** Lowland Anoa

**Scientific Name:** *Bubalus depressicornis*

**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Artiodactyla |
| Family: | Bovidae |




**Description:**

Body Length: 160-180 cm

Height: 90-180 cm at shoulder

Weight: 200-500 pounds

Horn Length: 18-37 inches

**General:** The smallest of the wild cattle species, anoas are stocky animals with short, stubby legs. The adults range in color from light to dark brown while the young are sometimes yellowish in color. Some anoas have white spots on their heads, chests or legs. Their horns are triangular shaped and slope backwards on the head.

**Range:** Found on the northern part of the Indonesian island of Sulawesi.

**Habitat:** Shaded, swampy, lowland forest.

**Status:** IUCN Status Endangered, CITES Appendix I. Unknown how many exist in their native habitat.

**Diet:** Grasses, ferns, palm, ginger, fallen fruit, aquatic plants, leaves.

**Reproduction:** Sexual maturity is attained at 2 years for the female anoa and 3 years for the male. There is no known breeding season; however, females are in estrous for 24 hours every 22-23 days. Gestation is 275-315 days and usually results in one calf, although twins have been born in captivity.

**Lifespan:** 15-20 years in the wild, 20-30 years in captivity

**Behavior:** The lowland anoa is largely a solitary animal but is sometimes found in pairs or very small groups. They are most active during the early morning and early evening but sometimes exhibit nocturnal tendencies. In their native habitat, they are known to be quite aggressive towards humans and attacks are common. They often wallow in mud or water and are reportedly excellent swimmers.

## PDZA LOWLAND ANOAS:

**Baby Bean** (female)

- Born at the Fort Worth Zoo on April 2, 2002.
- Transferred to PDZA in April 2004.
- One of her horns has a bend in it from an injury she had when she was younger.
- She is darker in color than our male.
- Baby Bean has had one offspring: Coco Bean (female) born here at PDZA on July 4, 2007.

# LOWLAND ANOA INTERPRETATION

- Zoo Diet: Herbivore pellets in the morning; free choice alfalfa hay throughout the day. They enjoy browse for enrichment.
- Herbivore Chow = This is what the anoa, porcupines and tapirs and are fed along with a variety of fruits and vegetables (the elephants are fed a different kind of biscuit, much larger)
- Lowland Anoas are the smallest of the wild cattle species, including being the smallest type of water buffalo.
- Their horns are triangular shaped.
- They are very efficient at crashing through forest undergrowth. Their horns are held close to their back to avoid getting tangled in the undergrowth.
- Unlike other species of water buffalo, Lowland Anoa are mainly a solitary species instead of a herd species.

# MALAYAN TAPIR – FACT SHEET

**Common Name:** Malayan Tapir

**Scientific Name:** *Tapirus indicus*

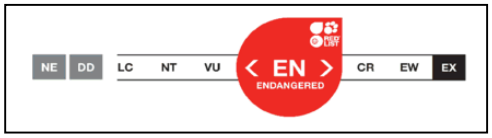
**Classification:**

| | |
|---|---|
| Phylum: | Chordata |
| Class: | Mammalia |
| Order: | Perissodactyla |
| Family: | Tapiridae |

**Description:**

Body length: 6 – 8 feet
Height: 3 – 3.5 feet
Tail: 2 – 4 inches
Weight: Males: 650-850 lbs, Females: 750-950 lbs

**General:** The body coloration is unmistakable: the front part of the body (ending just after front legs) and hind legs are black, while the back has a saddle of white or grey. This coloration renders the tapir nearly invisible in the moonlit jungle at night. Young tapirs resemble brown watermelons with whitish stripes and spots on a chocolate brown coat. The body is round and barrel-shaped, the tail no more than a stump. The nose and upper lip are extended to form a short, prehensile proboscis. The eyes are small and beady, and the ears are rimmed with white.




**Range:** Southern Burma, Malay Peninsula, S.E. Thailand and Sumatra

**Habitat:** Dense tropical lowland rainforest

**Status:** IUCN Status Endangered. CITES Appendix I. Major threats are loss of habitat and over-hunting.

**Diet:** Tapirs are herbivores that select tender leaves and shoots, and fruit from various plants. They are hindgut fermenters with limited stomach capacity, so they eat multiple small meals throughout their active periods.

**Reproduction:** Typically tapirs cycle every 28-31 days and give birth to a single offspring after a gestation of 390-403 days. Males will copulate with estrous females at least once during the cycle. Females have bred at 13 months and males at 24 months in zoos, though sexual maturity is generally at about 3 years. There appears to be no seasonal affect on reproduction.

**Lifespan:** Up to 30 years

**Behavior:** Older studies suggest they are solitary and nocturnal, but recent field studies show them to be more tolerant of other tapirs and more active during the day. Good climbers, they scale steep slopes with ease, and if alarmed gallop off with surprising speed.

## PDZA MALAYAN TAPIRS:

**Baku** (male) – Born April 29, 2014 at Denver Zoological Garden. Arrived at PDZA in August 2015.

# MALAYAN TAPIR INTERPRETATION

## BIOFACT: TAPIR SKULL (REPLICA)

Notice the empty cavity at the front of the skull where the fleshy part of the snout would be. The long snout is flexible and can move much like an accordion. This feature is what scientists believe has led to the success of this animal. Since many of the tapir's relatives are extinct, it is believed that this stretchy nose (that helps bring food to the mouth) allows tapirs to eat food that is slightly higher than what their relatives could reach, thus, increasing their food supply and leading to the success of this animal.

Notice their big, square and almost flat teeth (this model does not show wear that you would typically find on a real animal). These teeth are typical of large herbivores. The gap in between the teeth is also seen in its relatives, horses, though tapirs are more closely related to rhinoceroses.

Notice that this animal's eyes are located on the side of its head. This would suggest that it is a prey animal. Side eye placement allows for greater peripheral (or side vision). This enables the animal to see predators approaching from the side as well as from behind. This vision is very important for protecting an animal when it is grazing or feeding. A great way to remember the difference between prey and predators: "Eyes in the front, the animal hunts. Eyes on the side, the animal hides."

### FUN FACTS:

- Today there are four extant species of tapir. They include the Brazilian, Mountain (Andean), Baird's (Central American) and Malayan. Tapirs are thought to be remnants of an ancient lineage that evolved 55 million years ago, following the eclipse of dinosaurs. They predate the horse and rhinoceros families. The versatile, prehensile trunk of the tapir is considered the key to its success.
- The forefeet have four digits, each of which ends in a hoof. The fourth toe does not touch the ground, so footprints show the imprints of three digits. Hind feet have three digits.
- They communicate with whistling sounds and scent-marking urine.
- Tapirs make a high-pitched vocalization.
- They can spray their urine 10 feet or more!
- Tapirs are reclusive and crash off into the bush when humans are around, but will bite if cornered.
- They are also good swimmers, runners, and hill climbers.

- They almost always submerge themselves in water to defecate.
- Tapirs act as major seed dispersers for a substantial percentage of the plants that they consume.
- Salt is well liked by tapirs and they go out of their way to find it.
- Foraging is often done on a repeated foraging route, often with their nose to the ground. Often tapirs forage in a zigzag fashion. The fleshy proboscis or trunk is commonly used as a finger to grab almost out-of-reach leaves and grasses and pull them into the mouth.
- Habitat destruction and over-hunting are the two main factors contributing to their endangered status. Habitat destruction has mainly been a result of agriculture and increase in domestic cattle grazing.
- The main predators of the tapir are humans and tigers. Tapirs often find refuge from predators by taking to water when threatened.
- Tapirs rely on their sense of smell more than any of their other senses.

Zoo Diet: At the zoo, they are fed twice daily a diet of herbivore pellets, carrots, apples and bananas. They have a free choice diet of alfalfa hay. They also have a mineral block to lick. Herbivore Chow = This is what the anoa, porcupines and tapirs and are fed along with a variety of fruits and vegetables (the elephants are fed a different kind of biscuit, much larger)

- Normally considered shy, reclusive, nocturnal and solitary; more recent research has found just the opposite--they can be found in groups and have been seen foraging during daytime.
- Young tapirs are approximately 25 lbs. at birth.
- Tapirs have 1” thick hide at the neck area in order to aid their rapid movement through thick, dense brush. This thickness is also important to prevent severe damage if attacked by a predator.
- It is estimated that there are approximately 3000 tapirs in the wild and about 200 in zoos/captivity.
- When in water, they sink and can walk along the bottom.

## EXAMPLE CONVERSATION:

“Did you know you could help these endangered species by drinking your morning coffee? Today, coffee is grown in 16 of the world's 34 biodiversity hotspots. Buying shade-grown coffee helps to maintain biodiversity and ensure farmers receive fair compensation for their crops. You can look for the ‘Rainforest Alliance Certified’ stamp to help you find good choices. “

# WRINKLED HORNBILL – FACT SHEET

**COMMON NAMES:** WRINKLED HORNBILL

SUNDA WRINKLED HORNBILL

**SCIENTIFIC NAME:** *ACEROS CORRUGATUS*

**CLASSIFICATION:**

**Phylum:** Chordata
**Class:** Aves
**Order:** Coraciiformes
**Family:** Bucerotidae

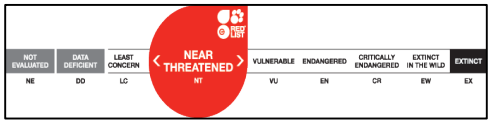
**DESCRIPTION:**

**Length:** 65 - 75 cm (26-29 inches)

**Weight:** Male weight: 1.6 kg (3.5 lbs)

**General:** Both male and female wrinkled hornbills have black plumage and a white tail. The male has a deep yellow bill with a red base, and a wrinkled red or orange casque. The male's eyes are surrounded by a rim of light blue skin, while the sides of the head, upper breast and tail are white, and the neck is bright yellow. The body, wings and tail tip of the male are black with a metallic green sheen. The female is smaller than the male and completely black, except for a yellow bill and casque, and a distinguishing bright blue neck. The female also has a smaller casque than the male.

The juvenile wrinkled hornbill looks similar to the adult male, but lacks any red color and has a small, pale yellow bill that lacks a casque. Immature female molts into adult face and neck colors at approximately one year.




**RANGE:** The wrinkled hornbill is found in Southeast Asia, where it is native to the Sundaic lowlands of Thailand, Brunei, Sumatra, Indonesia and Malaysia. It is regionally extinct from Singapore, where it was last seen in 1941.

**HABITAT:** Inhabits primary, evergreen and swamp forests in lowland areas. This species is not found in secondary forests that have been disturbed in any way. It can persist in selectively logged forests if primary forests are adjacent, but it does not occur in secondary forest. It can be found up to elevations of 1,000 meters, but is most commonly seen below 30 meters.

**BEHAVIOR:** The wrinkled hornbill gains its common name from its casque, a prominent bony crest on top of its large bill which in this species is wrinkled and ridged. The calls of the wrinkled hornbill consist of one to three coughing notes, described as a harsh "Kak-kak," or a deep "Row-wow" which can be heard for miles. The flapping wings produce an extremely loud rushing sound. It can often be found in pairs when feeding, but has been known to occur in groups of up to 30 birds in large fruit trees. It is not aggressive or territorial.

**DIET**: This is a forest species and eats mainly fruit, such as figs, although it will also eat small animals such as frogs and insects. Wrinkled hornbills do not drink, but get the water they need from their food.

**REPRODUCTION:**

Wrinkled hornbills probably reach sexual maturity at 5-6 years. Males and females generally pair for life. In Thailand, the breeding season normally occurs from January to June. North American captive births result in hatchings between February and August. If the first clutch fails, the birds will re-nest and try again.

After mating, the female will find a deep hole in a tree to nest in. She creates a mixture of feces, food, and feathers into a clay-like substance to plaster over the entrance. A narrow vertical slit in this hard wall provides space for the female to defecate and the male to regurgitate food to the female (and nestlings). She remains inside the nest, incubating two to three white eggs for approximately 30 days. During incubation, the female depends entirely on the male to provide her with food. After hatching, the female remains in the nest, brooding the chicks for another 65-73 days.

The chicks emerge from the nest with the female, or a few days after she has exited the nest cavity. After confinement inside the cramped nest for about 10 weeks, the fledglings are not strong flyers. It takes a day or two of exercising their muscles to enable fledglings to keep up with their parents. Parents continue to feed the juveniles as they forage together in the forests.

Because the female depends so much on the male to provide (food) for her and the nestlings, courtship occurs throughout the year to build and maintain strong pair bonds. The male and female invest much time developing this bond, so it is to their advantage to remain together year after year, returning to the same nest site to breed and raise their young.

**LIFE SPAN:** Life expectancy in the wild could be approximately 20-30 years. Researchers need information from long-term banding studies to accurately know life expectancy.

**STATUS:** The wrinkled hornbill is classified as Near Threatened on the IUCN Red List and listed on Appendix II of CITES.

Years ago, poaching threatened wrinkled hornbill survival rates, as villagers raided nests to sell nestlings for the pet trade. Today, the biggest threat to this hornbill is logging, which results in loss of habitat. Excessive logging removes the required large trees with naturally occurring cavities.

There has been extensive loss of Sundaic lowland forests due to widespread illegal logging, land conversion to agriculture, especially the cultivation of oil palm plantations, and forest fires.The wrinkled hornbill's dependence on undisturbed primary forest makes it particularly vulnerable to these threats. At higher elevations, deforestation has been less severe, meaning that these populations are less threatened. However, the wrinkled hornbill is on the verge of extinction in Thailand.

The population size of this species has not been quantified, but it has been described as always uncommon. It is likely to be declining at least moderately rapidly, and should be carefully monitored.

## PDZA WRINKLED HORNBILL:

Pilai – Female. Hatched at San Diego Wild Animal Park April 14, 1995. Came to PDZA January 2014 from Fort Worth Zoo. She was named after the world's foremost authority on Asian hornbills, Dr. Pilai Poonswad of Thailand.

## FUN FACTS:

- There are 57 species of hornbill. As of April 2014, 5 species of hornbill were listed as endangered or critically endangered by IUCN. 20 species were listed as vulnerable or near threatened.
- Hornbills are important because they help disperse seeds throughout the forest. They regurgitate larger seeds, and pass smaller seeds through their feces. It may be that forests need hornbills as much as hornbills need forests. The presence of nesting hornbills is a sign of a healthy Asian tropical rain forest.
- In the tropics, food resources vary with space and time. Fruiting trees can be far apart. As a result wrinkled hornbills are nomadic, covering large areas between foraging areas and roosts.
- Hornbills get their name from their unique bill. They use it to toss food into the air to eat. The bill is also used to build and maintain nests and in defense against predators such as snakes. The bill is very powerful because it is fused to the cranium, which in turn articulates with the fused upper vertebrae. This creates a pick-ax like beak, very useful to peck out of the nest.
- In most hornbill species, the casque is a hollow or spongy structure made out of keratin. It is believed that this structure acts as a vibrating chamber to make the hornbill's voice louder. The calls made by the bird range from the deep booming sounds as they begin foraging to brays, toots, bellows, and cackles.
- The bill and casque of juvenile birds are underdeveloped, and females often have a much smaller casque than males have. This may be because males also use their casque to attract mates and display their health and strength to other males. The males of some species even compete by knocking their casques together in mid-flight.

## TOUCAN OR HORNBILL?

While toucans and hornbills share many physical characteristics, they are two completely different families of birds. Many people look at hornbills and immediately call them "the Fruit Loops toucan." This confusion is understandable. Both groups of birds have long, sometimes colorful bills. They both nest in cavities in tropical regions, and feed predominantly on fruits. However, this is where the similarities end.

Toucans live only in Central and South America; hornbills live only in Africa and Asia. Toucans are more closely related to woodpeckers, while hornbills are more closely related to kingfishers and kookaburra. The similar appearance of toucans and hornbills is an excellent example of a phenomenon called convergent evolution. This theory hypothesizes that two or more different species from different families and geographically separated locations have adapted similarly to fit an available niche in nature.

## SOURCES:


- http://www.arkive.org/sunda-wrinkled-hornbill/aceros-corrugatus/
- BirdLife International 2012. *Aceros corrugatus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on **31 December 2013**.
- http://en.wikipedia.org/wiki/Wrinkled_Hornbill
- http://www.zoo.org/page.aspx?pid=1864

POINT DEFIANCE ZOO & AQUARIUM
Metro Parks Tacoma

# Clouded Leopard Cub Den Interpretive Training

# Introduction

In this online training, we will review clouded leopard status, diet, and reproduction; PDZA clouded leopards and Cub Den Interpretation guidelines.

Once you have completed this training, you will be approved to interpret at the Cub Den and may sign up for shifts on Volgistics.

Please contact Amy Hale if you have any questions.

*There are 26 slides in this presentation (2 down, 24 to go!)*

# Clouded Leopards

Clouded leopards are two species of wild cat that live throughout the forests of Southeast Asia. Those found on mainland Asia are *Neofelis nebulosa*, cats found on the islands of Borneo and Sumatra are named Sunda clouded leopards *Neofelis diardi*.

Despite their medium-size, clouded leopards are considered to be the smallest of the "big cats." They are slender bodied with very long tails.

Adult cats average a total length of 4-6 feet (half of which is tail), standing height of 10-16 inches, and weighing 25-50 pounds (females 25-35 lbs, males up to 50 lbs).

# Cats of the Canopy

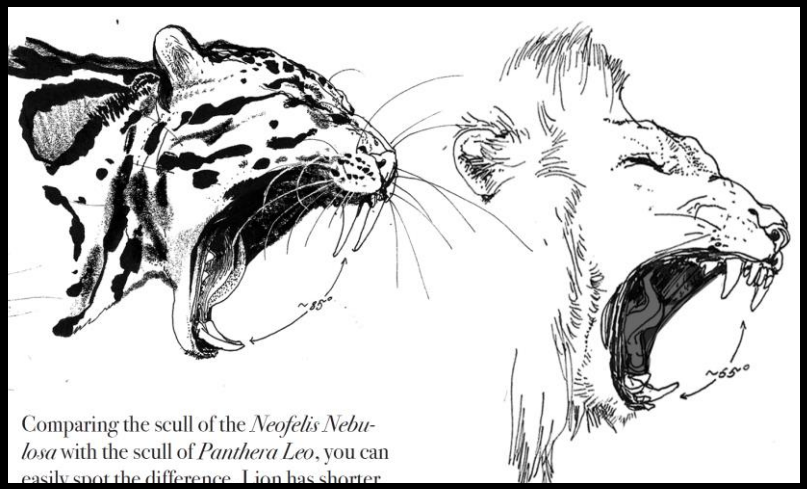
Clouded leopards are largely arboreal (living in trees) and are one of the best climbers in the cat family. Adaptations allow for climbing upside down underneath tree branches, hanging from branches with their hind feet, and even descending head first, like a squirrel.

**<u>Climbing adaptations:</u>**

- Large paws with sharp claws and specialized padding conform to the shape of the branch for a strong grip.
- Flexible ankle joints on the hind feet allow the foot to rotate backwards for climbing down trees head first.
- Short, stout legs provide leverage and a low center of gravity.
- Extremely long tails give balance.  Tails can be up to 3 feet long, or the same length as the body.

# Diet

Primary prey includes: monkeys, small deer, and wild pigs.  Clouded leopards may also take birds, rodents, and domestic poultry. Evidence suggests hunting takes place primarily on the ground with only occasional prey captured in trees.




Comparing the scull of the *Neofelis Nebulosa* with the scull of *Panthera Leo*, you can easily spot the difference. Lion has shorter

Clouded leopards have the largest ratio of upper canine teeth to skull size of any modern carnivore, causing some to compare it with the extinct saber-toothed cat.

Both saber-toothed cats and clouded leopards have an enormous mouth opening, around 100 degrees. In contrast, a modern lion can open its mouth about 65 degrees.

# Reproduction

While much is known from watching clouded leopards in a zoological setting, these two species of cat remain poorly understood. Unique challenges like their elusive nature and relative rarity, has slowed research of these species.

Clouded leopards appear to live a relatively solitary lifestyle in their forested habitat except during breeding season.

Mating can occur year round in wild populations, but in a zoological setting, most breeding occurs during the months of December through March.

Sexual maturity occurs around 2 years of age with females being capable of producing a litter of 1-5 cubs (2 cubs is most common) every year.

Gestation is 85-93 days long.

# Reproduction

While under the care of humans, clouded leopards present a reproductive challenge.  Unfortunately, incidences of aggression between a male and female have occurred.

Present care standards include introducing a male and female prior to one year of age.  The results have shown increased success forming pair-bonds and a lessening of aggression between the male and female.

# Caring for clouded leopards in Zoos

Cubs are routinely hand-raised by experienced keepers. This practice has yielded positive results in terms of overall health and well-being of newborn clouded leopard cubs.

As the cubs grow and have regular interactions with keepers, their comfort level around humans increases.

Evidence shows that adult cats hand-reared from birth are more adjusted to a zoological environment.  In contrast, mother-reared adult cats can be very shy and skittish, presenting more overall challenges to their care.

Taking a proactive approach and implementing effective husbandry practices of this endangered species will help to ensure long-term survival.

# Cub Milestones

***Newborns:*** Weigh about 6 ounces, their eyes are closed, they have no teeth and are bottle fed about six times a day. Cubs are fed a special milk formula designed especially for zoo cats, consuming a food volume equal to 10-20% of their current body weight each day.

***Two weeks:*** Their eyes are beginning to open, their teeth are emerging and they are beginning to walk on unsteady legs.

***Four weeks:*** They are fed about four times a day. Turkey-based baby food is added to their bottle to create a “meat milkshake”.

***Six weeks:*** They are getting their first taste of solid food as meat is gradually added to their diet. Their milk feedings are reduced slowly down to just one bottle per day. Cubs become more coordinated and agile and are starting to really climb and play.

***Three months:*** They are totally weaned.

# Clouded Leopard SSP

Clouded leopards living in North American zoos are collectively managed through a Species Survival Plan®, or SSP, administered by the Association of Zoos & Aquariums (AZA).

Currently, zoos in North America house only *Neofelis nebulosa* individuals, the only Sunda clouded leopard (*Neofelis diardi*) in human care is at Lok Kawi Wildlife Park in Sabah, Malaysian Borneo.

Clouded Leopard SSP program goals:

- Address zoo-based population management issues
- Stabilize population demographics (having an appropriate proportion of males & females representing all ages)
- Improve the population's genetics
- Develop conservation efforts in clouded leopard range countries

# Partners in Conservation

Clouded Leopard PROJECT

- The Clouded Leopard Consortium, based at the Khao Kheow Open Zoo in Thailand, is a partnership between the Thailand Zoological Parks Organization, PDZA, National Zoo, & Nashville Zoo to develop a viable self-sustaining clouded leopard breeding program. Through this partnership, the population of clouded leopards in zoos has increased and we are now seeing second generation clouded leopards being born in US zoos directly through our efforts!
- PDZA zookeepers founded the nonprofit Clouded Leopard Project (www.cloudedleopard.org). The group works closely with the zoo and The Zoo Society in fundraising efforts for conservation projects supporting field research, implementing education initiatives in range countries, and bringing global awareness to clouded leopard conservation issues. The CLP website serves as the official website of the Clouded Leopard SSP.
- Zoo staff members also conduct and support clouded leopard conservation work in Thailand and elsewhere in Southeast Asia.

# Protecting Habitat

Wild clouded leopard numbers are thought to be in decline, however scientists have no accurate estimate of true population numbers since they are so difficult to study and research efforts have so far been fairly limited.

Clouded leopards, along with Sumatran tigers and a host of other wildlife species, depend on tropical forests. In Southeast Asia these forests are rapidly being cut down to make way for palm oil plantations.

To ensure the long-term survival of clouded leopards, it is essential that there are enough protected areas in which they and their prey can live. Equally important is the development and enforcement of strict wildlife protection laws to eliminate poaching of clouded leopards and their prey.

Help clouded leopards by:

- Supporting PDZA and its conservation partners
- Learning more about palm oil at pdza.org/pawsforthecause
- Asking companies to commit to producing and using deforestation-free palm oil

PAWS
FOR THE CAUSE
RESPONSIBLE PALM OIL

# PDZA's Clouded Leopards

Point Defiance Zoo & Aquarium is home to nine clouded leopards.

Chai Li & Nah Fun
Born 2009

Josie
@ WWOT
Born 1998

Tien & Sang Dao
Born 2013

Chee Wit
Born 2010
&
Jao Ying
Born 2007

Banyan & Orchid
Born 2015

# Josie

**Josie** was born at the Cleveland Zoo on July 11, 1998 and came to PDZA in November 1998.

Josie lives behind the scenes at WWOT.  You may be able to catch a glimpse of her in the exercise yard at times.

Josie and Raja (who passed away in 2013) gave birth to Kwan Jai (female) and Rama (male) on April 3, 2003.

# Chee Wit & Jao Ying

Chee Wit

## Chee Wit

- Male
- Born February 14, 2010 at the National Zoo
- Came to PDZA in July of 2010

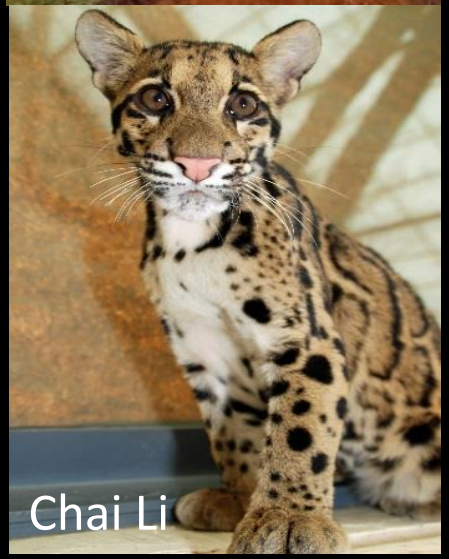
## Jao Ying

- Female
- Born May 30, 2007 at the Khao Kheow Open Zoo in Thailand
- Arrived at PDZA in March of 2010 from Thailand

Chee Wit and Jao Ying can be seen on exhibit in the early part of the morning, this is determined by our Zoological Staff. This pair has recommendations for breeding.

# Nah Fun & Chai Li

Nah Fun


Chai Li

**Nah Fun** (pronounced “nah-foon”)

- Male
- Born July 16, 2009
- Name means “rainy season” in Thai
- Arrived at PDZA from Thailand in April 2010

**Chai Li** (pronounced “chai-lye”)

- Female
- Born July 12, 2009
- Name means “beautiful one” in Thai
- Arrived at PDZA from Thailand in April 2010

Nah Fun & Chai Li have access to the main exhibit over night. During the day, they live behind the scenes at the Cats of the Canopy exhibit.

# Chai Li & Nah Fun have had 4 litters

Taji & Sumalee 2011

Chan Sung & Suksn 2012

**Taji** (M) & **Sumalee** (F) - June 14, 2011

- Taji went to Denver Zoo, November 15, 2011, with mate Lisu. They have had one litter of cubs.
- Sumalee went to Central Florida Zoo, January 26, 2012, with mate Sabah. They have had one litter of cubs.

**Chan Sung** (M) & **Suksn** (F) – May 8, 2012

- Chan Sung went to Tanganyika Wildlife Park in Kansas, September 6, 2012, paired with Sassy.
- Suksn went to Houston Zoo, September 6, 2012, paired with Tarek.

**Tien** (M) - May 1, 2013

- Lives at Point Defiance Zoo & Aquarium with mate Sang Dao.

**Teak** (M), **Kapok** (M), **Banyan** (M) **& Orchid** (F) – May 12, 2015

- Banyan and Orchid live at PDZA at our WWOT.
- Teak and Kapok went to Tanganyika Wildlife Park in Kansas, October 2015.

# Tien & Sang Dao

**Tien** (pronounced “Tee-N”)

- Male
- Born May 1, 2013
- The name was inspired by the sound of a Thai word for strong, stable and steady. It is not a direct translation.
- Born at PDZA, offspring of Chai Li & Nah Fun.

**Sang Dao** (pronounced “Sing  Dow”)

- Female
- Born March 27, 2013
- Came to PDZA September 2013 from Tanganyika Wildlife Park near Wichita, KS.

Tien and Sang Dao are the pair that is most often seen on exhibit.  To tell them apart, Tien is much larger in size than Sang Dao.  They were selected to be paired together through the SSP program as a potential breeding pair. They had their first litter in March 2016!

# The Exhibit ~ Cats of the Canopy

The $1 million Cats of the Canopy exhibit was completed in the summer of 2011.

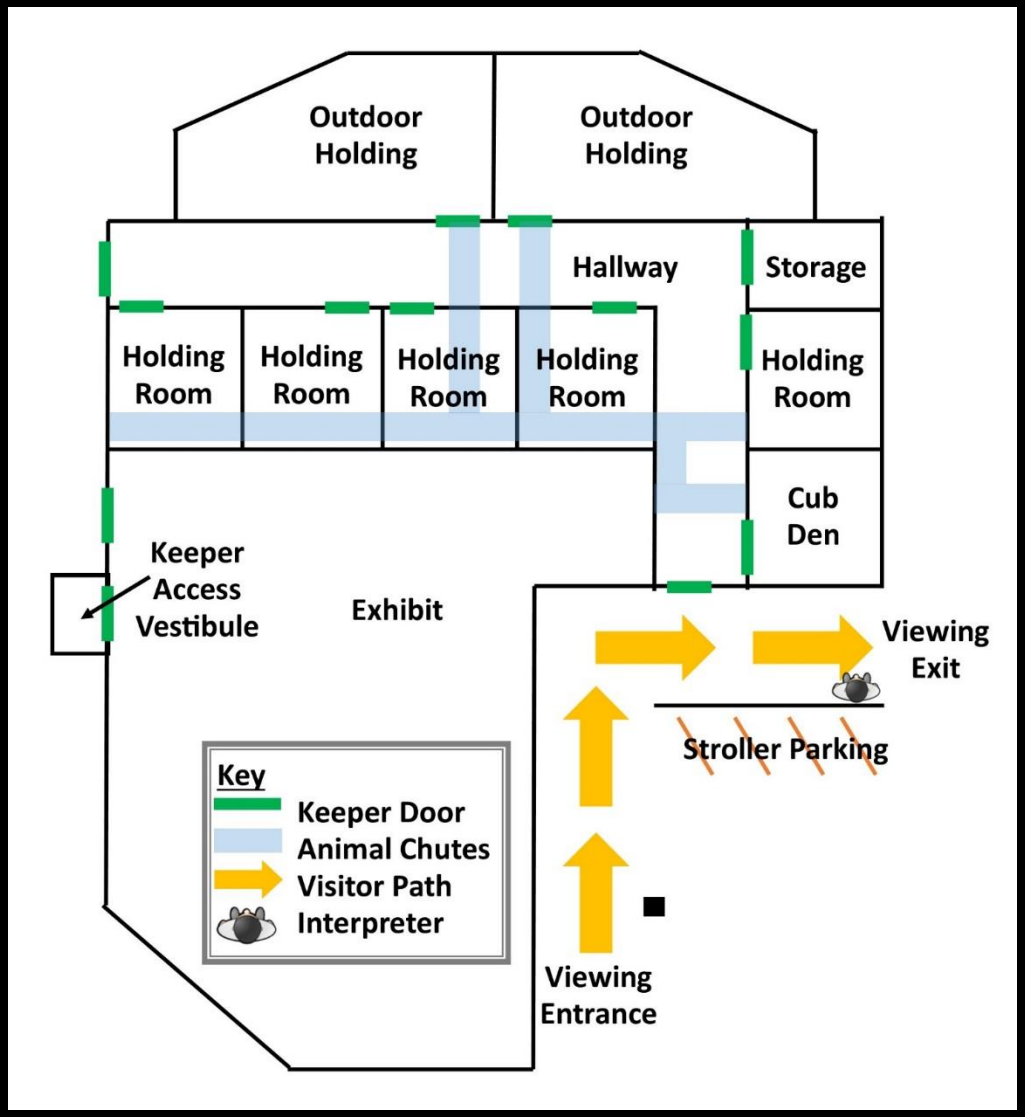
The June and John Mercer Cub Den is a key feature to this exhibit.  The floor of the cub den is heated.

Puyallup artist Bob Henry painted the jungle-scene mural in the Cub Den.

# Clouded Leopard Cub Den Goals:

- To ensure clouded leopards have a future by carefully managing their population through breeding programs.
- To educate visitors about this species of cat and share their story with the hope for long-term respect and support for their future.
- To give visitors a better understanding of how and why clouded leopard cubs in zoos are hand-raised.

# Cub Den Traffic Flow




- During cub feeding times, we will maintain a one-way flow of traffic. Visitors will enter from the left side of the cub den and exit to the right.
- Strollers should be parked along the wall partition outside of the viewing area.
- Long lines should wrap around the clouded leopard exhibit towards the elephant barn, keeping the pathway clear.
- Interpreters should position themselves at the exit where they can easily interact with visitors viewing the cubs. A step stool will be available to be easily seen over the crowd.

# Guidelines at Cub Den

**Visitor Guidelines at the Cub Den**

- Quiet voices, especially when cubs are sleeping
- No tapping on glass
- Photographs are allowed, camera flashes are ok but not recommended due to the reflection off the glass

# Interpretation at Cub Den

During high volume visitor days, expect a large gathering around the exhibit especially during scheduled feeding/interaction times.

- Share the story and conservation messages of clouded leopards with visitors.
- Use the IPad to show visitors pictures of the cubs if they aren't in view.
- Maintain the exit area by directing visitors to the entrance. Gently remind visitors there is a line and we are giving everyone a fair chance to view these precious animals.
- Encourage smaller visitors to stand up front with taller visitors behind them.
- When possible, keepers will use a microphone to talk to visitors. Keepers will not be able to take any questions.
- Depending on the number of visitors in line, you may need to gently encourage visitors to move on so others can see. Do this with respect and care, do not physically touch visitors, let them know they are welcome to get back in line if they wish to view the cubs longer.

# Frequently Asked Questions

I thought the cubs would be on exhibit, when can I see them?

We post the current daily viewing times at the front gate, at the exhibit, and on PDZA.org. During their first six months of life their needs change frequently so their viewing times also fluctuate to allow for the best care.

Those people are so lucky, how do I get that job?

Keepers have varying levels of advanced education, specialized training, and years of experience in this career field. Paid positions, internships and volunteer opportunities are posted at: www.pdza.org, www.AZA.org, www.AAZK.org

I want a clouded leopard as a pet.

Exotic animals do not make good house pets. Most exotic/non-domesticated animals have very strong federal and state laws protecting who is allowed to own them. Clouded leopards may look cute and cuddly, but they also have large teeth and claws and need specialized care. When considering getting any pet, you need to do your homework to be sure the animal is a good fit and you can commit to their care prior to bringing them into your home.

# Remember to ~ SHINE ~ With Customer Service

**S**OCIABLE - START WITH A SMILE , BE WARM & FRIENDLY

**H**ONEST - BUILD TRUST, SAY "I DON'T KNOW - LET ME FIND OUT"

**I**NDIVIDUAL - TREAT PEOPLE WITH RESPECT, USE UNCOMMON COMMON SENSE

**N**EEDS-BASED - KNOW VISITOR NEEDS: BATHROOMS, FOOD, EXHIBITS

**E**XCELLENT - EXCEED EXPECTATIONS, DETAILS MATTER, MAKE GUESTS SAY "WOW"

The role you play as an interpreter at PDZA is important. You are needed to help bridge the connection visitors make with the animals to the conservation messaging that will help protect them.

# THE END!

You have now completed the Cats of the Canopy Cub Den online training. After this slide, you will take a quiz on what you have just learned.

Next, you will be approved to interpret at the Cub Den and will be able to sign up for shifts on Volgistics.

POINT DEFIANCE ZOO & AQUARIUM
Metro Parks Tacoma

# CLOUDED LEOPARD

(*Neofelis nebulosa*)
**Habitat and Distribution:** Found in deep tropical forests, grasslands, scrub land, coastal hardwood forests and mangrove swamps of Nepal, the Indian state of Sikkim, southern China and south to Sumatra, Thailand, and Borneo.
**Size:** Up to 6 feet long (including 3-foot tail); 25-50 pounds. Males are larger than females.
**Wild Diet:** Monkeys, small deer, wild pigs, birds, and rodents; also domestic livestock such as calves, pigs, goats, and poultry.
**Predators**: Humans; occasionally leopards and tigers
**Reproduction:** Clouded leopards breed year-round. In zoos, mating peaks between December and March. Females give birth, usually in hollow trees, to litters of 1-5 cubs after a 3-month gestation period. Cubs weighs less than half a pound at birth, open their eyes after 10-12 days, and climb trees as early as six weeks old. They stay with their mothers for about 10 months, learning how to hunt.
**Behavior:** Clouded leopards are primarily nocturnal, solitary except during the breeding period, and largely arboreal. They are excellent tree climbers, using their long, heavy tails for balance. They spend their daylight hours sleeping in trees. At night, they hunt by stalking their prey from the trees or the ground. Little is known of the social organization of the clouded leopard.
Meet the clouded leopard cubs!

**IUCN Status:** Vulnerable

Clouded leopards are threatened by habitat destruction due to logging and an expanding human population. In fact, their habitat is undergoing the world's fastest deforestation rate (1.2-1.3% per year). Humans hunt clouded leopards for their pelts and to protect livestock. Palm oil plantations also pose a major threat to clouded leopards.

- Clouded leopards are among the best climbers in the cat family. They can climb upside down and hang from branches with their hind feet. They even climb down trees head-first, like squirrels!
- They have the largest canine teeth relative to body size in the cat family and can open their mouths to about a 100° angle--much wider than other cats. For this reason they are sometimes called the "modern day saber-toothed cat."
- Because of their shy nature, nocturnal tendencies and excellent camouflage, wild clouded leopards are rarely seen by people.

Point Defiance Zoo & Aquarium

# The problem with palm oil

Sumatran tigers, clouded leopards, and a host of other wildlife species depend on tropical forests. In Southeast Asia these forests are rapidly being cut down to make way for our growing appetite for palm oil. But we can take action to save wild cats and other forest creatures by asking companies to commit to producing and using palm oil responsibly.

PAWS FOR THE CAUSE today and help wild cats today by learning about responsible palm oil. A moment in your life could save theirs!

## PAWS TO CONSIDER

Palm oil is a form of vegetable oil, produced from the fruit of the oil palm tree, that you likely eat or use every day. It is a common ingredient in thousands of foods, household cleaners, cosmetics, and other personal care products. Most commercial palm oil is grown in Southeast Asia, primarily in the countries of Malaysia and Indonesia.

Some companies produce palm oil in ways that are less damaging to forests and wildlife and better support the economy and needs of local people. Known as sustainable palm oil, this product is more forest friendly and provides lasting income for farmers in Asia.

The Roundtable on Sustainable Palm Oil (RSPO) sets standards for certifying that palm oil is produced sustainably. The RSPO is made up of social and government organizations, companies, and businesses. Their standards address both forest protection and the health of plantation workers and their families.

While being a member of the RSPO is a good start, producing truly responsible palm oil goes beyond the RSPO standards. We'd like to see companies pledge to protect ALL forests and peatlands and be transparent in sharing their practices. Companies need to commit to mapping their supply chains in order to find out where their palm oil is coming from and how it's grown. By doing this, we can be sure that the palm oil we use is deforestation-free and doesn't harm wildlife.

## PAWS TO TAKE ACTION

Please join us in asking companies to use only deforestation-free palm oil that is produced without destroying any wildlife habitat. **Contact one of your favorite companies** that uses palm oil to let them know you care about protecting tropical forests and wildlife.

As a consumer, you can have a powerful impact by sending a letter, email, or tweet directly to a company. When consumers reach out to manufacturers and retailers, those companies can commit to deforestation-free palm oil and demand better practices from their suppliers or find other sources.

**See our sample letter >**

## SCORECARDS

- Review the Palm Oil Buyers Scorecard from the World Wildlife Foundation to discover how your favorite companies rank and learn more about the scoring process.
- Another Palm Oil Scorecard is produced by the Union of Concerned Scientists.

## MORE TO EXPLORE

- Responsible Palm Oil Candy List (PDF)
- Cheyenne Mountain Zoo's Palm Oil Crisis website
- Palm Oil Shopping App for your phone, offered by the Cincinnati Zoo
- Philadelphia Zoo's UNLESS project

**Questions?** Contact us!
pawsforthecause@pdza.org

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# Zoo Crew

# TRAINING MANUAL

A SMITHSONIAN'S NATIONAL ZOO FAMILY EDUCATION GUIDE

# JOIN THE ZOO CREW!

Being a wildlife conservationist and part of the Zoo Crew takes a lot of smarts and skills. During your visit to the Smithsonian's National Zoo, check out the exhibits and use this booklet to learn what it takes to care for all the different animals here, many of which are endangered. Once you complete your training, you can continue to help animals and the environment by visiting the Zoo's website at nationalzoo.si.edu and learning more.

This guide is intended for grownups and kids to share. It will help you navigate your way through the Zoo. Each page represents a different area of the Zoo; most will take about one hour. You do not have to follow the pages in order. If you have limited time, choose the areas you want to see most. (You can always come back another day.) You're ready to go—have a great visit at the National Zoo!

## Asia Trail

Travel half way around the world without leaving Washington, D.C., by exploring the Asia Trail exhibit. Meet seven exciting animal species native to Asia.

## Bird House

This indoor and outdoor exhibit showcases fine feathered friends from around the globe. Don't miss crowd favorites like flamingos, toucans, and kiwi.

## Small Mammals and Great Apes

Meet a variety of mini-mammals from the nocturnal to the naked. Afterwards visit the Great Ape House to see gorillas and orangutans.

## Reptile Discovery Center and Invertebrates

See anacondas and amphibians. Then creep back to the Invertebrate Exhibit to meet the Zoo's spineless wonders.

## Great Cats

Being a member of the Zoo Crew takes the right cattitude! Visit the Zoo's fearless felines: Sumatran tigers and African lions.

# ASIA TRAIL

## Enrichment

Animal keepers and scientists at the National Zoo have an important job—making sure the animals eat healthy diets, get plenty of exercise, and receive veterinary care. On top of that, the staff need to make sure the exhibits have all the necessary creature comforts. Keepers provide animals with tasty treats, special activities, and a variety of things to play with and explore. This is called "enrichment," and it lets the animals demonstrate their natural behaviors, keeps their bodies in shape, and helps them thrive. Did you know that playing fetch with your dog or putting rocks with caves in your fish's tank are forms of enrichment?

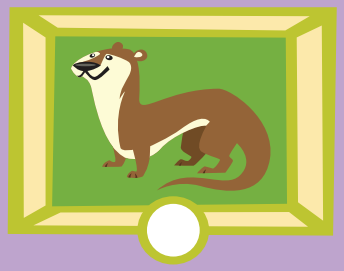
### Zoo Scientists at Work: **Clouded Leopards**

Clouded leopards are medium-size cats (20 to 60 pounds when they're fully grown), found in the forests of Southeast Asia, a habitat that is rapidly disappearing. They're shy, and very hard to study in the wild. Thankfully, National Zoo scientists have been working with this elusive species for more than 30 years in Thailand and here at the Zoo. Through their research, Zoo scientists learned that clouded leopards weren't breeding in captivity because their enclosures weren't giving them enough opportunities to climb and hide. By building enclosures with lots of trees to climb, vegetation to hide behind, and indoor spaces to retreat to, National Zoo scientists have created one of the most successful clouded leopard breeding programs in the world. They're working hard so that this partly cloudy cat will have a bright and sunny future!

## HAVE A BALL

**Match each of the animals to the type of enrichment they enjoy. For extra credit, use the space provided to list 5 things you use for enrichment.**

1
2
3
4
5



1

2

3

4

5

6

ANSWER KEY: GIANT PANDA 4; CLOUDED LEOPARD 6; RED PANDA 1; FISHING CAT 2; ASIAN OTTER 3; SLOTH BEAR 5.

# Where Are The Wild Things?

The **National Zoo's Asia Trail** opens today, giving modern new homes to some of the zoo's most popular animals. Tai Shan and his parents are the star attraction, of course, but the whole exhibit is great and full of fascinating things to see. Whatever you do, don't miss the adorable otters!

To make sure you see the entire Asia Trail, KidsPost's **Margaret Webb Pressler** has put together a list of cool things to find and fun facts to know — but you have to do the work. Take this page and a pencil to the zoo with you, and see how good a sleuth you are.

**1** Sloth bears love to get honey from bees' nests. What protects them from being stung?

_____

**2** Find the sloth bear claw and the device that scientists use to measure one.

**3** List the six ways that sloth bears make sound.

_____

_____

_____

_____

_____

**4** A python has slithered nearby! Find the evidence.

**5** Find the Latin name for the clouded leopard. Try to pronounce it!

**6** What helps clouded leopards balance on narrow tree branches?

_____

**7** Listen closely to hear the call of the endangered kingfisher bird.

**8** Snap! Was your picture just taken? Find the camera trap and maybe you will see yourself.

**9** Not all nests are made of twigs. Indian cliff swallows use mud. Check them out — if you can find them.

**10** How many cute Asian small-clawed otters do you see? Be careful not to double count. They all look the same and move really fast.

_____

**11** A tiger has been here! Find its footprint.

**12** Poaching is a problem for some animals. There's a poacher's trap hidden here. Watch out!

**13** If you were a stick of bamboo, how old would you be?

- ☐ Three days
- ☐ Four days
- ☐ Five days

**14** Are you older or younger than Tian Tian?

- ☐ Older
- ☐ Younger
- ☐ We have the same birthday!

**15** Is your hand bigger or smaller than a panda's paw?

- ☐ Bigger
- ☐ Smaller
- ☐ Same

**16** Find the yellow line that shows what used to be the pandas' habitat in China. Now find the purple line. What does it represent?

_____

**17** Check out the giant salamander. How does she breathe?

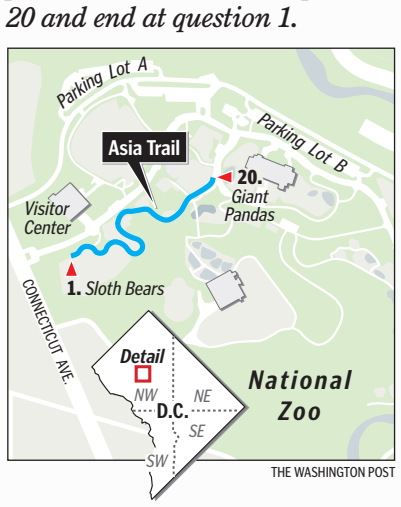
_____

**18** Find a newborn panda cub you can touch.

**19** Name two of Tai Shan's grandparents.

**20** Find the panda poop — and pick it up!

*If you enter Asia Trail at the sloth bears, start the scavenger hunt with question 1. If you start at the giant panda exhibit, start with question 20 and end at question 1.*




THE WASHINGTON POST

PYTHON ILLUSTRATION COURTESY NATIONAL ZOO; PHOTOS AND PANDA PHOTO ILLUSTRATION BY BILL WEBSTER — THE WASHINGTON POST

# WHAT'S IN THE BABY'S BOTTLE?

**The National Zoo has a bank of mammalian milk, the largest collection of its kind in the country. It includes samples of milk from hundreds of different mammals, from our zoos and research facilities all over the world.**

by Brittany Grayson

Ken Lang bottle feeds a clouded leopard cub at the National Zoo's Conservation and Research Center. (*Mehgan Murphy/NZP)*

The National Zoo has a bank of mammalian milk, the largest collection of its kind in the country. It includes samples of milk from hundreds of different mammals, from our Zoo and from zoos and research facilities all over the world.

Formulating a diet for a grown animal is hard enough. But the difficulty increases exponentially when nutritionists try to figure out what to put in a baby animal's bottle.

Milk varies widely across mammals, and nutritionists have to try to replicate the nutrients newborn animals need. Many zoos, including the National Zoo, used to hand-rear animals frequently, but today they only hand-rear in special situations where doing so ensures the animal's future health and well-being.

Recently, the Zoo began handrearing a red panda (*Ailurus fulgens*) cub and three clouded leopard (*Neofelis nebulosa*) cubs. The clouded leopards got a milk formula that's a mixture of two different commercially available cat formulas. But since red pandas aren't closely related to any large domesticated group, nutritionists decided to feed the red panda cub a formula Zoo nutritionists initially developed for giant panda (*Ailuropoda melanoleuca*) cubs. Although the two species aren't closely related, both eat primarily bamboo, so the nutrient requirements for newborns are similar.

Not only do nutrient needs differ between species, but scientists think they might change with time as well. To help answer questions like these, the National Zoo has a bank of mammalian milk, the largest collection of its kind in the country. It includes samples of milk from hundreds of different mammals, from our Zoo and from zoos and research facilities all over the world. Research based upon this milk will eventually help other zoos bottle-feed animals even more successfully, and scientists can study the milk to understand more about the metabolism and growth of wild animals.

Bottle-feeding baby animals, though, involves more than just selecting or creating the right milk formula. Ken Lang, an animal keeper, says figuring out how to bottle-feed animals has been a series of trials and errors, and builds upon an enormous bank of scientific knowledge.

"We use stomach capacity and body weight percentages to figure out the right amount to feed," he explains. "We calculate everything every day based on the cub's body weight."

In addition to finding just the right formula, keepers and nutritionists have to worry about how to make sure the formula gets into the baby's stomach.

"Although sometimes it looks like you just throw a bottle in the mouth, there's more to it than that," Lang says. "Hand-feeding can be tricky. A lot depends on the temperature of the milk, how well it flows out of the bottle, how well the cub grasps the nipple. For some cubs, you have to hold your fingers on the sides of their mouth to get suction. And they'll get frustrated if the milk isn't coming out properly or if the nipple is clogged."

He says keepers, veterinarians, and nutritionists meet every week (sometimes every day) to discuss the bottlefed babies and to perfect the process.

"As we tweak the protocol, we get better and better at what we feed, when we feed, and how often we feed."

Of course, the Zoo hopes that it never has to handraise many animals. But developing the knowledge and expertise to do so benefits the animals in our Zoo and, by sharing that knowledge, benefits all animals in captivity.

— BRITTANY GRAYSON *is a web content editor and science writer for Friends of the National Zoo.*

➔ More: "An Apple A Day"

➔ More: "75,000 Pounds of Bamboo"

If you have a comment about *Smithsonian Zoogoer* magazine, please email it to us.

Smithsonian Zoogoer *38(6) 2009. Copyright 2009 Friends of the National Zoo. All rights reserved.*

# CLOUDED LEOPARDS BORN IN THAILAND VIA ARTIFICIAL INSEMINATION

## ONLY THE SECOND TIME THE PROCEDURE HAS BEEN SUCCESSFUL

For Release: June 15, 2015

**To download images, visit the Smithsonian National Zoo's Flickr page.**

For only the second time, a litter of clouded leopard cubs has been born as the result of an artificial insemination. Pierre Comizzoli, reproductive physiologist at the Smithsonian Conservation Biology Institute (SCBI), performed the artificial insemination in Thailand last March alongside Paweena Thuwanut, a former JoGayle Howard Postdoctoral Fellow at SCBI, and Wanlaya Tipkantha, a doctoral candidate at Chulalongkorn University, who also studied at SCBI. The two cubs were born at the Khao Khew Open Zoo in Chonburi, Thailand June 9. The artificial insemination was the first successful procedure performed on a clouded leopard outside of the United States. The first and only other successful artificial insemination in clouded leopard was performed by the late SCBI scientist JoGayle Howard in 1992.

Scientists used a new technique to artificially inseminate a clouded leopard named Gra Ding. It was the first time the technique had been used on a clouded leopard. They deposited fresh semen from two different males in low doses into her oviducts. The doses totaled between 5 and 8 million sperm cells in each oviduct. Scientists have attempted artificial insemination in clouded leopards using classical methods since 1992 several times, but none worked. Classical methods

require at least 100 million sperm cells to be deposited using intrauterine insemination through laparoscopy. Gra Ding was selected for artificial insemination because she was not a successful natural breeder but is genetically valuable. The two males the semen samples were collected from were identified as good genetic matches for Gra Ding.

"The birth of these two cubs is a major step forward," said Comizzoli. "Clouded leopards have been incredibly challenging for us to breed, but this new technique means we have another tool to help keep the population genetically healthy and growing."

SCBI and Khao Khew Open Zoo are members of the Clouded Leopard Consortium, which is building a sustainable population in human care of the elusive and threatened cats, and studying wild populations in Southeast Asia.

Historically, scientists have had difficulty breeding clouded leopards because of male-female aggressions. Scientists found that males would often kill females during introductions for breeding. SCBI scientists demonstrated that raising males and females together from a very young age greatly reduced the chances of aggression. Scientists and the Species Survival Plan for clouded leopards then can pair males and females determined to be good genetic matches when they are only a few weeks old, but this is not always possible.

Both cubs appear to be healthy and are doing well. Keepers at Khao Khew Open Zoo are hand raising the cubs because it produces a better survival rate. Veterinarians have not determined the sex of the cubs yet. Scientists will use paternity tests to determine which male sired the cubs. It is possible the cubs have different fathers.

Clouded leopards are listed as vulnerable in the wild by the International Union for Conservation of Nature. It is estimated that there are only about 10,000 left in the wild. Threats to the species include habitat fragmentation, deforestation and illegal wildlife trafficking.

# # #

# 2015 FALL COMMUNITY LECTURE SERIES

Co-sponsored by the Smithsonian–Mason School of Conservation
Wednesday Evenings | October 7 – 28, 2015 | 7 p.m.
**Smithsonian Conservation Biology Institute** | Front Royal, Virginia

Journey with Smithsonian scientists and other conservation professionals as they travel the globe to study and protect species and ecosystems. Share their adventures during our free science lecture series.

## OCTOBER 7 | MARSHALL JONES

**Wildlife Trafficking**
Since 2007 Marshall Jones has been the Senior Conservation Advisor to the Director of the Smithsonian Conservation Biology Institute. An endangered species management, policy, and law enforcement specialist, he works to build SCBI partnerships and cooperative programs at the national, state, and local level. He previously served as Deputy Director and Acting Director of the U.S. Fish and Wildlife Service (USFWS). Prior to that role, he led the USFWS International Affairs Program, headed its wildlife trade and permits office, and served as Chief of the Regional Endangered Species Division of the Services Southeast Region. Among his many accomplishments, he authored the 1989 U.S. moratorium on the import of elephant ivory. Marshall will discuss current wildlife trafficking that threatens species both domestically and abroad.
(Note: this presentation may include some graphic images)

## OCTOBER 14 | MATT NEFF

**Salamanders: Jewels of Appalachia**
There are over 600 species of salamander on our planet…and Virginia is home to 56 of those species! That's almost 10% of the world's number of species! Matt Neff from the Department of Herpetology at the Smithsonian's National Zoo will discuss an array of our native species. He will also highlight the work being conducted at the Zoo's Salamander Lab and Jewels of Appalachia exhibit at the Reptile Discovery Center.

## OCTOBER 21 | KATE EVANS

**Elephants for Africa**
Dr. Kate Evans is the Founder and Director of Elephants for Africa, a small charity that conducts research to understand the ecological and social requirements of African elephants and how these can influence human-wildlife conflict. Currently conducting work in Botswana and South Africa, Elephants for Africa delivers scientific data to local decision makers. Join Kate as she shares her adventures from the field and her mission to ensure a future for wild populations of African elephant.

## OCTOBER 28 | JANINE BROWN AND KEN LANG

**Clouded Leopards**
SCBI has been involved in clouded leopard conservation for three decades and maintains one of the largest captive populations in North America. The 2011 opening of the state-of-the-art Clouded Leopard Breeding Facility provides this shy species the privacy needed to increase breeding success. In addition, knowledge gained from scientific studies of clouded leopards in the U.S. has led to a successful partnership with the Thailand Clouded Leopard Consortium, resulting in successful breeding of this elusive species in situ. Habitat loss, fragmentation, and human population pressure continue to threaten these leopards and other species that share their ecosystem in Southeast Asia. Join reproductive biologist Dr. Janine Brown and supervisory biologist Ken Lang as they discuss the current status of clouded leopard conservation efforts, as well as goals for the future for efforts at SCBI and abroad.

# DETAILS

**Wednesday evenings at 7 p.m., October 7 - 28**

The series is free and open to the public.
Seating is limited, so arrive early.

Lectures will be held at the SCBI's new campus
**Smithsonian Mason School of Conservation (SMSC) Dining Hall**
1500 Remount Rd
Front Royal, VA 22630

# FOR MORE INFORMATION

Contact the SCBI/FONZ Education Office by calling: (540) 635-6540
Contact the SCBI/FONZ Education Office by e-mail: SCBIeducation@si.edu

# AN ELEPHANT AND CLOUDED LEOPARD EXPERT IN THAILAND

**December 23, 2014**

*Dr. Janine Brown, a researcher with SCBI and an expert on reproductive hormones, is spending a month in Thailand, lending her expertise to clouded leopard and elephant projects there. Brown is a reproductive physiologist and one of the world's leading experts on elephants. She has been studying elephants and clouded leopards for over two decades, working to advance science's understand of the species and to save them from extinction.*

Read about the trip in her own words:

I left for Thailand on November 19. My first stop was Bangkok, where I stayed for a couple of days. I gave a seminar at Chulalongkorn University on how to use hormone monitoring to help care for animals. They want to set up an endocrine laboratory for wildlife there (something we have at SCBI) and asked me for my guidance. Such a research laboratory would help conservation science in the region.

Next, I went out to Khao Khew Open Zoo, which is about an hour outside of Bangkok. That's where the Clouded Leopard Breeding Program is. The breeding program is a consortium of organizations in the United States and Thailand, including the Smithsonian's National Zoo, the Nashville Zoo, and Point Defiance Zoo in the US and the Zoological Park Organization and Khao Khew Open Zoo in Thailand. The program began in 2002, and since then more than 60 cubs have been born. Several of those cubs have come to the US from Thailand to bolster the zoo populations here.

Based on my research, we now know that clouded leopards need tall, spacious enclosures and lots of enrichment to thrive and reproduce successfully. Also, we've discovered that hand-reared

cubs are much more likely to survive. Hand-rearing cubs, and interacting them as they get older, makes them especially easy to handle with less stress. Hand-reared cubs seem to enjoy interacting with their keepers and the occasional guest.

Janine Brown with a clouded leopard cub. Human interaction is an important part of young clouded leopards' socialization that helps them remain calm around humans their whole lives, which imrpvoes their health, welfare, and ability to reproduce successfully.

# Clouded Leopard

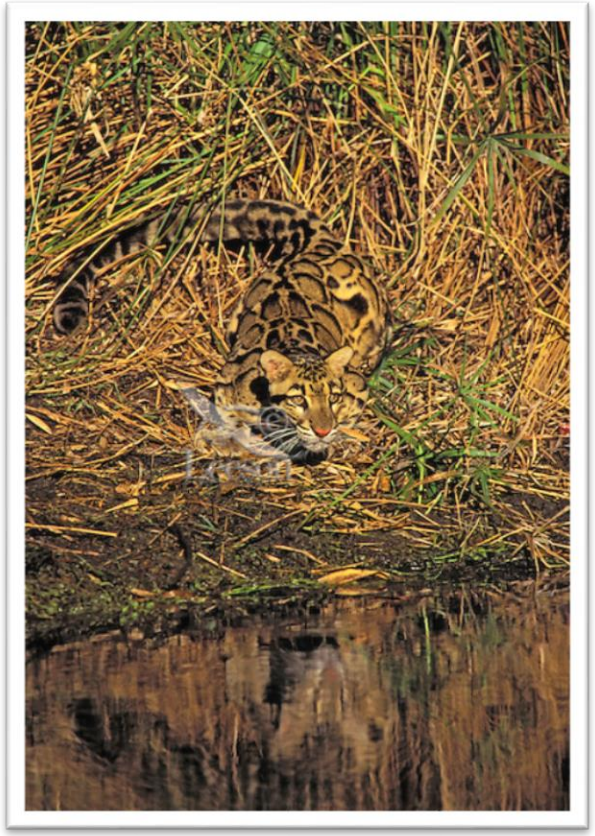
Neofelis nebulosa

# Clouded Leopard

- Member of Family Felidae
  - Tiger
  - Lion
  - Jaguar
  - Leopard
  - Snow Leopard
  - Caracal
  - Lynx

# Clouded Leopard Habitat and Range

- Subspecies of clouded leopard exist
- Can be found in Nepal, Bhutan, Myanmar, Taiwan, Laos, Cambodia, Vietnam and parts of India, China, and Malaysia
- Occur up to 10000ft
- Very arboreal and will use trees to rest and hunt
- Can be seen in secondary and logged forests, mangroves, grasslands, scrubland, tropical forests, and hardwood forests



# Clouded Leopard Camouflage

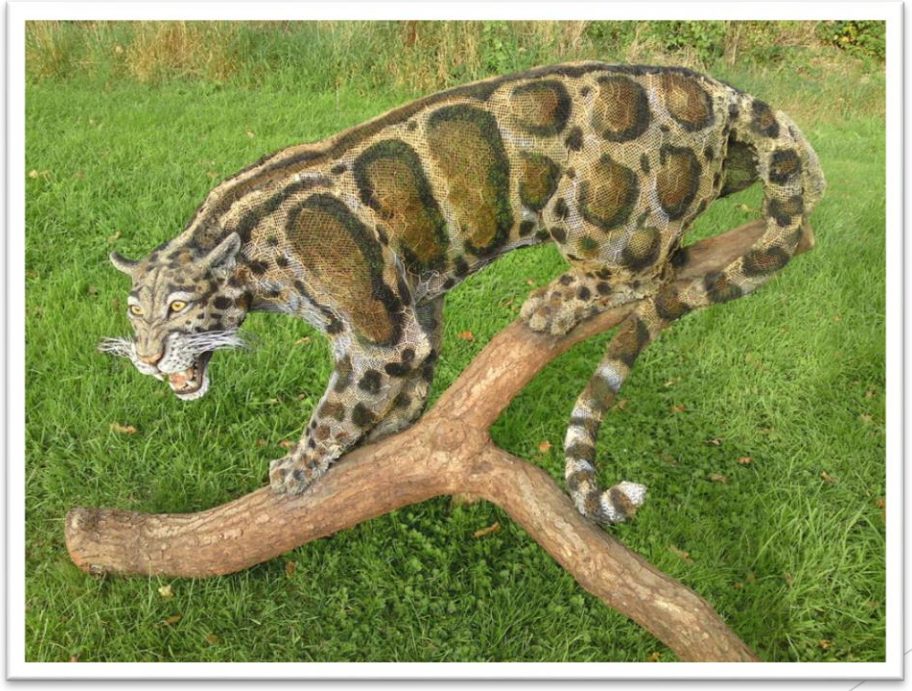
The spots or “clouds” on the clouded leopard coat helps them blend in while hunting.

# Clouded Leopard Diet and Feeding

- Clouded leopard are carnivorous
- Solitary hunters
- Will eat birds, fish, monkeys, deer, and rodents
- Apex predators

# Clouded Leopard Size and Appearance

- Largest teeth to skull ratio of any cat
- Have short legs, broad paws, and a long bushy tail used for balance
- Spots or “clouds” on their coat are unique and used for camouflage in trees
- Range from 24-50 pounds
- 48-78 inches long
- Smallest of the large cats…link between small and large cats



# Clouded Leopard Life Cycle

- Mating seems to able to occur throughout the year
- Mature at around 2 years old
- Gestation is 85-109 days
- Can have 1-5 offspring
- Can live about 10 years in the wild
- Upwards of 15 years in zoos

- Nashville Zoo Animals
  - Drupada (M)
  - Nuri (F)
  - Tula (F)
  - Sip Siam (F)
  - Natida (F)
  - Giaap (F)
  - Juup (F)

- Reason for Conservation Status
  - Habitat loss and deforestation
  - Poaching
    - Coat
    - Traditional medicines
    - Pet Trade
    - Meat

# Conservation Connections

- Clouded leopards are thought to be related to saber-tooth cats (Smiledon)
- Nashville Zoo is a founding member of the Clouded Leopard Consortium with the National Zoo and Kao Kheow Zoo in Thailand
- Nashville Zoo is the most successful breeder of clouded leopards with 28 cubs born  from 15 litters since 2009
- Important link between small cats and large cats

# Resources

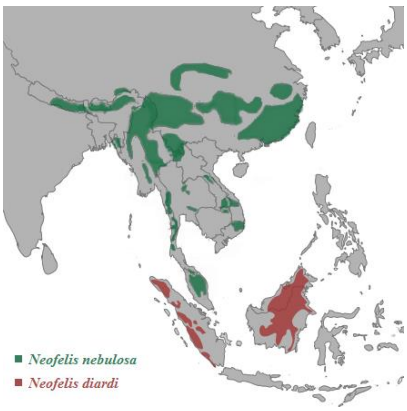
- http://www.iucnredlist.org/details/full/14519/0
- http://animaldiversity.ummz.umich.edu/accounts/Neofelis_nebulosa/
- http://www.cloudedleopard.org/

# Quiz

- What organization did Nashville Zoo help to start?
- Why is the size of the clouded leopard important?
- What region can clouded leopards be found?
- Where do clouded leopards spend much of their time?

**Common Name: Clouded Leopard**

**Scientific Name: Neofelis nebulosa**




**Taxonomy**

**Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Carnivora Family: Felidae Genus: Neofelis Species: nebulosa**

**Status in the Wild: Vulnerable As of Date: 2008**

**Reason for Status: Deforestation, hunted for their skins, use in traditional medicine, meat, and pet trade SSP: Yes**

**Conservation Efforts: The Nashville Zoo is part of the Clouded Leopard Consortium along with the National Zoo in Washington D.C., and the Kao Kheow Open Zoo in Thailand. Several other zoos have also recently joined. The Nashville Zoo is the most successful breeder of clouded leopards with 20 cubs born here since 2009. Protected by national legislation over most of its range and hunting is banned in Bangladesh, Brunei, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Taiwan, Thailand, and Vietnam.**

**Appearance and Physical Adaptations: Clouded leopards have the largest canine teeth relative to body size of any felid. Clouded leopards have proportionately short legs, long broad paws, and a long bushy tail.**

**Sexual Dimorphism: Males are larger**

**Nashville Zoo Animals: Arun (M), Jing Jai (F), Luk (M), Chet (M), Baylie (F), Lom Choy (F), Drupada (M), Tula (F), Nuri (F)**

| Physical Characteristics | | | | |
|---|---|---|---|---|
| | Weight | Height | Head/Body Length | Color |
| Male | 24-50 pounds | | 48-78 inches | Yellowish brown/gray with black “clouds” |
| Female | 24-50 pounds | | 48-78 inches | Yellowish brown/gray with black “clouds” |
| Offspring at Birth | | | | Spots are solid, not clouds which they gain at about 6 months |

**Geographic Range: Clouded leopards are found south of the Himalayas in Nepal, Bhutan, Myanmar, Taiwan, Vietnam, Laos, Cambodia, parts of northeastern India, south China, and mainland Malaysia**

**Habitat: Clouded leopards occupy tropical forests at elevations up to 9800 feet. They have also been spotted in secondary forests, logged forests, mangrove swamp, grassland, scrub land, dry tropical forest, and coastal hardwood forest.**

**Activity Period: Primarily nocturnal, but can exhibit some diurnal activity**

**Diet: Carnivorous, solitary hunters**

**Wild: Prey on birds, fish, monkeys, deer, and rodents**

**Zoo: Feline diet, mutton, beef knuckle bones, chicken, horsemeat, chicks, quail, ground turkey, trout, and mice**

| Reproductive Statistics, Behavior, and Lifespan | | | | | | |
|---|---|---|---|---|---|---|
| | Gestation | Sexual Maturity | Weaning Age | Offspring | Lifespan in Wild | Lifespan in Zoo |
| Male | | 23-24 months | | | 11 years | 13-15 years |
| Female | 85-109 days | 23-24 months | 10-14 weeks | 1-5 | 11 years | 13-15 years |

**Courtship and Parenting: Breeding behavior knowledge comes from captive animals which has made captive breeding difficult due to the lack of information. Clouded leopards are not thought to be monogamous in the wild. Mating seems to be able to occur any time of year.**

**Predators: Tigers, leopards, humans**

**Relatives: Several other species or subspecies of clouded leopards exist in Asia.**

**Interesting Facts: Largely arboreal and will use trees to rest and to hunt. Clouded leopards are the apex predator in their range. With clouded leopards being medium cats many think they are a link from small cats to big cats with their skull and teeth being similar to large cats while their body features are similar to smaller cats.**

**References:**


http://www.iucnredlist.org/details/full/14519/0

http://animaldiversity.ummz.umich.edu/accounts/Neofelis_nebulosa/

http://www.cloudedleopard.org/default.aspx?link=about_survival

# CURRICULUM VITAE

**NAME:** Karen Goodrowe Beck
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**WORK ADDRESS:** Point Defiance Zoo & Aquarium (PDZA)
5400 North Pearl Street
Tacoma, WA 98407

[redacted]

**PROFESSIONAL SOCIETIES:**

International Embryo Transfer Society
International Society of Wildlife Endocrinology
Association of Zoos & Aquariums – professional member

**WORK EXPERIENCE:**

- Member, Senior Management Team and Workforce Management Work Team, Metro Parks Tacoma; 2013-present
- Chair, PDZA Conservation Committee; [redacted]nt
- Chair, PDZA Animal Welfare Committee; [redacted]
- **General Curator, Point Defiance Zoo & Aquarium (PDZA); June,** [redacted]
- [redacted]003
- Ad Hoc Member, Toronto Zoo Education Advisory Committee, 2[redacted]
- Strategic Planning Committee, Toronto Zoo;[redacted]
- Assistant Curator/Mammals, Toronto Zoo; [redacted]
- Adjunct Faculty Member, Department of Biomedical Sciences, University of Guelph; [redacted]
- Ad Hoc member, Toronto Zoo Animal Care, Research and Acquisition Committee, 1[redacted]
- Chair, Biology and Conservation Animal Welfare and Research Committee, Toronto Zoo; 1991-2002
- Research Associate, National Zoological Park, Smithsonian Institution, Washington, D.C.; [redacted] present
- Associated Member, Faculty of Graduate Studies, University of Guelph; 1[redacted]
- **Reproductive Physiologist, Toronto Zoo; 1**[redacted]
- Graduate Fellow, National Zoological Park, 1[redacted]

- Graduate Research/Teaching Assistant, Department of Physiology, Uniformed Services University of the Health Sciences; 1983-1987
- Guest worker, Animal Center Section, Veterinary Resources Branch, National Institutes of Health; 1982-1987

**Association of Zoos & Aquariums (AZA) and related Conservation Programs:**

- AZA Accreditation Inspection teams: [redacted]
- Vice Chair, Clouded Leopard SSP®; [redacted]
- Vice Chair, Tiger SSP®, Coordinator, Sumatran tiger program; [redacted]
- AZA Wildlife Conservation & Management Committee (WCMC); [redacted]
  - Coordinator for Committee's Conservation Grant Fund reviews
- Co-Coordinator and facilitator, Southeast Asia Clouded Leopard and Small Cat Summit; Bangkok, Thailand, [redacted]
- Vice-chair, AZA Endocrinology Scientific Advisory Group; [redacted]
- Tiger SSP® Reproductive Advisor; [redacted]nt
- Washington State Oregon Spotted Frog working group and Recovery Team and AZA Taxon Champion; [redacted]011
- Felid TAG Steering Committee; 2[redacted]ent
- Co-Chair, AZA Reproductive Sciences Advisory Group; [redacted]
- Chair, AZA Genome Resource Banking Advisory Group; 1[redacted]
  - Participant, CBSG sponsored workshops: Population Biology Aspects of Genome Resource Banking; Database Management of Genome Resource Banks, Front Royal, VA [redacted]
  - Facilitator, Genome Resource Banking Advisory Group workshop, Toronto Zoo, 1[redacted]
- Reproductive Advisor, AZA Red Wolf Species Survival Plan®; [redacted]nt
  - Invited Participant, Population Habitat Viability Analysis, [redacted]
- Reproductive Advisor, AZA Canid Taxon Advisory Group; [redacted]
  - Facilitator, CBSG Algonquin Wolf PHVA, 2000
- Research Advisor, AZA Small Carnivore Taxon Advisory Group; [redacted]

**Grants Received:**

<u>Principal Investigator</u>

1. Point Defiance Zoo & Aquarium Conservation Committee "The Clouded Leopard Consortium – Support and Strategic Planning for Breeding Programs in Thailand and AZA Zoos" [redacted]

2. Point Defiance Zoo & Aquarium Conservation Committee "Red Wolf (Canis rufus) Genome Resource Banking - integrating reproductive sciences into conservation programs" [redacted]

3. Point Defiance Zoo & Aquarium Conservation Committee "Evaluation of Reproductive Function in Female Red Wolves Following Contraception with Deslorelin" [redacted]

[redacted]
animal management" [redacted]

[redacted]

5. Vancouver Island Marmot Foundation "Reproductive Biology of Captive Vancouver Island Marmots (Marmota vancouverensis)" 2001-2003 $58,100
6. Morris Animal Foundation "The Enigmatic Red Wolf: Developing Effective Reproductive Technologies for Conservation" 2001-2004 $94,500
7. Natural Sciences and Engineering Research Council (Canada) "Understanding canine gamete physiology for population management" 1999-2003 $52,800
8. Morris Animal Foundation Genome Resource Banking: 'Developing a "Frozen Zoo" for the Endangered Red Wolf' 1997-1999 $45,000
9. International Rhino Foundation "Reproductive Biology of the Sumatran rhinoceros (Dicerohinus sumatrensis) for in situ Management" 1996 $15,000
10. Natural Sciences and Engineering Research Council (Canada) "Understanding canine gamete physiology for population management" 1995-1999 $48,000
11. Endangered Species Fund-Metro Toronto Zoo "Endocrine and behavioral analysis of estrous cyclicity, pregnancy and pseudo-pregnancy in the Black-footed ferret" 1995-1997 $32,000
12. Garfield Weston Foundation "Development of Embryo Collection and Freezing Techniques in Wood Bison" 1993-1996 $150,000
13. Henry N.R. Jackman Foundation "Urinary Hormonal Analysis for Reproductive Evaluation of Female Greater One-Horned Asian Rhinoceros - North American Population" 1994-1995 $2,500
14. Gannett Communities Fund "Urinary Hormonal Analysis for Reproductive Evaluation of Female Greater One-Horned Asian Rhinoceros - North American Population" 1993 (computer & printer) $5,000
15. World Wildlife Fund/Metropolitan Toronto Zoological Society "Embryo Collection and Cryopreservation in Wood Bison" 1991-1993 $49,100
16. Richard Ivey Foundation, Ultrasound machine for Wood Bison Project ,1990 $28,000
17. Max Bell Foundation/Metropolitan Toronto Zoological Society "Feline Gamete Physiology" 1989-1992 $122,000
18. Nixon Griffis Fund for Zoological Research "Spermatozoal Capacitation and In Vitro Fertilization in the Caracal (Felis caracal)" 1988-1990 $2,977

Co-investigator:

AZA Conservation Endowment Fund "Rearing Innovation for Endangered Oregon Spotted Frogs: A Collaborative Effort in a Correctional Institution Milieu" 2011, $19,488

Riverbanks Zoo and Garden Conservation Support Fund, "Understanding factors affecting the success of Tiger SSP breeding recommendations" $4,000

University of Guelph, Pet Trust Fund "Towards a non-surgical solution to pet overpopulation (canids)"
1999 $5,000
1998 $6,000
1997 $8,000
1995 $4,000
1994 $9,000

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| | 1993 | $7,500 |
| University of Guelph, Pet Trust Fund "Cryopreservation of canine spermatozoa" | 1992 | $3,500 |

Other Funds:

1. Samuel McLaughlin Foundation, stipend for Ph.D. student -"Canine semen freezing" 1994 $10,000
2. Roy C. Hill Foundation (microscopes and video cameras), 1993 $3,200
3. Henry White Kinnear Foundation (video cameras & storage unit), 1993 $2,000
4. Tippet Foundation (Apple computer and Printer), 1993 $3,000

**Peer Reviews:**

Associate editor, Journal of Zoo and Wildlife Medicine 1995-2000
WCMC representative to CGF second tier reviews 2012, 2013, 2014
Ad hoc reviewer: AZA Conservation Endowment Fund, Journal of Zoo and Wildlife Medicine, Theriogenology, Zoo Biology, Journal of Wildlife Management, Biology of Reproduction, Canadian Journal of Veterinary Medicine, Reproduction, Scholarly Studies Grant Program, Smithsonian Institution

**Major Lectures:**

1. First International Symposium on Canine and Feline Reproduction – Reproductive Biology of the Domestic Cat, 1988, Dublin, Ireland
2. International Congress on Animal Reproduction and Artificial Insemination - Reproduction and Artificial Breeding in Cats, 1992, The Hague, Netherlands
3. Society for Theriogenology - Application of Reproductive Technology to Conservation Programs,1997, Montreal, Canada
4. Canadian Embryo Transfer Association – Use of Biotechnology in Conservation Programs, 1999, London, Ontario
5. International Congress on Animal Reproduction and Artificial Insemination – Piecing together the Puzzle of Carnivore Reproduction, 2000, Sweden
6. International Embryo Transfer Society, Keynote speaker, Satellite Symposium on: Assisted Reproductive Technology (ART) for the Conservation and Genetic Management of Wildlife, 2001, Omaha, Nebraska
7. AZA National Conference: Amphibian Conservation Session, Conversation of the Oregon Spotted Frog in Washington State, 2008, Milwaukee, WI.

## REPRODUCTIVE PHYSIOLOGIST RESPONSIBILITIES

**RESEARCH RESPONSIBILITIES:**

- Manage and direct the Toronto Zoo's Reproductive Physiology research program.
- Establish research priorities and projects for reproductive physiology, in consultation with curatorial, veterinary and animal care staff.
- Direct and evaluate performance of research personnel, post-doctoral fellows and graduate students, ensuring liaison with animal care staff and other zoological institutions.
- Manage budget and grants for research program.
- Edit and submit research findings to peer-reviewed journals.
- Delivery of presentations and tours to the public, school groups (high school and university level),

Toronto Zoo Foundation members, Boards of Management (Zoo & Foundation) and donors/potential donors regarding the zoo's conservation and research programs.

- Coordinate and carry out multi-institutional research projects.
- Serve as a knowledge resource to other zoos and similar organizations.
- Independently secure external grant funding to supplement base program.
- Liaise with Development staff to seek program support and infrastructure funding.
- Interaction with the media (newspapers, magazines, radio and TV interviews and animal outreach) as a spokesperson for the Zoo.
- Assistant Coordinator, Toronto Zoo Strategic Plan development and Toronto Zoo Conservation Plan Development.

**CURATORIAL RESPONSIBILITIES:**

- Management of the Toronto Zoo mammal collection (~ 700 specimens), including correspondence for animal transactions/acquisitions, decisions on euthanasia, hand-rearing, animal movements and all other curatorial duties/decisions in the absence of the Curator of Mammals (~10-12 weeks/year).
- Lead curatorial staff in discussions/decision making process for: 1) identifying conservation priorities and 2) outlining a plan for conservation & science programs at the zoo.
- Advisor to animal care staff for cheetah, black-footed ferret and Vancouver Island marmot breeding programs, regarding animal movements, management strategies and housing/exhibit conditions, feeding and use of reproductive technologies.
- Graphics design: Red panda, Tree kangaroo, Siberian tiger, Sumatran tiger, Wolf, Lion-tailed macaque, African lion, Tasmanian devil
- Exhibit design/renovation: Siberian tiger, Black-footed ferret, Lion-tailed macaque
- Participate in collection and habitat planning processes for the Toronto Zoo
- Participate in animal care staff (e.g. keeper) interviews and selection.

**ANIMAL WELFARE AND RESEARCH COMMITTEE CHAIR RESPONSIBILITIES:**

- Serve as an ad hoc member to the Board of Management's Animal Care, Research & Acquisition (ACRAC) committee
  - prepare reports to the ACRAC for the CEO
  - provide input to the ACRAC on welfare and research issues
  - participate in ≥ 6 site evaluations (holdings and exhibits)/year.
- Ensure working lists of "Holdings of Concern", "Chronically Ill Animals" and "Animals Off Display" are kept current and are discussed by the committee.
- Lead the committee through discussions on sensitive/controversial issues such as euthanasia, use of animals for research, acceptance/rejection of research proposals.
- Liaison to the Canadian Council on Animal Care and the Ontario Ministry of Food and Agriculture (Animals for Research Act), including submission of yearly reports on animals used for research.
- Serve as liaison between the committee and animal care staff regarding welfare issues and concerns.
- Serve in an informal capacity as Research Manager for the Zoo.
- Coordinate on-site research projects.

**GENERAL CURATOR RESPONSIBILITIES:**

- Responsible for Point Defiance Zoo & Aquarium animal collection, as well as personnel and budgets for all animal-related areas: zoological, Red wolf, aquarium and veterinary departments.
- Reporting to the Deputy Director/COO - member of the Senior Management team directing all aspects of Zoo operations and budget decisions
- Chair, Conservation Committee – responsible for oversight of science-based conservation at PDZA; Coordinate grant submission, review and awarding of grants and financial expenditure activities
- Chair, Animal Welfare Committee – responsible for animal care, husbandry and management issues and for coordinating review of all research at PDZA
- Emergency Responder and Weekend Duty officer – Senior Manager on site to respond to all types of emergency issues on zoo grounds.
- Zoological representative to 35 million dollar bond program and 3 million dollar capital campaign for capital facilities and new animal exhibit areas.
- Liaise with the Zoo Society on fundraising initiatives and donor cultivation
- Public voice to the media on animal-related issues

**Media Experience:**

- Media spokesperson for the zoo (newspapers, magazines, radio and TV – news & documentaries/public interest) regarding conservation, research and animal management programs.

**EDUCATION PROGRAMS**

Secondary Level:

Vertebrate Reproduction 1994-2000: In conjunction with the Education Department, developed and delivered a 2 hour, interactive education program and poster for local Grade 11 students (more than 700 students/year), designed to fit the provincial curriculum for reproductive biology.

Post-graduate level:

Graduate student advisor:

1. Debi Matsuda, M.Sc. 1992-1994: characterization of reproductive patterns and evaluation of estrous cycle synchronization in the Canadian Wood bison.
2. Margery Hay, Ph.D. 1992-1996: cryopreservation of canine spermatozoa and development of in vitro bioassays for evaluation of canine sperm cell function.
3. Leanne Othen, M.Sc. 1995-1997: evaluation of estrous synchronization, superovulation and embryo recovery in wood bison.
4. Kristen Young, M.Sc. 1995-1998: characterization of reproductive patterns and the effects of exogenous stressors during estrous cyclicity and pregnancy in black-footed ferrets.
5. Sue Walker, M.Sc. 1997-1999: reproductive endocrinology of the red wolf.
6. Helen Bateman, M.Sc. 1998-2001: effects of cooling and glycerol on canine sperm cell function.
7. Annabel Musson, M.Sc. 1999-2001: semen characteristics and cryopreservation of Mexican and grey wolf spermatozoa.
8. Karen Bailey, Ph.D. 2002-2006: reproductive characteristics and demographics of the red wolf.

Post-doctoral supervisor:

1. Dr. Valerie Madison - wood bison reproduction and domestic cat in vitro oocyte maturation
2. Dr. Margery Hay - canine gamete biology

Graduate committee member/co-supervisor:

1. Dawn Kelk, M.Sc. (University of Guelph) 1990-1992 and Ph.D. 1992-1998: mechanisms of early embryonic development using interspecific hybrid embryos; member
2. Laura Graham, MSc. (University of Guelph) 1990-1992: development of fecal hormone assays for the felid taxon; co-supervisor.
3. Karrie Rose, D.V.Sc. (University of Guelph) 1993-1996: characterization and cryopreservation of pheasant semen; co-supervisor.
4. Martin Ouellet, Ph.D. (McGill University) 1995-present: assessment of reproductive function in male anurans; member.
5. Merryn McIninch, M.Sc. (York University) 1997-2004: behavioral and endocrine characteristics of male and female reproductive function in the Indian rhinoceros; co-supervisor.
6. Maria Franke, M.Sc., senior keeper, Australasia, Toronto Zoo (University of Kent) 1998-2001 behavioral and endocrine characteristics of female reproductive function in four species of tree kangaroo; co-supervisor.
7. Luisa Steinsky, M.Sc., senior keeper, elephants, Toronto Zoo. (York University) 1999-2001: correlates of behavioral characteristics and endocrine profiles in the female African elephant; co-supervisor.
8. Gabriela Mastromonaco, Ph.D. (University of Guelph) 2001-2002 nuclear transfer and early embryonic development in the gaur.
9. Tamara Keeley, M.Sc. (York University) 2001-2002: reproductive behavior and endocrinology of the Vancouver Island Marmot.
10. Lisa Triggs, M.Sc. (University of Washington) 2008-present: reproductive behavior and endocrinology of the Pacific walrus.

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Isabel de Cunha – Sao Paolo State University, Sao Paolo, Brazil

Post-graduate teaching:

Ontario Veterinary College, University of Guelph:

Early Embryonic Development (post-graduate): Lectures in Intra- and Inter-species Embryo Transfer, 1992-1996

Veterinary Embryology: Lectures on Use of Biotechnology for Non-domestic Species, 1990-1997

Veterinary Biochemistry: Lectures on Clinical and Research Aspects of Biochemistry, 1993-1997

Genome Banking for Wildlife Conservation (post-graduate) - Course Director, 1997

[redacted]

**PUBLICATIONS:**

Theses:

1. Observations on Stallion Spermiogenesis by the Use of Transmission Electron Microscopy with Special Attention to the Saga of the Manchette. Master's Thesis. Department of Veterinary Biosciences, University of Illinois.
2. Consequences of Exogenous Gonadotropin Therapy on Fertilization and Early Embryonic Development in the Domestic Cat and the Fertilization In Vitro of Feline Follicular Oocytes. Ph.D. Dissertation. Department of Physiology, Uniformed Services University of the Health Sciences.

Peer-reviewed publications:

1. Goodrowe, K.L. and Heath, E.E. Disposition of the manchette in the normal equine spermatid. Anat. Rec. 209:177-183, 1984.
2. Goodrowe, K.L., Chakraborty, P.K. and Wildt, D.E. Pituitary and gonadal response to exogenous LH-releasing hormone in the male domestic cat. J. Endocrinol. 105:175-181, 1985.
3. Wildt, D.E., Schiewe, M.C., Schmidt, P.M., Goodrowe, K.L., Howard, J.G., Phillips, L.G., O'Brien, S.J. and Bush, M. Developing animal model systems for embryo technologies in rare and endangered wildlife. Theriogenology 25:33-51, 1986.
4. Diehl, J.R., Stuart, L.D., Goodrowe, K.L. and Wildt, D.E. Effects of Altrenogest and exogenous gonadotropins on ovarian function and embryo recovery in swine leukocyte antigen, inbred miniature swine as influenced by cystic endometrial hyperplasia. Biol. Reprod. 35:1261-1268, 1986.
5. Goodrowe, K.L. and Wildt, D.E. Ovarian response to human chorionic gonadotropin or gonadotropin releasing hormone in natural and induced-estrus cats. Theriogenology 27:811-817, 1987.
6. Wildt, D.E., Bush, M., Goodrowe, K.L., Packer, C., Pusey, A.C., Brown, J.L., Joslin, P. and O'Brien, S.J. Reproductive and genetic consequences of founding isolated lion populations. Nature, 329:328-331, 1987.
7. Brown, J.L., Armstrong, D., Simmons, L.G., Goodrowe, K.L. and Wildt, D.E. Evaluation of the pituitary-gonadal response to GnRH, and of adrenal status, in the leopard (Panthera pardus japonensis) and tiger (Panthera tigris) J. Reprod. Fertil. 82:227-236, 1988.
8. Goodrowe, K.L., Howard, J.G. and Wildt, D.E. Comparison of embryo recovery, embryo quality, oestradiol-17ß and progesterone profiles in domestic cats at natural or induced-oestrus. J. Reprod. Fertil. 82:553-561, 1988.
9. Goodrowe, K.L., Miller, A.M. and Wildt, D.E. Capacitation of domestic cat spermatozoa as determined by homologous zona pellucida penetration. Proc. XIth Intl. Cong. Anim. Reprod. Artif. Insem. #244, 1988.
10. Goodrowe, K.L., Wall, R.J., O'Brien, S.J., Schmidt, P.M. and Wildt, D.E. Developmental competence of domestic cat follicular oocytes after fertilization in vitro. Biol. Reprod. 39:355-372, 1988.

11. Wildt, D.E., Miller, A.M. and Goodrowe, K.L. In vitro fertilization in the domestic cat (Felis catus) and leopard cat (Felis bengalensis). Proc. Soc. Theriogenology. pp. 376-382, 1988.
12. Brown, J.L., Wildt, D.E., Phillips, L.G., Seidensticker, J., Fernando, S.B.U., Miththapala, S. and Goodrowe, K.L. Adrenal-pituitary-gonadal relationships and ejaculate characteristics in captive leopards (Panthera pardus kotiya) isolated on the island of Sri Lanka. J. Reprod. Fertil. 85:605-614, 1989.
13. Goodrowe, K.L., Howard, J.G. Schmidt, P.M. and Wildt, D.E. The reproductive biology of the domestic cat with special reference to endocrinology, sperm function and in vitro fertilization. J. Reprod. Fertil. Suppl. 39:73-90, 1989.
14. Goodrowe, K.L., Miller, A.M. and Wildt, D.E. In vitro fertilization of gonadotropin-stimulated leopard cat (Felis bengalensis) follicular oocytes. J. exp. Zool. 252:89-95, 1989.
15. Miller, A.M., Roelke, M.E., Goodrowe, K.L., Howard, J.G. and Wildt, D.E. Oocyte recovery, maturation and fertilization in the puma (Felis concolor). J. Reprod. Fertil. 88:249-258, 1990.
16. Schiewe, M.C., Howard, J.G., Goodrowe, K.L., Stuart, L.D. and Wildt, D.E. Human menopausal gonadotropin induces ovulation in sheep, but embryo recovery after prostaglandin $F_{2\alpha}$ synchronization is compromised by premature luteal regression. Theriogenology 34:469-486, 1990.
17. Buckrell, B.C., Gartley, C.J., Mehren, K.G., Crawshaw, G.J., Johnson, W.H., Barker, I.K., Balke, J., Coghill, C., Challis, J.R.G. and Goodrowe, K.L. Failure to maintain interspecific pregnancy following transfer of Dall's sheep embryos to domestic ewes. J. Reprod. Fertil. 90:387-394, 1990.
18. Crawshaw, G.J., Brown, J.L. and Goodrowe, K.L. Infertility in a male cheetah. J. Zoo Wildl. Med. 22:119-124, 1991.
19. Goodrowe, K.L., Crawshaw, G.J. and Mehren, K.G. Stimulation of ovarian activity and oocyte recovery in the caracal (Felis caracal) and cheetah (Acinonyx jubatus). J. Zoo Wildl. Med. 22:42-48, 1991.
20. Miththapala, S., Seidensticker, J., Phillips, L.G., Goodrowe, K.L., Fernando, S.B.U., Forman, L. and O'Brien, S.J. Genetic variation in Sri Lankan leopards. Zoo Biol. 10:139-146, 1991.
21. Goodrowe, K.L., Hay, M. and King, W.A. Nuclear maturation of domestic cat ovarian oocytes in vitro. Biol. Reprod. 45:466-470, 1991.
22. Donoghue, A.M., Howard, J.G., Byers, A.P., Goodrowe, K.L., Bush, M., Blumer, E., Lukas, J., Stover, J., Snodgrass, K. and Wildt, D.E. Correlation of sperm viability with gamete interaction and fertilization in vitro in the cheetah (Acinonyx jubatus). Biol. Reprod. 46:1047-1056, 1992.
23. Goodrowe, K.L. Feline reproduction and artificial breeding technologies. Anim. Reprod. Sci. 28: 389-397, 1992.
24. Goodrowe, K.L., Wildt, D.E. and Monfort, S.L. Effective suppression of ovarian cyclicity in the lowland gorilla with an oral contraceptive. Zoo Biol. 11:261-269, 1992.
25. Howard, J.G., Donoghue, A.M., Goodrowe, K.L., Blumer, E.S., Snodgrass, K., Starnes, D., Tucker, M., Bush, M. and Wildt, D.E. Successful induction of ovarian activity and laparoscopic intrauterine artificial insemination in the cheetah (Acinonyx jubatus). J. Zoo Wildl. Med. 23:288-300, 1992.
26. Donoghue, A.M., Johnston, L.A., Goodrowe, K.L., O'Brien, S.J. and Wildt, D.E. Influence of day of oestrus on egg viability and comparative efficiency of in vitro fertilization in domestic cats in natural or gonadotrophin-induced oestrus. J. Reprod. Fertil. 98:85-90, 1993.
26. Hay, M. and Goodrowe, K.L. Comparative cryopreservation and capacitation of spermatozoa from epididymides and vasa deferentia of the domestic cat. J. Reprod. Fertil. Suppl. 47:297-305, 1993.

27. Goodrowe, K.L. and Hay, M. Characteristics and zona binding ability of fresh and cooled domestic cat epididymal spermatozoa. Theriogenology 40:967-976, 1993
28. Hay, M.H., Bellem, A.C., Brown, J.L. and Goodrowe, K.L. Reproductive patterns in tamandua (Tamandua tetradactyla). J. Zoo Wildl. Med. 25:248-258, 1994.
29. Graham, L.H., Goodrowe, K.L., Raeside, J.R., Liptrap, R.M. Non-invasive monitoring of ovarian function in several felid species by measurement of fecal estradiol 17ß and progestins. Zoo Biol. 14:223-237, 1995.
30. Bellem, A.C., Monfort, S.L. and Goodrowe, K.L. Monitoring reproductive development, menstrual cyclicity and pregnancy in the lowland gorilla (Gorilla gorilla) by enzyme immunoassay. J. Zoo Wildl. Med. 26:24-31, 1995.
31. Goodrowe, K.L., Smak, B., Presley, N. and Monfort, S.L. Reproductive, behavioral and endocrine characteristics of the Dall's sheep (Ovis dalli dalli). Zoo Biol. 15:45-54, 1996.
32. Matsuda, D.M., Gartley, C.J., Bellem, A.C., Liptrap, R.M., King, W.A., Madison, V. and Goodrowe, K.L. Endocrine and behavioral events of estrous cyclicity and synchronization in Wood bison (Bison bison athabascae). Theriogenology 45:1429-1441, 1996.
33. Brown, J.L., Wildt, D.E., Wielebnowski, N., Goodrowe, K.L., Graham, L.H., Wells, S. and Howard, J.G. Reproductive activity in captive female cheetahs (Acinonyx jubatus) assessed by faecal steroids. J. Reprod. Fertil. 106:337-346. 1996.
34. Hay, M.A., King, W.A., Gartley, C.J., Leibo, S.P. and Goodrowe, K.L. Effects of cooling, freezing and glycerol on penetration of oocytes by spermatozoa in dogs. J. Reprod. Fertil. Suppl. 51 99-108, 1997.
35. McDougall, K., Hay, M.A., Goodrowe, K.L., Gartley, C.J. and King, W.A. Changes in the number of follicles and oocytes in ovaries of prepubertal, peripubertal and mature bitches. J. Reprod. Fertil. Suppl. 51 25-31, 1997.
36. Hay, M.A., King, W.A., Gartley, C.J., Leibo, S.P. and Goodrowe, K.L. Canine spermatozoa - Cryopreservation and evaluation of gamete interaction. Theriogenology 48:1329-1342, 1997.
37. Schwarzenberger, F., Walzer, C., Tomasova, K., Vahala, J., Meister, J., Goodrowe, K.L., Zima, J., Straub, G. and Lynch, M. Faecal progesterone metabolite analysis for non-invasive monitoring of reproductive function in the white rhinoceros (Ceratotherium simum). An. Reprod. Sci. 53: 173-190, 1998
38. Goodrowe, K.L., Hay, M.A., Platz, C.C., Behrns, S.K., Jones, M.T. and Waddell, W.T. Characteristics of fresh and frozen-thawed red wolf (Canis rufus) spermatozoa. An. Reprod. Sci. 53: 299-308, 1998.
39. Othen, L.S., A.C. Bellem, A.C., Gartley, C.J., Auckland, K., King, W.A., Liptrap R.M. and Goodrowe, K.L. Hormonal control of estrous cyclicity and attempted superovulation in Wood bison (Bison bison athabascae). Theriogenology 52:313-323, 1999.
40. Hay, M.A. King, W.A., Gartley, C.J. and Goodrowe, K.L. Correlation of peri-ovulatory serum and fecal progestins in the domestic dog. Canadian J. Vet. Res. 64: 59-63, 2000.
41. Goodrowe, K.L., Walker, S., Ryckman, D., Mastromonaco, G., Hay, M.A., Bateman, H. and Waddell, W.T.. Piecing together the puzzle of carnivore reproduction. An. Reprod. Sci 60-61: 389-403, 2000.
42. Sladky, KK, Horne, WA, Goodrowe KL, Stoskopf, MK, Loomis, MR, Harms, CA. Evaluation of epidural morphine for postoperative analgesia in ferrets (Mustela putorius furo) Contemp Top Lab Anim Sci 39:33-38, 2000.

43. Goodrowe, K.L., Mastromonaco, G.F., Ryckman, D.P., Walker, S.L., Bateman, H.L., Platz, C.C. Jr., Waddell, W.T. In vitro maintenance and effects of cooling and cryopreservation on red wolf (Canis rufus) sperm characteristics. J Reprod Fertil 57(Suppl):387-392, 2001.
44. Young, K.M, Brown, J.L., Goodrowe, K.L. Characterization of reproductive cycles and adrenal activity in the black-footed ferret (Mustela nigripes) by fecal hormone analysis. Zoo Biol. 20:517-536, 2001.
45. Walker, S.L., Waddell, W.T., Goodrowe, K.L. Reproductive endocrine patterns in captive female and male red wolves (Canis rufus) assessed by fecal and serum hormone analysis. Zoo Biol. 21:321-336, 2002.
46. Mastromonaco, G.F., Hay, M.A., Goodrowe, K.L. The effects of oocyte storage and cumulus cell presence on canine zona penetration by domestic dog spermatozoa. Theriogenology 57:1123-1134, 2002.
47. Goodrowe, K.L. Programs for invasive research in North American zoos and aquariums. ILAR Journal 44:317-323, 2003.
48. Lockyear, K.M., Goodrowe, K.L., Waddell, W.T., MacDonald, S.E. Comparison of different osmolalities and egg-yolk composition in processing media for the cryopreservation of red wolf (Canis rufus) sperm. Theriogenology 71:469-479, 2009.
49. Lockyear, K.M., Waddell, W.T., Goodrowe, K.L., MacDonald, S.E. Retrospective investigation of captive red wolf reproductive success in relation to age and inbreeding. Zoo Biol. 28: 214-229, 2009.
50. Keeley T, Goodrowe KL, Graham LH, Howell C, MacDonald SE. The reproductive endocrinology and behavior of the Vancouver Island marmot (*Marmota vancouverensis)*. Zoo Biol. 31:275-290, 2012.
51. Saunders, S.P., Harris, T., Traylor-Holzer, K., Goodrowe Beck, K. Factors influencing breeding success, ovarian cyclcity, and cub survival in zoo-managed tigers (Panthera tigris). An Reprod. Sci. 144:38-47, 2014.
52. Nájera , F. Brown, J., Goodrowe, K., Schwartz, R. Kongprom, U., Revuelta, L., Wildt, D. MASS Dynamic in hand reared clouded leopard (Neofelis nebulosa) cubs: From birth until three months old. In press. J. Zoo Wildl. Med. 2014
53. Anderson, K., Goodrowe Beck, K., Waddell, W., Nordberg-Wilke, C., Wolf, K. Ultrasound morphometrics and hormone analysis as predictors of red wolf (Canis rufus) reproductive health. Submitted. J. Zoo Wildl. Med. 2014

Book Chapters and Proceedings:

1. Wildt, D.E., Phillips, L.G., Simmons, L.G., Goodrowe, K.L., Howard, J.G., Brown, J.L. and Bush, M. Seminal-endocrine characteristics of the tiger and the potential for artificial breeding. In: The Global Tiger Survival Plan. Eds. U.S. Seal and R. Tilson. Noyes Publications, Park Ridge, pp. 255-279, 1987.
2. Wildt, D.E. and Goodrowe, K.L. The potential for embryo technology in the Black-Footed Ferret. In: The Reproductive Biology of the Black Footed Ferret. Ed. U.S. Seal, E.T. Thorne, M.A. Bogan and S.H. Anderson. Yale University Press, New Haven, pp. 160-176, 1989.
3. Goodrowe, K.L. Application of Reproductive Biotechnology to Wildlife Conservation Programs. In: Proceedings, Society for Theriogenology, pp. 30-37, 1997.
4. Goodrowe, K.L., Mastromonaco, G.F., Othen, L.S. Reproductive patterns in female bison (Bison bison sp.). In: Current Therapy in Large Animal Theriogenology 2nd Edition. Eds. R.S. Youngquist, W.R. Threlfall. Chapter 137, pp. 1000-1004, 2006.

Abstracts:

1. Goodrowe, K.L. and Heath, E.E. Saga of the manchette in the equine spermatid. Proc. Amer. Assoc. Anat., Anat. Rec. #66, 1982.
2. Diehl, J.R., Stuart, L.D., Goodrowe, K.L., Chakraborty, P.K. and Wildt, D.E. Induced ovulation in the NIH strain of inbred miniature pig. Proc. Xth Intl. Cong. Anim. Reprod. Artif. Insem. #315, 1984.
3. Schiewe, M.C., Howard, J.G., Stuart, L.D., Goodrowe, K.L. and Wildt, D.E. Human menopausal gonadotropin (hMG) for superovulation of sheep. Theriogenology 23:227, 1985.
4. Goodrowe, K.L. and Wildt, D.E. Ovarian response to exogenous gonadotropins in the domestic cat. Proc. Fed. Amer. Soc. Exp. Biol. #11233, 1985.
5. Goodrowe, K.L., Howard, J.G. and Wildt, D.E. Embryo recovery and quality in the domestic cat: Natural versus induced-estrus. Theriogenology 25:156, 1986.
6. Brown, J.L., Goodrowe, K.L., Armstrong, D.L., Simmons, L.G. and Wildt, D.E. Pituitary, gonadal and adrenal responses to GnRH in two species of wild Felidae. Biol. Reprod. 36 (Suppl. 1): 129, 1987.
7. Goodrowe, K.L., Wall, R.J. and Wildt, D.E. Influence of gonadotropins and developmental competence of in vitro fertilized feline follicular oocytes. Theriogenology 29:250, 1988.
8. Miller, A.M., Goodrowe, K.L. and Wildt, D.E. Influence of gonadotropin source and treatment interval on in vitro fertilization of cat follicular oocytes. Biol. Reprod. 38 (Suppl. 1):73, 1988.
9. Brown, J.L., Wildt, D.E., Phillips, L.G and Goodrowe, K.L. Adrenal-pituitary-gonadal responses of captive male and female leopards administered ACTH and GnRH. Biol. Reprod. 38 (Suppl. 1):221, 1988.
10. Goodrowe, K.L., Mehren, K.G., Wildt, D.E. and Monfort, S.L. Monitoring pregnancy in Dall's sheep (Ovis dalli dalli) by urinary hormonal analysis. Proc. Amer. Assoc. Zoo Vet. pp. 192-193, 1988.
11. Buckrell, B., Gartley, C., Goodrowe, K.L., Crawshaw, G.C., Johnson, W.H., Barker, I.K., Balke, J. Coghill, C. and Mehren, K.G. Failure of interspecific pregnancy maintenance following transfer of Dall's sheep embryo to domestic ewes. Proc. Amer. Assoc. Zoo Vet. pp. 77-78, 1988.
12. Miller, A.M., Howard, J.G., Goodrowe, K.L., Johnston, L.A., Hurlbut, S.L., Roelke, M.E., Bush, M. and Wildt, D.E. In vitro fertilization strategies for domestic and nondomestic felids. Proc. Amer. Assoc. Zoo Vet. pp. 196-198, 1988.
13. Miller, A.M., Roelke, M.E., Goodrowe, K.L., Howard, J.G. and Wildt, D.E. Oocyte recovery, maturation and in vitro fertilization in the puma (Felis concolor). Theriogenology 31:228, 1989.
14. Goodrowe, K.L., Mehren, K.G., Crawshaw, G.J., Carnio, J., Wildt, D.E. and Monfort, S.L. Manipulation of menstrual cyclicity in the lowland gorilla with oral contraceptives. Proc. Fertility in the Great Apes p. 22, # 34, 1989.
15. Buckrell, B.C., Gartley, C.J., Mehren, K.G. and Goodrowe, K.L. Superovulation in dall's sheep (Ovis dalli dalli). Theriogenology 3:201, 1990.
16. Goodrowe, K.L., Mehren, K.G. and King, W.A. Meiotic maturation of domestic cat ovarian oocytes in vitro. Theriogenology 33:237, 1990.
17. Hay, M. and Goodrowe, K.L. Comparative cryopreservation and capacitation of domestic cat epididymal spermatozoa. Biol. Reprod. 44 (Suppl. 1):181, 1991.
18. Donoghue, A.M., Howard, J.G., Byers, A.P., Goodrowe, K.L., Bush, M., Blumer, E., Lukas, J., Stover, J., Snodgrass, K. and Wildt, D.E. Sperm viability influences gamete interaction in vitro in the cheetah. Biol. Reprod. 44 (Suppl. 1):72, 1991.

19. Donoghue, A.M., Johnston, L.A. and Goodrowe, K.L. Follicular development, maturation and in vitro fertilization of oocytes from domestic cats in natural estrus or after eCG-treatment. Biol. Reprod. 46 (Suppl. 1):82, 1992.
20. Hay, M. and Goodrowe, K.L. Cryopreservation of domestic cat epididymal spermatozoa as a model for gamete salvage. Proc. 2nd Intl. Symp. Canine/Feline Reprod. p. 46, 1992
21. Graham, L.H., Raeside, J.I., Goodrowe, K.L. and Liptrap, R.M. Measurement of fecal 17b estradiol and progesterone in non-pregnant domestic and exotic cats. Proc. 2nd Intl. Symp. Canine/Feline Reprod. p. 175, 1992
22. Bellem, A.B. and Goodrowe, K.L. Urinary hormone analysis to detect estrus and monitor pregnancy in captive wild ungulates. Proc. Amer. Assoc. Zoo Parks & Aquariums, 1992.
23. Hay, M., Bellem, A.B. and Goodrowe, K.L. Investigations into the reproductive physiology of the lesser anteater (Tamandua tetradactyla). Proc. Amer. Assoc. Zoo Parks & Aquariums, 1992.
24. Graham, L., Goodrowe, K.L., Raeside, J.I. and Liptrap, R.L. Monitoring ovarian function in exotic felids via fecal steroids. Proc. Amer. Assoc. Zoo Parks & Aquariums, 1992.
25. Kirkpatrick, J.F., Calle, P.O., Kalk, Pl, Kolter, L., Zimmerman, W., Goodrowe, K., Turner, J.W. Jr., Liu, I.K.M. and Bernoco, M. Immunocontraception of female captive exotic ungulates. Proc. Amer. Assoc. Zoo Vets. 100-101, 1992.
26. Kirkpatrick, J.F., Calle, P.O., Kalk, Pl, Kolter, L., Zimmerman, W., Goodrowe, K., Turner, J.W. Jr., Liu, I.K.M., Bernoco, M. and Rutberg, A.T. Immunocontraception in zoo animals: Vaccinating against pregnancy. Proc. Amer. Assoc. Zoo Vets. 290-291, 1993.
27. Hay, M., King W.A., Gartley, C.J., Goodrowe, K.L. Influence of spermatozoa on in vitro nuclear maturation of canine ova. Biol. Reprod. 50 (Suppl. 1):362, 1994.
28. Matsuda-Motomura, D.M.,Gartley, C.J., Bellem, A.C., Liptrap, R.M., Madison, V. and Goodrowe, K.L. Endocrine and behavioral events of estrous cyclicity and synchronization in Wood bison (Bison bison athabascae). Theriogenology 43:273, 1995.
29. McIninch, A.C. Bellem, S.E. MacDonald, K.L. Goodrowe, L.H. Graham, J.L. Brown, T.L. Roth. Monitoring fecal progestogen metabolites in the Sumatran rhinoceros (Dicerohinus sumatrensis) by enzyme immunoassay. Proc. 7th World Conf. Breeding Endangered Species. Cincinnati Zoo. 1999.
30. McIninch, M.D., K.L. Goodrowe, S.E. MacDonald. Correlation of behavior and reproductive hormones in the Indian rhinoceros, Rhinoceros unicornis. Proc. Anim. Behav. Soc. Ann. Mtg. 1999. P. 53.
31. Bateman, H.L., M.A. Hay, G.F. Mastromonaco, D.P. Ryckman, K.L. Goodrowe. Characterization of epididymal spermatozoa. Theriogenology. 53:486, 2000.

Attachment #5

[redacted]

# Karen Nelson Wolf, MS, DVM, Dipl. ACZM

## EDUCATION

[redacted]T

## SPECIALTY BOARD CERTIFICATION

Diplomate, American College of Zoological Medicine (2011)

## WORK AND CLINICAL EXPERIENCE

**Head Veterinarian**
**Point Defiance Zoo & Aquarium, Tacoma, WA, [redacted]nt**
Plan, organize and direct operations of the Veterinary Department, including budget development and supervision of professional staff. Design and oversee the training program for intern veterinarians and veterinary students. Diagnose and treat sick collection animals and maintain preventive medicine program. Develop policies, procedures and standards to ensure the health, safety and welfare of the animal collection. Advise senior staff members on topics concerning animal health and medical care. Interface with the marketing department and serve as media representative for issues pertaining to the health of collection animals.

**Zoological Medicine Resident**
**NC State University College of Veterinary Medicine, Raleigh, NC, [redacted]8**
Clinical management of a diverse collection of captive zoo animals at the North Carolina Zoological Park, including preventative medicine, surgery and necropsy. Residency involved rotations at 3 North Carolina aquariums (Pine Knoll Shores, Fort Fisher, Roanoke Island) and the Karen Beasley Sea Turtle Hospital. Additional experience included marine mammal stranding response and necropsy, an external rotation at the Marine Mammal Center (Sausalito, CA) and capture and surgery of wild waterfowl (Aleutian Islands, AK). Responsibilities also included clinical training and supervision of senior veterinary students and preparing lectures and providing laboratory instruction for 1st-3rd year veterinary students.

**Exotic, Wildlife, and Zoological Medicine Intern**
**Kansas State University College of Veterinary Medicine, Manhattan, [redacted]**
In depth clinical experience in the medical management of exotic pet species, native wildlife, and zoo animals representing 3 zoological parks (Sunset Zoo, Topeka Zoo, Rolling Hills). Experience included chemical immobilization, anesthesia, and surgery of exotic animals. Duties also included revision of existing preventative medicine programs, teaching senior veterinary students and manuscript preparation.

**Small Animal Medicine, Surgery, and Critical Care Intern**
**Mesa Veterinary Hospital, Mesa, AZ, 2[redacted]**
Rotating internship with general practitioners and board certified specialists. Experience included elective external rotations at the Phoenix Zoo's Animal Care Center.

**Hubert Student Fellowship in International Health**
**Centers for Disease Control and Prevention, Atlanta, GA; Phnom Penh, Cambodia, 2001**
**Reference: Charles Rupprecht, VMD, PhD** (cyr5@cdc.gov)
Project: *Emerging Infectious Disease Issues Related to Chiroptera in Southeast Asia*
Summer fellowship project conducting surveillance for bat lyssaviruses in multiple locations throughout Cambodia. Project involved emerging infectious disease surveillance including field sample collection, diagnostics, and training local scientists.

**Summer Fellowship in Science, Technology, and Public Policy Issues in Veterinary Medicine**
[redacted]
Project*: Infrared Triggered Photography and Tracking Plates to Monitor Oral Rabies Vaccine Uptake by Raccoons in Culverts*
Participated in an oral rabies vaccination program targeting raccoons in a suburban environment with a focus on epidemiological research and public policy. Conducted independent research project to assess the dynamics of vaccine bait uptake by raccoons and to evaluate the inter-species competition for baits placed in culverts.

**Graduate Research Assistant**, **Reproductive Physiology Program**
**National Zoological Park, Smithsonian Institution, Washington, DC, 1[redacted]**
**Reference: David Wildt, PhD** (wildtd@si.edu)
MS thesis: *Reproductive Inefficiency and the Influence of Age in Male Black-footed Ferrets (Mustela nigripes)*
Graduate research focused on the reproductive biology and management of the endangered black-footed ferret. Developed extensive technical, research and professional skills in reproductive physiology and wildlife conservation. Trained veterinarians at participating captive breeding programs in semen collection, analysis, and cryopreservation techniques.

**Biological Technician**, **Reproductive Physiology Program**
**National Zoological Park, Smithsonian Institution, Washington, DC, 1[redacted]**
[redacted] cryobanks for individual strains of mice in collaboration with the National Institute of Aging. Assisted in a variety of projects involving the reproductive physiology of diverse species ranging from Asian elephants to endangered carnivores. Technical support included semen collection, analysis, cryoreservation, and gamete micromanipulation.

**Clinical Embryologist/Andrologist**
**Center for Reproductive Research and Testing, Rockville, MD, 1[redacted]**
[redacted], in vitro fertilization, and embryo selection and transfer to recipients. Performed semen analyses and preparation of samples for in vitro fertilization.

## REFEREED PUBLICATIONS

Seeley KE, **Wolf KN**, Bishop MA, Jacobson M, KuKanich B. Pharmacokinteics of long acting antibiotic cefovecin (Convenia®) in copper rockfish (*Sebastes caurinus*). American Journl of Veterinry Research *in review*

Seeley KE, Garner MM, Waddell WT, **Wolf KN**. 2015. A survey of diseases in captive red wolves (*Canis rufus*), 1997-2012. Journal of Zoo and Wildlife Medicine *in review*.

Anderson KA, Goodrowe Beck K, Waddell WT, **Wolf KN**. 2015. Ultrasound morphometrics and hormonal values as predictors of red wolf (*Canis rufus*) reproductive health. Journal of Zoo and Wildlife Medicine *in review*.

Anderson KA, **Wolf KN**. 2014. Iron deficiency anemia in a ring tailed lemur (*Lemur catta*) with concurrent chronic renal failure. Journal of the American Veterinary Medical Association 244(4):471-475.

Anderson KA, **Wolf KN**. 2013. Medical management of pyometra in three red wolves (*Canis rufus*). Journal of Zoo and Wildlife Medicine 44(4):1010-1017.

Anderson KA, Garner MM, Reed HH, Cook K, Aguilar A, Horton S, Case AL, **Wolf KN**. 2013. Hemorrhagic diathesis in avian species following intramuscular administration of polysulfated glycosaminoglycan. Journal of Zoo and Wildlife Medicine 44(1):93-99.

Degernes LA, **Wolf KN**, Zombeck DJ, MacLean RA, DeVoe RS. 2012. Ventricular diverticula formation in captive parakeet auklets (*Aethia psittacula*) secondary to foreign body ingestion. Journal of Zoo and Wildlife Medicine 43(4): 889-897.

Chinnadurai SK, Troan BV, **Wolf KN**, DeVoe RS, Huijsmans CJ, Hermans MH, Wever PC. 2009. Septicemia, endocarditis, and cerebral infarction due to Staphylococcus aureus in a harp seal (*Phoca groenlandica*). Journal of Zoo and Wildlife Medicine 40(2):393-7.

**Wolf KN**, Troan BT, DeVoe R. 2008. Chronic urolithiasis and subsequent cystectomy in a San Esteban Island chuckwalla, *Sauromalus varius*. Journal of Herpetological Medicine and Surgery 18 (3/4): 106-112.

**Wolf KN**, Harms CA, Beasley J. 2008. Evaluation of five clinical analyzers for use in health assessment in sea turtles. Journal of the American Veterinary Medical Association 233(3):470-475.

**Wolf KN**, DePerno CS, Jenks JA, Stoskopf M, Kennedy-Stoskopf S, Haroldson BS, Marcino JW, Swanson CS, Brinkman TJ, Osborn PG, Tardiff JA. 2008. Serologic survey of selected infectious diseases and selenium status of white-tailed deer (*Odocoileus virginianus*) in southern Minnesota. Journal of Wildlife Diseases 44(1):181-187.

**Wolf KN**, Lock B, Carpenter JW, Garner MM. 2007. Baylisascaris procyonis in a Moluccan cockatoo (*Cacatua moluccensis*). Journal of Avian Medicine and Surgery 21(3):220-225.

**Wolf KN**, Pilcicki J, Elvinger FE. 2003. Infrared-triggered photography and tracking plates to monitor oral rabies vaccine uptake by raccoons in culverts. Wildlife Society Bulletin 31:387-391.

**Wolf KN**, Wildt DE, Vargas A, Marinari PE, Ottinger MA, Howard JG. 2000. Reproductive inefficiency in male black-footed ferrets (*Mustela nigripes*). Zoo Biology 19:517-52.

**Wolf KN**, Wildt DE, Vargas A, Marinari PE, Kreeger JS, Ottinger MA, Howard JG. 2000. Age dependent changes in sperm production, semen quality and testicular volume in the black-footed ferret (*Mustela nigripes*). Biology of Reproduction 63:179-187.

Roberts RL, **Wolf KN**, Sprangel ME, Rall WF, Wildt DE. 1999. Prolonged mating in prairie voles increases embryo number. Biology of Reproduction 60:756-762.

## BOOK CHAPTERS

**Wolf KN**, Carpenter JW, Kolmstetter CM: Feeding small pet mammals. In: Hand MS, Thatcher CD, Remillard RL, Roudebush P, Novotny BJ (eds). Small Animal Clinical Nutrition 5th Edition. Mark Morris Institute. Topeka, KS. 2010.

## ABSTRACTS

Anderson KA, Garner MM, Reed HH, Cook K, Aguilar R, Horton S, Case AL, **Wolf KN**. 2012. Heorrhagic diathesis in avian species following intramuscular administration of polysulfated glycosaminoglycan. Proceedings: American Association of Zoo Veterinarians, pp 190.

**Wolf KN**, DeVoe R, Degernes L, MacLean R, Zombeck D, Reininger K. 2007. Ventriculotomy and post-surgical management of ventricular diverticula in captive parakeet auklets (*Aethia psittacula*). Proceedings: American Association of Zoo Veterinarians, pp 170.

Larsen RS, **Wolf KN**, Peterson MR. 2007. Effects of assisted ventilation on common eiders (*Somateria mollissima*) anesthetized with propofol for radio transmitter implantation. Proceedings: American Association of Zoo Veterinarians, pp 38-39.

**Wolf KN**, Harms CA, Dombrowski DS, Goetz DM, Hall AJ, Parish LA, Royal LW, Smith SM, Beasley J. 2006. Comparison of plasma biochemistry analyzers for use in sea turtle assessment. Proceedings: International Association of Aquatic Animal Medicine 37: 122-123.

**Wolf KN**, Lewbart GA, Mashima TY. 2003. Spring viremia of carp: animal health policy considerations. Proceedings: American Association of Zoo Veterinarians, pp 207-208.

Bright PR, Elvinger F, Schmidt E, Mills CM, **Wolf KN**, Landolfi JA, Church SD. 2000. Oral rabies vaccine distribution strategy for raccoons in an urban/suburban area utilizing geographic information systems. Proceedings: Conference of Research Workers in Animal Diseases, Abst. 17.

Wildt DE, **Wolf KN**, Howard JG. Biopolitics, reproduction and conservation of endangered species. 1998. Proceedings: Society for the Study of Reproduction, Supplement 23:M-6

Howard JG, **Wolf KN**, Marinari PE, Kreeger JS, Anderson TR, Vargas A, Wildt DE. 1998. Delayed onset of sperm production in 1-year old male black-footed ferrets. Proceedings: Society for the Study of Reproduction, Supplement 58:124.

Howard JG, **Wolf K**, Vargas A, Marinari P, Kreeger J, Williamson L, Wildt DE. 1998. Enhanced reproductive efficiency and pregnancies after artificial insemination in black-footed ferrets. Proceedings: American Association of Zoo Veterinarians, pp 351-352.

## SYMPOSIA PRESENTATIONS

Red Wolf Species Survival Plan, Annual Meeting, Akron, OH 2014
Red Wolf Species Survival Plan, Annual Meeting, Homosassa, Fla 2013
American Association of Zoo Veterinarians, Annual Conference, Knoxville, TN 2007
Wildlife Rehabilitators of North Carolina, Symposium, Asheboro, NC 2007
International Association of Aquatic Animal Medicine, Annual Conference, Bahamas 2006
Crissey Zoological Nutrition Symposium, Raleigh, NC 2006, 2007
NC Wildlife Damage Control Agent Certification Seminar, Raleigh, NC 2006, 2007
Student Chapter of the American Veterinary Medical Association, Annual Symposium, College Station, TX 2005
13th Annual Mid-Western Exotic Animal Medicine Conference, Manhattan, KS 2004
American Association of Zoo Veterinarians, Annual Conference, Minneapolis, MN 2003
Black-footed Ferret Species Survival Plan, Annual Meeting, Laramie, WY 1998
American Andrology Society, Annual Conference, Long Beach, CA 1998
New Opportunities in Animal Health Science, Annual Conference, Front Royal, VA 1997, 1998

## AWARDS

E. L. Tyler and C. W. Vaughan, Jr. Endowed Scholarship 2002
The CDC Foundation's O.C. Hubert Student Fellowship in International Health 2001
Virginia Maryland Fellowship in Science, Technology, and Public Policy Issues in Veterinary Medicine 2000
Smithsonian Institution, Visiting Student Scholarly Studies Grant Appointment 1998-1999

## PROFESSIONAL MEMBERSHIPS/APPOINTMENTS

Oregon State University College of Veterinary Medicine
Service: Courtesy Faculty member 2013-present
American College of Zoological Medicine
Service: 2012 ACZM Exam Committee, Subcommittee on Maintenance of Certification
American Association of Zoo Veterinarians
Service: Red Wolf SSP Veterinary Advisor, Co-Chair Committee on Wildlife Health and Conservation
American Veterinary Medical Association

## REFERENCES

Available on request

**Karen D. Povey**
[redacted]

[redacted]

## SUMMARY OF QUALIFICATIONS

[redacted] **animal care manager, educator, and wildlife conservationist**

- Skillful oral and written communicator, author, presenter, teacher, and curriculum designer for wide-ranging audiences including the general public, zoo visitors, pre-school through college age students, donors, sponsors; accomplished institutional spokesperson for screen and print media.
- Effective manager of on- and off-site conservation education programming including staff and volunteer recruitment, training, supervision, and budget management. Skilled in building cohesive, motivated, and successful teams. Highly accomplished with inter-departmental coordination and collaboration with community and academic organizations.
- Accomplished in the development and evaluation of visitor engagement initiatives and messaging to enhance learning, connect guests with nature, and influence the adoption of conservation behaviors.
- Experienced staff and peer trainer, providing interactive, learner-focused programs for audiences of all levels including volunteers, seasonal staff, full-time staff, and AZA colleagues on topics including message design and delivery, ecosystem conservation, and operant conditioning.
- Highly engaged with AZA activities: serving on the Conservation Education Committee, elected inaugural Chair of the Ambassador Animal Scientific Advisory Group, coordinator of the Education Advisor Program, Education Advisor for the Felid TAG and Clouded Leopard SSP.
- Initiated and advanced interpretive animal programming to enhance the PDZA visitor experience, culminating in the development of the $5 million Wild Wonders Outdoor Theater, an industry-leading facility offering AZA award-winning presentations with novel conservation education messaging to foster environmental stewardship in audiences.
- Animal behavior specialist with twenty-five years of experience managing husbandry and training behaviors for a wide range of vertebrate taxa.
- Co-founded and serves as President and CEO of the 501(c)(3) organization, the Clouded Leopard Project, devoted to research, conservation, and education efforts on behalf of the clouded leopard and other endangered small Southeast Asian felids. In partnership with PDZA, develops *in situ* education materials, provides technical support for range country educators from partnering NGOs, and conducts teacher training.
- Committed to conservation in my daily life, both personally and professionally, and displays a passion for inspiring conservation action in others.

## PROFESSIONAL EXPERIENCE

[redacted]

Point Defiance Zoo & Aquarium, Tacoma, WA

[redacted]

**Associate Curator of Education and Conservation**
**Instructor, Science and Math Institute, Tacoma Public Schools**
Point Defiance Zoo & Aquarium, Tacoma, WA

[redacted]

**Senior Staff Biologist**, **Wild Wonders Outdoor Theater/Interpretive Animal Programming** Point Defiance Zoo & Aquarium, Tacoma, WA

[redacted]

**Senior Staff Biologist**, **World of Adaptations,** Point Defiance Zoo & Aquarium. Tacoma, WA

[redacted]

[redacted] **Project Co-founder, President and CEO** (www.cloudedleopard.org)

[redacted]

**Wildlife Theater Trainer/Supervisor/Outreach Manager**, Marine World Africa USA, Vallejo, CA

## MEMBERSHIPS, APPOINTMENTS, AND OTHER PROFESSIONAL ACTIVITIES

Member, AZA Conservation Education Committee

Chair, AZA Ambassador Animal Scientific Advisory Group

Clouded Leopard Species Survival Plan® Education Advisor

AZA Felid Taxon Advisory Group, Education Co-Advisor

Professional Fellow Member, Association of Zoos and Aquariums

Member, Board of Directors, International Association of Avian Trainers and Educators 2006 & 2007

AZA Conservation Education Training Program, 2000

Frequent presenter at AZA National Conferences, Felid TAG meetings, and International Assoc. of Avian Trainers and Educators National Conferences on program animal and conservation topics

Co-coordinator and volunteer, PDZA Purple Martin Monitoring Project and PDZA Pika Watch Project

Presenter for Pacific Science Center's Science Café and Tacoma TEDx

## HONORS AND AWARDS

Leader of Point Defiance Zoo & Aquarium team receiving the following awards:

- 2006 AZA Education Award, Wild Wonders Outdoor Theater
- 2006 Husbandry Behavior of the Year, International Association of Avian Trainers and Educators
- 2006 Interpretive Award, International Association of Avian Trainers and Educators
- 2008 Enrichment Award, International Association of Avian Trainers and Educators
- 2009 Show Behavior of the Year, International Association of Avian Trainers and Educators
- 2009 AAZK Certificate of Merit for Zoo Keeper Education

## SELECTED PUBLICATIONS

Povey, Karen, *Ambassador Animal Handbook*. AZA Publication (in press).

Povey, Karen, *The Clouded Leopard's Secret*. Bilingual (Thai/English; Malay/English; Indonesian/English) conservation education storybook for distribution in clouded leopard range countries, April 2010-12.

Povey, et al. Clouded Leopard and Small Felid Conservation Summit Final Report. IUCN/SSC Conservation Breeding Specialist Group, 2009.

Povey, Karen & Keith Winston, "Program Animal Position Statement." American Zoo and Aquarium Association's Conservation Education Committee, 2002.

Povey, Karen & José Rios, "Using Interpretive Animals to Deliver Affective Messages in Zoos." *Journal of Interpretation Research*, 2002.

Author of fourteen books for middle readers with Lucent Publishing and Gale Books.

Place holder for Andy Goldfarb CV

Place holder for Shannon Smith CV

Place holder for Kadie Burrone CV

Place holder for Piper Leiper CV

# Maureen O'Keefe

[redacted]

## EDUCATION

[redacted] [redacted]

## PROFESSIONAL EXPERIENCE

### Point Defiance Zoo and Aquarium, Tacoma, WA ([redacted]t)

**[redacted]: Senior Staff Biologist Wild Wonders Outdoor Theater**

- Provide work direction and guidance for Wild Wonders Outdoor Theater (WWOT) and Budgie Buddies free flight aviary staff.
- Provide over-sight of animal care, training, and enrichment.
- Oversee the scheduling, hiring, and training of seasonal staff and interns.
- Conduct performance evaluations of seasonal staff and interns.
- Coordinate visitor experience opportunities with the Education and Marketing departments.
- Provide input for budgetary and resource needs.
- Serve on the Zoo's Conservation and Safety committees.
- Serve as AZA Institutional Representative for many species within the area.
- Contribute to initiatives of the Ambassador Animal Scientific Advisory Group, including serving on the editorial team of the Ambassador Animal Handbook (in press.)
- In addition continue to fulfill Staff Biologist duties as listed below.

**[redacted]: Staff Biologist Wild Wonders Outdoor Theater**

- Co-produce and write the Wild Wonders Outdoor Theater show, a multi-taxa live animal presentation.
- Present both formal and informal presentations on and off-site.
- Provide daily husbandry and care, maintain enclosures and exhibits for invertebrates, amphibians, reptiles, birds, and mammals.
- Write program animal husbandry and handling protocols and procedures.
- Work with curatorial and veterinary staff to plan and execute animal acquisition, provide hand-rearing, operant conditioning/training, husbandry, and enrichment for animals in collection.
- Supervise and train seasonal staff, interns, and volunteers on animal training and handling of program animals.
- Assist veterinary staff in medical procedures including the distribution of daily oral medication, hand injections, and animal restraint.
- Oversee the scheduling, hiring, and training of seasonal staff for the Budgie Buddies exhibit.
- Maintain staff schedule, keeping within given annual budget.

- Serve as a broadcast and print spokesperson promoting the Zoo and the WWOT.
- Served on the Zoo's Enrichment, Animal Welfare, Parking, and Safety committees.
- Assisted in the design of animal holding facilities and staging area during WWOT development.

[redacted]

- Performed diet preparation, enrichment, husbandry and care for reptiles, amphibians, birds, and mammals housed in the World of Adaptations building.
- Presented both formal and informal keeper talks.
- Hand-raised and trained program animals.
- Conducted off-site interpretive animal programming for the Zoo's School Assembly Program.
- Interviewed by many television shows and newspapers to promote the school program and Zoo.
- Maintained animal enclosures and exhibits.
- Supervised and trained seasonal employees and volunteers.
- Assisted in the design of animal holding facilities and animal species selection for the first phase of Kids' Zone.

## DREAMWORLD, Coomera, QLD Australia ([redacted])

**[redacted]: Wildlife Education Supervisor**

- Supervised, trained, and evaluated a staff of four.
- Created and presented educational programs on native Australian wildlife for school outreach and in-park wildlife education programs.
- Presented both formal and informal keeper talks.
- Oversaw the handling and training of program animals.
- Maintained animal enclosures and exhibits.

**[redacted]: Wildlife Theater Supervisor**

- Established a multi-species educational show for Dreamworld showcasing Australian native animal species – dingo, koala, wombat, reptiles, birds of prey, etc.
- Assisted in the design of animal holding facilities and staging area for show.
- Hired, trained and evaluated a staff of three.
- Trained, handled and cared for program animals.
- Maintained animal enclosures and exhibits.

## MARINE WORLD AFRICA USA, Vallejo, CA (May [redacted]

**[redacted]: Supervisor Wildlife Theater**

- Supervised a staff of seven employees including scheduling, annual evaluations, animal training techniques, husbandry, etc.
- Supervised Gentle Jungle (petting zoo, hoofstock, and small animal displays) and Reptile Discovery (non-venomous reptile house).
- Responsible for the production and presentation of the Wildlife Theater Show (an educational show emphasizing wildlife conservation and demonstrating animals' natural behaviors).
- Responsible for the safety of the area including inspections, safety talks, accident reports, etc.
- In addition, continued to fulfill Senior Animal Trainer/School Assembly duties as listed below.

**[redacted]: Senior Animal Trainer Wildlife Theater/School Assemblies**

- Co-administrated, scheduled and presented school outreach program – "School Assembly Safari" (a series of four programs on various conservation topics designed for kindergarten through high school levels that incorporated live animals as well as a slide show presentation) at schools throughout northern California.
- Assisted in the design of various programs, including narrative scripts and fact sheets.
- Trained animals to perform natural behaviors for an educational multi-species show and school outreach program.
- Handled animals in close contact with the public while encouraging and answering questions.
- Performed extensive public relations duties – including appearances on numerous local and national television programs, radio talk shows, and newspaper interviews.
- Maintained expense account records.
- Supervised less senior personnel.
- Responsible for general cleaning and maintenance of all program animals.

[redacted]ng animals.

## MEMBERSHIPS AND POSITIONS

- Member, International Association of Avian Trainers and Educators (IAATE)
- Member, American Association of Zoo Keepers (AAZK)
  Point Defiance Chapter President (2009, 2008, 2007, and 2006)
  Point Defiance Chapter Vice President (2005, 2003, and 2005)
- Vice President Clouded Leopard Project (2009-present)
- Secretary Clouded Leopard Project (2011-present)
- Member, Australasian Society of Zoo Keeping (ASZK) (1998-2001)

## PROFESSIONAL PAPER PRESENTATIONS

- "Who Says You Can't Teach an Old Bird New Tricks? Enriching a Common Raven *(Corvus corax)* Through Innovative Behaviors." IAATE - Tampa (2013)

- "Saving Time and Resources: The Implementation of a Comprehensive Zoo-wide Enrichment Database at point Defiance Zoo & Aquarium." IAATE - Albuquerque (2010)

- "Almost Famous: The Story of the Clouded Leopard Project and Its Rising Star." AAZK - Seattle (2009)

- "Lucky Ducks: The Trials and Tribulations of Indian Runner Duck (*Anas platyrhinos*) Husbandry." IAATE - Holland (2008)

- "From Inspiration to Action: Reaching New Heights with New Ideas." IAATE - Nashville (2006)

- "Small Beginnings Can Lead to Grand Openings: The Evolution of the Wild Wonders Outdoor Theater at Point Defiance Zoo & Aquarium." AAZK - Dallas (2004)

## HONORS AND AWARDS

Part of a team receiving the following awards:

- National AAZK Travel Grant Recipient (2012)
- Show Behavior of the Year, International Association of Avian Trainers and Educators (2009)
- Lee Houts Excellence in Enrichment Award (2009)
- Certificate of Merit for Zoo Keeper Education, American Association of Zoo Keepers - 2009
- Enrichment Award, International Association of Avian Trainers and Educators (2008)
- Interpretive Award, International Association of Avian Trainers and Educators (2006)
- Husbandry Behavior of the Year, International Association of Avian Trainers and Educators (2006)
- AZA Education Award, Wild Wonders Outdoor Theater (2006)

## CERTIFICATIONS & COURSES

- AZA professional training course: Avian Management, Biology, and Conservation (2012)
- San Diego Zoo Global Academy:
    - Zoonotic Disease and Biosecurity
    - Working Safely With Dangerous Animals
    - Government Regulations
    - Fundamentals of Animal Learning
    - Introduction to Nutrition
- CPR/First aid

Attachment #5

**Telena Marie Welsh**
[redacted]

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*Experience:*

**Point Defiance Zoo & Aquarium** [redacted]
Tacoma, WA
*Staff Biologist- Asian Forest Sanctuary*
-General husbandry of Sumatran tiger, Lowland anoa, Indian crested porcupine, Asian small clawed otter, siamang, gibbon, wrinkled hornbill, Malayan tapir
-Compile and analyze data (via excel, numbers, ZIMS) related to long term animal care including diet consumption and nutrition, weight, reproductive activity, cub rearing, etc.
-Oversee and train area internship participants
-Create and implement an excel-based system for ordering produce zoo-wide
-Assist in handling and transport of animals
-Distribute daily medications and treatments according to veterinary recommendations
-Exemplified problem solving skills in relation to routine and emergency animal situations
-Assist veterinary staff with medical procedures and physical examinations
-Perform daily, as well as critical long-term animal observations to determine animal health, behavior abnormalities and reproductive activity
-Complete daily animal presentations including handling, training, keeper talks and scripted shows.
-Shift animals in a rotational/ multi-species exhibit atmosphere
-Participate in quarantine procedures as necessary
-Create and execute training programs for a variety of animals
-Create and monitor various animal data sheets, including diets, weights, and reproduction
-Routinely use ZIMS data entry for zoological records

**Point Defiance Zoo & Aquarium** [redacted]
Tacoma, WA
*Zoological Aide-Kids' Zone, Rocky Shores, Wild Wonders Outdoor Theater*
-Prepare diets and performed daily feedings in a safe and accurate manner
-Clean and properly maintained all exhibits, holdings and transport/medical areas
-Create and implemented enrichment items for a variety of species
-Act as a mentor to new hires and educated new team members on all aspects of animal husbandry.

**Apple Inc.** [redacted]
Tacoma, WA
*Administrative Specialist/Staff Mentor*
-Create and monitor store schedule
-Inventory and complete ordering
-Plan and implement store events
-Act as a store mentor for new and existing staff
-Teach both group and individual lessons on various computer software applications

**Woodland Park Zoo** [redacted]
Seattle, WA
*Summer Program Presenter*
-Present approved program activities on zoo grounds
-Assist in animal program handling for approved animals

**University Place Veterinary Hospital** [redacted]
University Place, WA
*Veterinary Assistant*
-Monitor animals during surgical procedures involving anesthesia
-Assist veterinary staff in annual check ups as well as emergency situations
-Relief receptionist

**Point Defiance Zoo Society** *2*[redacted]
Tacoma, WA
*Sales Representative*
-Customer service for new and existing members

**Point Defiance Zoo & Aquarium** [redacted]
Tacoma, WA
*Program Instructor/Summer Camp Coordinator*
*Interpretive Volunteer*
-Create and implemented new summer camp programing geared towards ages 4-18
-Manage summer camp instructors and aids, 10+ people
-Teach camps aged 4-18
-Lead the zoos overnight snooze program
-Act as an education interpreter for all areas of the zoo

[redacted]

**Northwest Trek Wildlife Park** [redacted]
Eatonville, WA
*Keeper Intern*
-Assisted with the general husbandry of mammals, reptiles and birds

*General Animal Experience:*
Species Survival Plan Coordinator- Lowland anoa
Studbook Keeper- Lowland anoa

[redacted]

[redacted]

*Certifications:* First Aid and CPR
AZA Animal Training and Applications in Zoo and Aquarium Setting

*Other:* Independent Study- Human/Wildlife Conflict in Africa
AZA Studbook Webinar
AZA Felid TAG- Husbandry Course
AZA Mid-Year Meeting- Ungulate Husbandry Workshop

Christy Webster
[redacted]

## Objective:

To obtain employment working with animals, where I can utilize my educational background in biology and personal experience, to increase my knowledge and public [redacted]

## Professional Literature

- Husbandry and Medical Management of Over-groomed Meerkat (*Suricata suricatta)* Kits, published in The Journal of AAZK, Inc., Animal Keepers' Forum November [redacted]
  The management of four Meerkat kits, husbandry and medical aspects including supplementation of kits. Discussed methods of managing without pulling kits from colony, successes and losses.

- Thermoregulation in Whiptail Lizards (Ameiva quadrilineata), Costa Rica, [redacted]
  Studied Whiptail Lizards in Costa Rica, monitored their behavior, movement and substrate temperatures. Presented research results at Pacific University, [redacted]

- The Effect of Separation on Gerbil (Gerbillus sp.) Greeting Behavior, Forest Grove, Oregon, 1[redacted]
  [redacted] behavior after different periods of separation, also tested for difference [redacted]

- Research paper presentation about the introduction and effect of nutria on the Pacific Northwest, Dec. 1[redacted]

## Workshops/Internships

- **NEI Free Flight Bird Show Intern** [redacted]
  Helped run multi-species bird show, general daily husbandry of various avian species, including birds of prey, parrots and corvids. Assisted with training of all show animals.

- **Interpretive Workshop** [redacted]
  Weeklong workshop on interpretive theories and how to conduct successful public presentations.

- **NEI Bird Training Workshop** [redacted]
  Weeklong workshop teaching operant conditioning training, lecture and hands-on learning.

## Work History

- **Staff Biologist, Point Defiance Zoo & Aquarium,** [redacted]
  Responsible for the daily care of a variety of animals during my time on staff the past 8 years including Malayan Tapirs, Lowland Anoa, Indian-crested Porcupines, Asian Small-clawed Otters, White-cheeked Gibbon, Siamangs, Sumatran Tigers, Malayan Tigers and relief keeper for Clouded Leopards and Elephants. Duties include feeding, cleaning exhibits and holdings; minor exhibit repair and restructuring, scheduled public talks, training and enrichment.

- **Temporary Keeper, Point Defiance Zoo & Aquarium,** [redacted]**, Tacoma, WA**
  Help take care of many animals including Tapirs, Otters, Porcupines, Siamangs and Gibbons. Duties included feeding, cleaning and answering questions from the public.

- **Kennel Staff, South Hill Vet,** [redacted] **Puyallup, WA**
  Assist Vet staff with treatments and restraint as needed, clean and autoclave surgical tools. Also responsible for stocking supplies and general janitorial cleaning of clinic.

- **Natural Encounters Keeper, Houston Zoo,** [redacted]**, Houston, TX**
  General husbandry duties of a variety of small animals including Meerkats, Asian Small-clawed Otters, and Scarlet Ibis. Responsibilties included daily upkeep of exhibits and daily presentations. Public presentations both in an exhibit setting and in an animal close encounter setting. Handling animals included parrots, mammals, reptiles and Birds of Prey. Also took part in on-site and off-site Special Events with handling animals. Training with a variety animals including parrots, small carnivores and rodents.

- **Zoological Aide, Pt. Defiance Zoo and Aquarium,** [redacted]**, Tacoma, WA**
  Worked with and took care of many animals including Lorikeets, Reindeer, Porcupines, Goats and Scorpions. Duties included feeding, cleaning and answering questions from the public.

- **Kennel Staff, South Hill Vet, Feb.** [redacted] **Tacoma, WA**
  Assist Vet staff with treatments and restraint as needed, clean and autoclave surgical tools. Also responsible for stocking supplies and general janitorial cleaning of clinic.

- **Supervisor, CheckPoint Conoco, [redacted], Pullman, WA**
  Ordered food for Blimpie and TCBY components and made subs, served TCBY treats and ran cash register.

- **Farm Laborer, JP Farms, [redacted] (Seasonally), Westlake, OR.**
  Built fences, drove tractor, sprayed weeds, fed cattle, stacked hay, watched for birthing signals, painted barns, hand-raised calves.

**References available upon request**

# Alicia Pike

[redacted]

[redacted]

## Point Defiance Zoo & Aquarium – Tacoma, WA

**STAFF BIOLOGIST | ASIAN FOREST SANCTUARY |** [redacted]

- Responsible for Sumatran tigers, a Malayan tiger, small-clawed otters, Indian crested porcupines, lowland anoa, siamangs, white-cheeked gibbons, and a wrinkled hornbill in a rotational exhibit system.
- Responsible in helping to care for Asian elephants, clouded leopards, musk ox, and a reindeer.

**STAFF BIOLOGIST | KIDS' ZONE |** [redacted]

[redacted] black & white ruffed lemurs, Parma wallabies, Damaraland mole rats, meerkats, non-venomous reptiles, amphibians, fresh-water fish, invertebrates, and domestic petting zoo animals.

**PRESIDENT| POINT DEFIANCE AAZK CHAPTER |** [redacted]

- Performed leadership duties for AAZK events surrounding conservation, staff recognition, and career advancement.

**ZOOLOGICAL AIDE | ASIAN FOREST SANCTUARY |** [redacted]

- Provided basic husbandry for Sumatran tigers, siamangs, white-cheeked gibbons, Indian crested porcupines, Malayan tapir, small-clawed otters, and lowland anoa.
- Assisted staff with clouded leopard cubs, musk ox, and reindeer.

**ZOOLOGICAL AIDE | KIDS' ZONE | JUNE 2010 -** [redacted]

- Provided basic husbandry for ring-tailed lemurs, black lemurs, Parma wallabies, Damaraland mole rats, meerkats, non-venomous reptiles, amphibians, fresh water fish, invertebrates, and domestic petting zoo animals.

**ZOOLOGICAL AIDE | AQUARIUM | JUNE 2005 –** [redacted]

- Provided basic husbandry and life support responsibilities for North and South Pacific marine fish and invertebrate species.

**SEASONAL INTERPRETER | EDUCATION |** [redacted]

[redacted] of the facility.

**VOLUNTEER | EDUCATION |** [redacted] **–** [redacted]

- Provided knowledgeable information and presentations for guests at most areas of the facility.

## Woodland Park Zoo - Seattle, WA

**ZOOKEEPER NON-BENEFITED | NORTH TEAM |** [redacted]

- Responsible for Matschie's tree kangaroo, three-banded armadillo, Komodo dragons, and various species of venomous and non-venomous reptiles and amphibians.

## Wildlife Safari – Winston, OR

**ZOO KEEPER | VILLAGE |** [redacted]

- Responsible for a wide variety of species including, but not limited to, siamangs, white-cheeked gibbons, lar gibbons, ring-tailed lemurs, red-ruffed lemurs, cotton-top tamarins, owl monkeys, maned wolves, ringtail cat, bobcat, cougar, coatis, capybara, prehensile-tailed porcupine, African crested porcupine, screaming hairy armadillo, Kirk's dik-dik, opossum, Chilean flamingos, red-billed hornbills, Ne-ne geese, bald eagle, red-tailed hawk, great horned owl, Western screech owl, scarlet macaw, blue & gold macaw, Moluccan cockatoo, double yellow-headed Amazon, American alligators, red-tailed boa, Amazon tree boa, African spurred tortoise, Californian desert tortoise, blue-tonged skink, and various invertebrates.

**ZOO KEEPER | UNGULATE |** [redacted]

- Responsible for white rhino, hippo, reticulated giraffe, Rothschild's giraffe, gemsbok, scimitar-horned oryx, addax, eland, Damaraland zebra, white-bearded wildebeest, Watusi cattle, ostrich, waterbuck, sitatunga, Egyptian geese, grey-crowned cranes, Bactrian camel, blackbuck, sika deer, Tibetan yak, fallow deer, nilgai, black swans, sarus cranes, greater rhea, emu, bison, Roosevelt elk, llama, guanaco, aoudad, and a bald eagle.
- Responsible in helping to care for African lions, brown bears, and black bears.

**VICE PRESIDENT| WILDLIFE SAFARI AAZK CHAPTER |** [redacted]

- Led and assisted with various conservation fund-raisers and AAZK events.

**ZOOLOGICAL INTERN| PAID |** [redacted]

- Assisted with staff and performed staff duties for all zoological departments. Hands-on experience and care for African elephants, cheetahs, tigers, lions, bears, ungulates, and more (as listed above).

## Washington State University – Pullman, WA

**PROGRAM COORDINATOR | WSU RAPTOR CLUB |** [redacted]

- Responsible for a golden eagle, Swainson's hawk, rough-legged hawk, red-tailed hawks, Cooper's hawk, sharp-shinned hawk, prairie/gyrfalcon hybrid, peregrine falcon, American kestrels, great horned owls, barn owls, Northern saw-whet owls, and western screech owls.
- Also provided care for releasable birds such as all above listed species plus bald eagles.

**PRESIDENT | WSU ZOOLOGY CLUB |** [redacted]

- Performed leadership duties to facilitate animal experiences for those students interested in zoological careers.

**VOLUNTEER | WSU GRIZZLY BEAR CENTER |** [redacted]

- Provided basic husbandry for brown bears of various ages under the supervision of the Nutritionist.

**Copper Aitken-Palmer, DVM, PhD**

Department of Conservation Medicine [redacted]

[redacted]

[redacted].

[redacted]

## AREA OF SPECIAL EXPERTISE

Zoo animal, wildlife and exotic animal veterinarian, [redacted].
Artificial insemination for the giant panda, [redacted]
Semen collection, evaluation and freezing for the giant panda, [redacted]

## SPECIALIZED AND ADVANCED TRAINING

Residency Zoological Medicine Veterinary, U. of Florida, Certificate of Residency, 2011.
Corneal surgeries, Ophthalmology workshop, N.A. Veterinary Conference, Orlando, FL, 2012.
Eye lid surgeries, Ophthalmology workshop, N.A. Veterinary Conference, Orlando, FL, 2012.
Advanced dental surgeries, Interactive Lab, N.A. Veterinary Conference, Orlando, FL , 2012.
Abdominal ultrasound, Interactive Lab, N.A. Veterinary Conference, Orlando, FL, 2012.
Visiting veterinary resident, Kruger National Park, South Africa, 2011.
Wild oyster catcher population assessment team, exposure to oil, New Orleans, LA, 2010.
Oiled Sea Birds, Interactive Lab, South Padre Island, TX, 2010.
Marine Mammal Ophthalmology, Interactive Lab, South Padre Island, TX, 2010.
American College of Zoological Medicine Board Prep, Short Course, Raleigh, NC, 2010.
American College of Zoological Medicine Board Prep, Ultra-short Course, Tulsa, OK, 2009.
16th Annual Zoo and Wildlife Pathology Workshop, Topic: Cardiology, Tulsa, OK, 2009.
Wild duck population transmitter surgical team, University of Florida, 2009.
Wild Manatee Capture and Bio-survey Team, Crystal River, FL 2009.

## PROFESSIONAL ACITIVIES

American Association of Zoo Veterinarians, 2004-2011.
North American Veterinary Conference, Orlando, FL, 2013, 2012.
International Embryo Transfer Society Annual Meeting, Orlando, FL, 2011.
'Post-symposium on International Transport of Wildlife Tissues and Gametes'

American Association of Zoo Veterinarians Annual Meeting, Kansas City, MO, 2011.
American Association of Zoo Veterinarians Annual Meeting, South Padre Island, TX, 2010.
International Sirenian Conservation Conference, Atlanta, GA, 2009.

[redacted]

**MASTER OF SCIENCE THESIS**

Influence of Buffering System and Cryopreservation on Domestic Cat Spermatozoa and Seminal Plasma Characteristics of Domestic and Non-domestic Cat Species

**DOCTORATE OF PHILOSOPHY DISSERTATION**

Assessment of Male Puberty, Seasonality and Sperm Cryopreservation Methods in the Giant Panda

**PUBLICATIONS (FIVE YEARS)**

**Aitken-Palmer C,** Rong H, Burrell C, Zhang Z, Wang C, Spindler R, Wildt DE, Ottinger MA, Howard JG. 2012. Protracted reproductive seasonality in the male giant panda (*Ailuropoda melanoleuca*) reflected by patterns in androgen profiles, ejaculate characteristics, and selected behaviors. *Biology of Reproduction*. 86(6):

**Aitken-Palmer C,** Lewis DD, Kim SE and Reese DJ. 2012. Use of circular fixator construct for metacarpal fracture stabilization in a fawn. *Veterinary Record*. 170: 444.

**Aitken-Palmer C,** Kiupel M, Russell K, Hayes L, Heard D. 2012. Cutaneous B-cell lymphoma in a Perdido Key Beach Mouse (*Peromyscus polintus trissyllepsis*). *Comparative Medicine.* 62:95-98.

**Aitken-Palmer C**, Reese D, Isaza R, Pope B. 2011. Hypovitaminosis C delays growth in juvenile little golden mantled flying fox (*Pteropus pumilus*), *Veterinary Record*. 170:22.

**Aitken-Palmer C**, Gerlach T, Blackwood S, Isaza R, Dunbar M. 2011. Anterior uveitis an atypical presentation of granular lymphoma in a caracal (*Caracal caracal*), *Veterinary Ophthalmology.* 14: 337-340.

Quesada RJ, Heard DJ, **Aitken-Palmer C**, Hall NH, Conley KJ, Childress AL, Wellehan JFX. 2011. Detection and phylogenetic characterization of a novel herpesvirus from the trachea of two stranded common loons (*Gavia immer*). *Journal of Wildlife Diseases*. 47:233-239.

Phelps H C, **Aitken-Palmer C**, Lewis D , Use of a linear-circular hybrid external skeletal fixator for stabilization of a juxta-physeal proximal radial fracture in a odocoileus virginianus. 2010 *Journal of Zoo and Wildlife Medicine*. 41: 688-696.

Quesada RJ, **Aitken-Palmer C**, Conley K, Heard DJ. Accidental submeningeal injection of propofol in gopher tortoises (*Gopherus polyphemus*). 2010. *Veterinary Record.* 167:494-495.

**PRISCILLA HART JOYNER, BVMS**
Veterinary Medical Officer
Smithsonian Conservation Biology Institute
[redacted]
xville

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**Professional Employment**

[redacted] Veterinarian
Pender Veterinary Centre & Pender Exotic Veterinary Centre
Fairfax, Virginia 22033, USA

[redacted] Relief Veterinarian
Pantops Veterinary Hospital
Charlottesville, Virginia 22911, USA

[redacted] Field Veterinarian, Cambodia
Wildlife Conservation Society, Cambodia
Phnom Penh, Cambodia

[redacted] Relief Veterinarian
Banfield, The Pet Hospital
North Fayette Township, Pennsylvania 15061, USA

[redacted] Veterinarian
Pittsburgh Zoo & PPG Aquarium
Pittsburgh, Pennsylvania 15203, USA

February 2000 – July 2002 Veterinarian
Woodcroft Vet Group, Langdale Veterinary Hospital
Cheadle Hulme, England UK

## VETERINARY LICENSE

| | |
|---|---|
| Commonwealth of Virginia | Current |
| DEA | Current |

## PROFESSIONAL ORGANIZATIONS

American Association of Wildlife Veterinarians
American Association of Zoo Veterinarians
American Veterinary Medical Association
Association of Avian Veterinarians
Association of Exotic Mammal Veterinarians
Association of Reptilian and Amphibian Veterinarians
Wildlife Disease Association

## AWARDS

**2004 Morris Animal Foundation Grant Award**: **$15,000**
Investigation of sevoflurane as a safe anesthetic agent in bald eagles (*Haliaeetus leucocephalus*). **Joyner, P.H.**, Sleeman, J.M., Zagaya, N., And Jones, M.P.

**2002 Oklahoma State University Post-graduate Grant Program Award: $3,000**
Evaluation of an Intraerythrocytic piroplasm of Pallas' cats (*Otocolobus manul*) as a potential source of infectious disease for domestic cats. **Joyner, P.H.**, Hoover, J.P., Meinkoth, J., And Kocan, A.

## BIBLIOGRAPHY OF PUBLICATIONS

Chu, D.K.W., Leung, C.Y.H., Gilbert, M., **Joyner, P.H.**, Ng, E.M., Tse, T.M., Guan, Y., Peiris, J.S.M., Poon, L.L.M. 2011. Avian coronavirus in wild aquatic birds. *Journal of Virology.* 85: 12815-12820.

Chu, D.K.W., Leung, C.Y.H., Perera, H.K.K., Ng, E.M., Gilbert, M., **Joyner, P.H.,** Grioni, A., Ades, G., Guan, Y., Peiris, J.S.M., Poon, L.L.M. 2012. A Novel Group of Avian Astroviruses in Wild Aquatic Birds. *Journal of Virology.* 86:13772-13778.

Gilbert, M., Bickford, D., Clark, L., Johnson, A., **Joyner, P.H.**, Ogg-Keats, L., Khammavong, K., Van, L.N., Newton, A., Seow, T.P.W., Roberton, S., Silithammavong, S., Singhalath, S., Yang, A., and Seimon, T.A. 2013. Amphiban Pathogens in Southeast Asian Frog Trade. *EcoHealth*. Online February 13, 2013.

Gilbert, M., Chea, S., **Joyner, P.H.**, Thomson, R.L., Poole, C. 2012. Characterizing the trade of wild birds for merit release in Phnom Penh, Cambodia and associated risks to health and ecology. *Biological Conservation.* 153:10-16.

Georoff, T.A., **Joyner, P.H.,** Hoover, J.P., Payton, M.E., And Pogranichniy, R.M. 2008. Seroprevalence of retrovirus in North American captive macropodidae. *Journal of Zoo and Wildlife Medicine.* 39:335-341.

Ishtiaq, F., Gilbert, M., Brown, J., **Joyner, P**., Sodnomdarjaa, R., Luttrell, M.P., Stallknecht, D., And Joly, D.O. 2012. Antibodies to Influenza A Virus in Wild Birds across Mongolia, 2006-2009. *Journal of Wildlife Diseases.* 48:768-775.

**Joyner, P.H.**, Brown, J.D., Holladay, S., Sleeman, J.M. 2006. Characterization of the bacterial microflora of the tympanic cavity of eastern box turtles (*Terrapene carolina carolina*) with and without aural abscess. *Journal of Wildlife Diseases.* 42:859-864.

**Joyner, P.H.,** Jones, M.P., Ward, D., Gompf, R., Zagaya, N., And Sleeman, J.M. 2008. Induction and recovery characteristics and cardiopulmonary effects of sevoflurane and isoflurane in Bald eagles. *American Journal of Veterinary Research.* 69:13-22.

**Joyner, P.H.,** Kelly, S., Shreve, A.A., Snead, S.E., Sleeman, J.M., And Pettit, D.A. 2006. West Nile virus in raptors from Virginia during 2003: Clinical, diagnostic, and epidemiologic findings. *Journal of Wildlife Diseases.* 42:335-344.

**Joyner, P.H.**, Reichard, M.V., Meinkoth, J., Milne, V.E., Confer, A.W., Kocan, A.A., And Hoover, J.P. 2007. Experimental infection of domestic cats (*Felis catus*) with *Cytauxzoon manul* from Pallas' cats (*Otocolobus manul*). *Veterinary Parasitology.* 146:302-306.

**Joyner, P.H.**, Rochat, M.C., And Hoover, J.P. 2004. Use of a hybrid external skeletal fixator for repair of a periarticular tibial fracture in a Patagonian cavy. *Journal of the American Veterinary Medical Association.* 224:1298-1301.

**Joyner, P.H.**, Shreve, A.A., Spahr, J., Fountain, L., And Sleeman, J.M. 2006. Phaeohyphomycosis in a free-living eastern box turtle (*Terrapene carolina carolina*). *Journal of Wildlife Diseases.* 42:883-888.

Leung, C., Gilbert, M., **Joyner, P.**, Chow, K., Ho, C., Guang, Y., and Peiris, M. In Review. The effect of storage and transport conditions on virus viability in swabs collected for avian influenza surveillance. *Journal of Influenza and Other Respiratory Viruses*.

Snider, T.A., **Joyner, P.H.**, And Clinkenbeard, K.D. 2008. Disseminated Histoplasmosis in an African pygmy hedgehog (*Atelerix albiventris*). *Journal of the American Veterinary Medical Association.* 232:74-76.

**JANINE L. BROWN**

[redacted]

Research Physiologist, Smithsonian Institution, National Zoological Park, Smithsonian Conservation Biology Institute, Front Royal, VA
Associate Professor, Department of Obstetrics and Gynecology, Uniformed Services University of the Health Sciences, Bethesda, MD
Research Associate, Department of Obstetrics and Gynecology, Uniformed Services University of the Health Sciences, Bethesda, MD

**CURRENT ADJUNCT APPOINTMENTS:**

| | |
|---|---|
| 2012-present | Adjunct Associate Professor, Department of Population Medicine and Diagnostic Services, College of Veterinary Medicine, Cornell University, Ithaca, New York |
| 2009-present | Adjunct Faculty, Department of Animal & Poultry Science, University of Guelph, Canada |
| 2008-present | Adjunct Faculty, Department of Zoology, University of Michigan, Lansing, MI |
| 2004-present | Adjunct Graduate Faculty, Department of Clinical Sciences, Kansas State University, Manhattan, KS |
| 2002-present | Adjunct Research Professor, Biology Department, American University, Washington, DC |
| 1998-present | Adjunct Graduate Faculty, University of Maryland, College Park, MD |
| 1996-2002 | Adjunct Associate Professor, Department of Obstetrics and Gynecology, Uniformed Services University of the Health Sciences, Bethesda, MD |
| 1988-present | Affiliate Professor, Department of Biology, George Mason University, Fairfax, VA |

**HONORS AND AWARDS:**

| | |
|---|---|
| 2012 | Morris Animal Foundation Innovative Scientist of the Year |
| 2010 | Zoo Biology Best Published Paper in 2010 |
| 2009 | Outstanding Graduate Award: Science, Education and Technology, Washington State University |
| 2005 | Distinguished Service Award, Elephant Manager's Association |
| 2004 | Zoo Biology Best Published Paper in 2002 |
| 2003 | Zoo Biology Best Published Paper in 2001 |
| 2003 | Discovery Film, Kandula: An Elephant Story, focused on the science behind the production of NZP elephant by AI |
| 2002 | Alumni Recognition Award, Washington State University |
| 2000 | PBS/BBC Film, Urban Elephant, highlighted elephant AI at NZP |
| 1995 | AAZV Presidential Service Award |
| 1983 | American Society of Animal Science Graduate Student Competition (1st place) |
| 1977 | Graduation with honors (B.S.) |

**MEMBERSHIPS:**

| *Professional* | *Honorary* |
|---|---|
| American Zoo and Aquarium Association | Sigma Xi |
| Elephant Managers Association | Alpha Zeta |

Society for the Study of Reproduction

*Invited*
IUCN-The World Conservation Union
Asian Elephant Specialist Group

**EDITORIAL ACTIVITIES:**

| | |
|---|---|
| 2011-present | Associate Editor: Zoo Biology |
| 2010-present | Editorial Board: Domestic Animal Endocrinology |
| 2009 | Guest Editor: Zoo Biology – Special Issue on *Care and Welfare of Elephants in AZA Institutions* |
| 2008-present | Advisory Board: Brazilian Journal of Veterinary Research |
| 2004 | Guest Editor: Science India – Special Issue on *Elephants* |
| 2000 | Guest Editor: Zoo Biology – Special Issue on *Elephant Biology* |
| 1998 | Guest Editor: Animal Reproduction Science - Special Issue on *Reproductive Research in Wildlife Species* |
| 1996-2005 | Editorial Board: Animal Reproduction Science |
| 1995-2004 | Editorial Board: Biology of Reproduction |
| 1995-2010 | Editorial Board: Zoo Biology |
| 1992-1995 | Associate Editor: Journal of Zoo and Wildlife Medicine |
| 1988-present | Ad hoc reviewer for over 15 scientific journals |

**OTHER PROFESSIONAL ACTIVITIES:**

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|---|---|
| 2012-present | Emeritus Status, International Society of Wildlife Endocrinologists |
| 2009-2012 | Chair, International Society of Wildlife Endocrinologists |
| 2009 | Co-Founder, International Society of Wildlife Endocrinologists |
| 2008-present | Chair, AZA Endocrinology Scientific Advisory Group |
| 2007-2010 | Wildlife Advisory Board – Morris Animal Foundation |
| 2007-present | Research Advisory Board - Audubon Center for Research on Endangered Species |
| 2005-2007 | NZP Peer Recognition Awards Committee |
| 2004 | Selection Committee, 5th International Symposium on Canine and Feline Reproduction |
| 2004 | Presentation Awards Committee, Society for the Study of Reproduction |
| 2003-present | Elected Member: Asian Elephant Specialist Group |
| 2003-present | Elected Member: IUCN World Conservation Union |
| 2002-2006 | IACUC Committee, SCBI |
| 2002-present | AZA Reproduction Scientific Advisory Group |
| 2001-2006 | Endocrinology Advisor: Felid Taxon Advisory Group |
| 2001-2005 | Endocrinology Advisor: Cheetah SSP; Clouded Leopard SSP |
| 2000-2009 | Scientific Advisor: International Elephant Foundation |
| 1999-2003 | NZP Peer Review Committee |
| 1996-present | Reproductive Advisor: Elephant Taxon Advisory Group/SSP |
| 1994-present | Extramural Grant Reviewer: USDA-BARD Program; USDA-NRI Competitive Grants Program; USDA-NRICGP Program Grant; Austrian Science Foundation; U.S. Marine Fisheries |
| 1991-present | NZP Radiation Safety Committee/SCBI Radiation Safety Officer |
| 1990-1994 | NIH Consultant, Special Review Committee |

**TRAINING:**

Graduate Students (M.S) - 22
Graduate Students (Ph.D.) - 11
Postdoctoral Fellows - 7
Visiting Scientists - 50
International Training Workshops - 14

**PUBLICATIONS:**

M.S. Thesis

Influence of selenium and glutathione peroxidase on bovine seminal production and quality. 1980. P.L. Senger, advisor (Washington State University, Pullman).

Ph.D. Dissertation

Studies of pituitary LHRH and ovarian LH and FSH receptors in cystic-ovarian-diseased dairy cows. 1984. J.J. Reeves, advisor (Washington State University, Pullman).

Book Chapters

1. Brown, J.L. 2014. Comparative reproductive biology of elephants. In: Reproductive Sciences in Animal Conservation - Progress and Prospects. Advances in Experimental Medicine and Biology. W.V. Holt, J.L. Brown, P. Comizzoli, eds., Springer Science and Business Media, New York, NY. Pp. 135-169.
2. Holt, W.V., J.L. Brown and P. Comizzoli. 2014. Reproductive science as an essential component of conservation biology. In: Reproductive Sciences in Animal Conservation - Progress and Prospects. Advances in Experimental Medicine and Biology. W.V. Holt, J.L. Brown, P. Comizzoli, eds., Springer Science and Business Media, New York, NY. Pp. 3-14.
3. Holt, W.V., J.L. Brown and P. Comizzoli. 2014. Conclusions: Environmental change, wildlife conservation and reproduction. In: Reproductive Sciences in Animal Conservation - Progress and Prospects. Advances in Experimental Medicine and Biology. W.V. Holt, J.L. Brown, P. Comizzoli, eds., Springer Science and Business Media, New York, NY. Pp. 503-514.
4. Micheletti, T., S. Walker and J.L. Brown. 2014. Non-invasive hormonal monitoring. In: Tratado de Animais Selvagens, 2nd Edition. Z.S. Cubas, J.C.R. Silva, J.L. Catao-Dias, eds., ROCA Publishing, Brazil.
5. Hodges, K., J.L. Brown and M. Heistermann. 2010. Noninvasive monitoring of reproductive status and stress. In: Wild Mammals in Captivity, Edition II. D.G. Kleiman, K.V. Thompson, C.K. Baer, eds., University of Chicago Press, Chicago, IL Pp. 447-468.
6. Wildt, D., W. Swanson, J. Brown, A. Sliwa and A. Vargas. 2010. Felids *ex situ* for managed programmes, research and species recovery. In: Biology and Conservation of Wild Felids, McDonald, D., ed., Oxford University Press, Oxford, UK. Pp. 292-303.
7. Wildt, D.E., J.G. Howard, K. Pelican, J. Brown and B. Pukazhenthi. 2009. Contributions of reproductive science to wild felid conservation. In: Iberian Lynx Ex-situ Conservation: An Interdisciplinary Approach. Fundación Biodiversidad, A. Vargas, C. Breitenmoser, U. Breitenmoser, eds., Fundación Biodiversidad, Madrid, Spain. Pp. 293-304.
8. Pelican, K.M., T. Abaigar, A. Vargas, J.M. Rodríguez, J. Bergara, A. Rivas, J. López, J. Brown, D.E. Wildt. 2009. Unusual gonadal hormone profiles in the Iberian as determined by fecal monitoring. In: Iberian Lynx Ex-situ Conservation: An Interdisciplinary Approach. Fundación Biodiversidad, A. Vargas, C. Breitenmoser, U. Breitenmoser, eds., Fundación Biodiversidad, Madrid, Spain. Pp. 341-352.
9. Brown, J.L. 2009. Comparative endocrinology of domestic and nondomestic felids. In: Iberian Lynx Ex-situ Conservation: An Interdisciplinary Approach. Fundación Biodiversidad, A. Vargas, C. Breitenmoser, U. Breitenmoser, eds., Madrid, Spain. Pp. 329-340.
10. Brown, J.L., N. Wielebnowski and J. Cheeran. 2008. Challenges with identifying and evaluating pain, distress and suffering in elephants. In: Elephants and Ethics. C. Wemmer, C. Christen, eds. John Hopkins University Press, Baltimore, MD. Pp. 121-148.
11. Hildebrandt, T.B., J.L. Brown, K. Jewgenow and F. Goeritz. 2006. Use of ultrasound to study and augment reproduction in the giant panda. In: Biology of the Giant Panda. D.E. Wildt, D. Lindburg, eds. Cambridge University Press, Cambridge, UK. Pp. 410-439.
12. Brown, J.L. 2006. Reproductive endocrinology. In: The Biology, Medicine and Surgery of Elephants. S. Mikota and M. Fowler, eds. Blackwell Publishing, Ames, IA. Pp. 377-388.
13. Hildebrandt, T.B., J.L. Brown, R. Hermes and F. Goeritz. 2003. Ultrasound for the analysis of reproductive function in wildlife. In: Reproduction and Integrated Conservation Science, D.E. Wildt, W.V. Holt, A.R. Pickard, J.C. Roger, eds. Zoological Society of London, Pp. 166-182.
14. Wildt, D.E., J.G. Howard and J.L. Brown. 2001. Role of reproductive sciences in carnivore conservation. In: Carnivore Conservation, J.L. Gittleman, S.M. Funk, D.W. Macdonald and R.K. Wayne, eds., Cambridge University Press, Cambridge, UK. Pp 359-371.
15. Brown, J.L., L.H. Graham, N. Wielebnowski, W.F. Swanson, D.E. Wildt and J.G. Howard. 2001. Understanding the basic reproductive biology of wild felids by monitoring faecal steroids. In: Advances in

Reproduction in Dogs, Cats and Exotic Carnivores, P.W. Concannon, G.C.W. England, W. Farstad, C. Linde-Forsberg, J.P. Verstegen and C. Doberska, eds. J. Reprod. Fertil. Suppl. 57, Portland Press, Colchester, UK. Pp. 71-82.

16. Wildt, D.E., J.L. Brown and W.F. Swanson. 1998. Reproduction in cats. In: Encyclopedia of Reproduction, Vol. 1, E. Knobil and J. Neill, eds., Academic Press, New York. Pp. 497-510.
17. Niemuller, C., J.L. Brown and J.K. Hodges. 1998. Reproduction in elephants. In: Encyclopedia of Reproduction, Vol. 1., E. Knobil and J. Neill, eds., Academic Press, New York. Pp. 1018-1029.
18. Wildt, D.E. L.G. Phillips, L.G. Simmons, K.L. Goodrowe, J.G. Howard, J.L. Brown and M. Bush. 1987. Seminal-endocrine characteristics of the tiger and the potential for artificial breeding. In: Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, R.L. Tilson and U.S. Seal, eds., Noyes Publications, Park Ridge, Pp. 255-279.
19. Brown, J.L., H.M. Schoenemann and P.K. Chakraborty. 1994. Pituitary and gonadal responses to hemicastration: A model for investigating the regulation of testicular function. In: Current Trends in Experimental Endocrinology, Vol. 2, J. Menon, ed., Research Trends Publications, Council of Scientific Research Integration, Trivandrum, Pp. 41-56.

Edited Volumes

1. Holt, W.V., J.L. Brown and P.C. Comizzoli. 2014. Reproductive Sciences in Animal Conservation - Progress and Prospects. Advances in Experimental Medicine and Biology. Springer Science and Business Media, New York, NY.
2. Soltis, J. and J.L. Brown. 2010. Special Issue on The Care and Welfare of Elephants in AZA Institutions. Vol. 29 (3-4). 450 pages.
3. Iyer, S. and J.L. Brown. 2004. Special Issue on Elephants. Science India. 120 pages.
4. Brown, J.L. 2000. Special Issue on Elephant Biology. Zoo Biology, Vol. 19 (5). 480 pages.
5. Wildt, D.E., J.D. Mellen and J.L. Brown. 1999. Felid Taxon Advisory Group Action Plan. Disney's Animal Kingdom, Publ., Florida. 128 pages.
6. Brown, J.L. and D.E. Wildt. 1998. Reproductive Research in Wildlife Species. Animal Reproduction Science, Vol. 53 (1-4). Elsevier Science, United Kingdom. 320 pages.

Peer-reviewed Publications

1. Brown, J.L., S. Paris, N. Prado-Oviedo, C. Meehan, J. Hogan and K. Carlstead. 2016. Reproductive health assessment of female elephants in North American zoos and association of husbandry practices with reproductive dysfunction in African elephants (*Loxodonta africana*). PLoS One.
2. Nganvongpanit, K., Buddhachat, K., S. Klinhom, J.L. Brown and P. Mahakkanukrauh. 2016. Preliminary study to test the feasibility of sex identification of human (*Homo sapiens*) bones based on differences in elemental profiles determined by handheld X-ray fluorescence. Biol. Trace Elem. Res. doi: 10.1007/s12011-016-0625-3
3. Fourie, N.H., J.L. Brown, J.E. Phillips-Conroy and R.M. Bernstein. 2016. Sources of variation in hair cortisol in wild and captive non-human primates. Zoology doi:10.1016/j.zool.2016.01.001
4. Somgird, C., S. Sripiboon, S. Mahasawangkul, K. Boonprasert, J.L. Brown, T.A.E. Stout, B. Colenbrander and C. Thitaram. 2015. Differential testosterone response to GnRH-induced LH release before and after musth in adult Asian elephant (*Elephas maximus*) bulls. Theriogenology (accepted)
5. Bansiddhi, P., P. Vongchan, A. Satityuenyong, K. Boonprasert, S. Mahasawangkul, R Roongsri, J.L. Brown and C. Thitaram. 2015. Blood compatibility testing in Asian elephants using antiglobulin techniques to improve breeding success. Asian J. Anim. Vet. Adv. 10:903-910.
6. Thitaram, C., J.L. Brown and S. Luz. 2015. Summary ASEAN Captive Elephant Working Group Meeting. Gajah 43:46-47.
7. Somgird, C., P. Homkong, S. Sripiboon, J.L. Brown, T.A.E. Stout, B. Colenbrander, S. Mahasawangkul and C. Thitaram. 2015. Potential of a gonadotropin-releasing hormone vaccine to suppress musth in captive male Asian elephants (*Elephas maximus*). Anim. Reprod. Sci. doi: 10.1016/j.anireprosci.2015.11.019
8. Nganvongpanit, K., Buddhachat, K. and J.L. Brown. 2015. Comparison of bone tissue elements between normal and osteoarthritic bones in dogs. Biol. Trace Element Res. DOI 10.1007/s12011-015-0556-4

9. Koester, D.C., D.E. Wildt, J.L. Brown, K.A. K. Meeks and A.E. Crosier. 2015. Motile sperm output by male cheetahs (*Acinonyx jubatus*) managed *ex situ* is influenced by public exposure and number of care-Givers. PLoS One 10(9): e0135847. doi: 10.1371/journal.pone.0135847
10. Edwards, K.L., J. Trotter, M. Jones, J.L. Brown, H. Steinmetz and S.L. Walker. 2015. Investigating temporary acyclicity in a captive group of Asian elephants (*Elephas maximus*): relationship between management, adrenal activity and social factors. Gen. Comp. Endocrinol. doi:10.1016/j.ygcen.2015.09.011
11. Putman, S.B., J.L. Brown, A.D. Franklin, E.C. Schneider, N.P. Boisseau, C.S. Asa and B.S. Pukazhenthi. 2015. Characterization of ovarian steroid patterns in female African lions (*Panthera leo*), and the effects of contraception on reproductive function. PLoS One (accepted)
12. Thitaram, C., S. Dejchaisri, C. Somgrid, T. Angkawanish, J.L. Brown, S. Chomdech and D. Kangwanpong. 2015. Genetic relatedness and social group formation in reintroduced Asian elephants in Thailand. Appl. Anim. Behav. Sci. 172:52-57 doi:10.1016/j.applanim.2015.09.002
13. Fourie, N.H., T.R. Turner, J.L. Brown, P.J. Grobler, J.G. Lorenz and R.M. Bernstein. 2015. Variation in vervet (*Chlorcebus aethiops*) hair cortisol concentrations reflect ecological disturbance by humans. Primates 56:365-373.
14. Micheletti, T., Z.S. Cubas, W. de Moraes, M.J. de Oliveira, Furtado, P.V., C.A. de Oliveira, S. Putman, J.L. Brown, S.L. Walker and N. Moreira. 2015. The use of altrenogest to avoid hyperestrogenism after eCG-hCG ovulation in tigrina (*Leopardus tigrina*). Theriogenology 84:575-582.
15. Nájera, F., J.L. Brown, D.E. Wildt, U. Kongprom, L. Virolle, L. Revuelta and K. Goodrowe-Beck. 2015. Body mass dynamics in hand reared clouded leopard (*Neofelis nebulosa*) cubs from birth to weaning. Zoo Biol. 34:239-243.
16. Yang, L.L., F. Huettmann, J.L. Brown, S.Q. Liu, W.X. Wang, J.Y. Wang, D.F. Hu. 2015. Fecal glucocorticoid metabolite relates to social rank in Sichuan snub-nosed monkeys. Italian J Zool. 10.1080/11250003.2015.1081707
17. Nganvongpanit, K., Brown, J.L., Buddhachat, K., Somgird, C. and C. Thitaram. 2015. Elemental analysis of Asian elephant (*Elephas maximus*) teeth using X-ray fluorescence and a comparison to other species: a preliminary report. Biol. Trace Elem. Res. doi:10.1007/s12011-015-0445-x
18. Mumby H.S., P. Towiboon, K. K. U Mar, A. Courtiol, Z. Min-Oo, C. Thitaram, J.L. Brown and V. Lummaa. 2015. Stress and body condition are associated with climate and demography in Asian elephants. Conserv. Physiol. 3:1-14. doi:10.1093/conphys/cov030
19. Fourie, N.H., C.J. Jolly, J.E. Phillips-Conroy, J.L. Brown and R.M. Bernstein. 2015. Variation in hair cortisol concentrations in wild populations of two baboon species (*Papio anubis*, *P. hamadryas*) and a population of their natural hybrids. Primates 56:259-272.
20. Daigle, C.L., J.L. Brown, K. Carlstead, B. Pukazhenthi, E. Freeman and R.J. Snider. 2015. Multi-institutional survey of social, management, husbandry and environmental factors for the SSP African lion *Panthera leo* population: Examining the effects of a breeding moratorium in relation to breeding success. Int. Zoo Yrbk. 49:198–213 DOI:10.1111/izy.12073.
21. Nájera, F., K. Kaufman, W. Asaithanmakul, U. Kongprom, C. Aitken-Palmer, J. Brown, K. Goodrowe, R. Schwartz, D.E. Wildt and M. Bush. 2014. Swimmer syndrome in a clouded leopard (*Neofelis nebulosa*) cub. J. Zoo Wildl. Med. 45:386-388.
22. Malcolm, K.D., W.J. McShea, D.L. Garshelis, S-J. Luo, T.R. Van Deelen, S. Li, L. Miao, D. Wang and J.L. Brown. 2014. Responses of Asiatic black bears to variable habitat quality in China: Increased stress associated with food limitation, crop raiding, and foraging beyond reserve boundaries. Global Ecol. Conserv. 2:267-276.
23. Fernández, D., D. Doran-Sheehy, C. Borries and J.L. Brown. 2014. Reproductive characteristics of wild Sanje mangabeys (*Cerocebus sanjei*). Am. J. Primatol. 76:1163-1174. doi: 10.1002/ajp.22301.
24. Morfeld, K.A., R.L Ball and J.L. Brown. 2014. Recurrence of hyperprolactinemia and continuation of ovarian acyclicity in captive African elephants (*Loxodonta africana*) treated with cabergoline. J. Zoo Wildl. Med. 45(3):569-576.
25. Khonmee J., J.L. Brown, K. Taya, S. Rojanastien, V. Punyapornwithaya, D. Thumasanukul, A. Kongphoemphun, B. Siriaroonrat, W. Tipkatha, V., P. Pongpiachan and C. Thitaram. 2014. Assessment of ovarian activity in captive goral (*Naemorhaedus griseus*) using noninvasive fecal steroid monitoring. Theriogenology doi: 10.1016/j.theriogenology.2014.07.012

26. Morfeld, K.A. and J.L. Brown. 2014. High body condition scores and elevated insulin and leptin are associated with ovarian acyclicity in zoo African elephants (*Loxodonta africana*). Reprod. Fertil. Dev. doi: 10.1071/RD14140.
27. Mesa, B., J.L. Brown, K. Pelican and M.J. Kelly. 2014. Effect of natural environmental conditions in Belize on fecal glucocorticoid metabolite concentrations in jaguars (*Panthera onca*). Conserv. Physiol. DOI: 10.1093/conphys/cou039
28. de Paz, R., N.P. Souza and J.L. Brown. 2014. Evaluation of glucocorticoid faecal monitoring as a non-invasive assessment of stress in captive crab-eating fox (*Cerdocyoun thous*) after ACTH stimulation. J. Steroids Horm. Sci. S12:008. doi: 10.4172/2157-7536.S12-006
29. Khonmee J., J.L. Brown, S. Rojanastien, D. Thumasanukul, A. Kongphoemphun, B. Siriarunrat, W. Tipkatha, V. Punyapornwithaya and C. Thitaram. 2014. Seasonality of fecal androgen and glucocorticoid metabolite excretion in male goral (*Naemorhaedus griseus*) in Thailand. Anim. Reprod. Sci. 146:70-78.
30. Khonmee J., J.L. Brown, S. Rojanastien, A. Aunsusin, D. Thumasanukul, A. Kongphoemphun, B. Siriarunrat, W. Tipkatha, V. Punyapornwithaya and C. Thitaram. 2014. Influence of gender, enclosure size, and environmental conditions on fecal glucocorticoid metabolite concentrations in goral (*Naemorhaedus griseus*). PLoS ONE 9(3) e91633. doi: 10.1371/journal.pone.0091633
31. Cikanek, S., S. Nockhold, A. Estrada, J. Guerrel, R. Ibanez, J.L. Brown, J.W. Carpenter and B. Gratwicke. 2014. Determining an optimal grouping strategy for the *ex-situ* conservation of *Atelopus* spp. PLoS ONE 9(2):e90218. doi:10.1371/journal.pone.0090218
32. Morfeld, K.A., J. Lehnhardt, C. Alligood, J. Bolling and J.L. Brown. 2014. Development of a body condition scoring index for female African elephants validated by ultrasound measures of subcutaneous fat. PLoS ONE 94 (4) doi: 10.1371/journal.pone.0093802.
33. West, K.L., J. Ramer, J.L. Brown, J. Proudfoot, J. Sweeney and D.R. Bergfelt. 2014. Thyroid hormone concentrations in relation to age, sex, pregnancy status and perinatal loss in bottlenose dolphins (*Tursiops truncates*). Gen. Comp. Endocrinol. 197:73-81.
34. Carlstead, K., J.A. Mench, C. Meechan and J.L. Brown. 2013. An epidemiological approach to animal welfare research in zoos: The elephant welfare project. J. Appl. Anim. Welfare Sci. 16:319-337.
35. Freeman, E.W., J.M. Meyer, S. Putman, B.A. Schulte and J.L. Brown. 2013. Family status affects ovarian cycle activity based on fecal progestagen metabolite analysis in female African elephants. Cons. Physiol. 1: cot025 doi:10.1093/conphys/cot025.
36. Pukazhenthi, B.S., V. Quse, M. Hoyer, O. Sanjur and J.L. Brown. 2013. Reproductive biology and breeding management of tapirs. J. Integrative Zool. 8:18-34.
37. Burgess, E.A., J.L. Brown and J.M. Lanyon. 2013. Sex, scarring, and stress: understanding seasonal costs in a cryptic marine mammal. Conserv. Physiol. 1: cot014 doi:10.1093/conphys/cot014.
38. Schwarzenberger, F. and J.L. Brown. 2013. Noninvasive hormone monitoring: An important tool for the breeding management of wildlife species. Wien. Tierärztl. Mschr. - Vet. Med. Aust. 100:209-225.
39. Prado-Oviedo, N., Malloy, E.J., Deng, Xinyi and J.L. Brown. 2013. Hyperestrogenism is not associated with hyperprolactinemia and ovarian acyclicity African elephants (*Loxodonta africana*). Gen. Comp. Endocrinol. 189:7-14.
40. Scarlata, C.D., B.A. Elias, J.R. Godwin, R.A. Powell, D. Shepherdson, L.A. Shipley and J.L. Brown. 2013. Influence of environmental conditions and facility on faecal glucocorticoid concentrations in pygmy rabbits (*Brachylagus idahoensis*). Anim. Welfare 22: 357-368.
41. Malcolm, K., W.J. McShea, T.R. Van Deelen, H.J. Bacon, F. Liu, S. Putman, X. Zhu and J.L. Brown. 2013. Analyses of fecal and hair glucocorticoids to evaluate short- and long-term stress and recovery of Asiatic black bears (*Ursus thibetanus*) removed from bile farms in China. Gen. Comp. Endocrinol. 185:97-106.
42. Watson, R., C. Munro, K.L. Edwards, V. Norton, J.L. Brown and S.L. Walker. 2013. Development of a versatile enzyme immunoassay for non-invasive assessment of glucocorticoid metabolites in a diversity of taxonomic species. Gen. Comp. Endocrinol. 186:16-24.
43. Kiso W.K., V. Selvaraj, J. Nagashima, A. Asano, J.L. Brown, D.S. Schmitt, J. Leszyk, A.J. Travis and B.S. Pukazhenthi. 2013. Lactotransferrin in Asian elephant (*Elephas maximus*) seminal plasma correlates with semen quality. PLOS One 8:e71033
44. Sobolewski, M.E., J.L. Brown and J.C. Mitani. 2013. Female parity, male aggression and the challenge hypothesis in wild chimpanzees. Primates 54:81-88.

45. Parker, N., M.L. Power, M. Carden, J.L. Brown and O.T. Oftedal. 2013. Variation in the composition of milk of Asian elephants (*Elephas maximus*) throughout lactation. Zoo Biol. 32:291-298.
46. Sobolewski, M.E., J.L. Brown and J.C. Mitani. 2012. Territoriality, tolerance and testosterone in wild chimpanzees. Anim. Behav. 84:1469-1474.
47. Ahlering, M.A., J.E. Maldonado, L.S. Eggert, R.C. Fleischer, D. Western and J.L. Brown. 2012. Conservation outside protected areas and the impact of human-dominated landscapes on wildlife. Conserv. Biol. 5:150-162.
48. Kiso, W.K., A. Asano, A.J. Travis, D.L. Schmitt, J.L. Brown and B.S. Pukazhenthi. 2012. Pretreatment of Asian elephant spermatozoa with cholesterol-loaded cyclodextrins and glycerol addition at 4°C improves cryosurvival. Reprod. Fertil. Dev. 24:1134-1142.
49. Bergfelt, D.R., D.L. Thompson, J.L. Brown, N.A. Presley, K.L. West, M. Campbell and G.P. Adams. 2012. Investigation of an immunoreactive chorionic gonadotropin-like substance in the placenta, serum and urine of pregnant bottlenose dolphins (*Tursiops truncatus*). Aquatic Mammals 38:354-361.
50. Wildt, D.E., B.S. Pukazhenthi, K. Snodgrass, S. Shurter, L. Greene, R. Rieches, D. Beetem, R. Sawyer and J.L. Brown. 2012. Where will zoo animals come from? New ways to get to species sustainability. *Connect* (magazine of the Association of Zoos and Aquariums, August), pp. 10-13.
51. Glaeser, S.S., M.S. Martin, K.E. Hunt, M. Finnegan and J.L. Brown. 2012. Investigation of individual and group variability in estrous cycle characteristics in female Asian elephants (*Elephas maximus*) at the Oregon Zoo. Theriogenology 78:285-296.
52. Dow, T.L. and J.L. Brown. 2012. Evidence of hyperprolactinemia as a growing cause of ovarian acyclicity in female zoo African elephants (*Loxodonta africana*). Reprod. Fertil. Dev. 24:1019-1027.
53. Scarlata, C.D., B.A. Elias, J.R. Godwin, R.A. Powell, D. Shepherdson, L.A. Shipley and J.L. Brown. 2012. Relationship between fecal glucocorticoids and reproductive success in captive pygmy rabbits (*Brachylagus idahoensis*). J. Mammal. 93:759-770.
54. Boedeker, N.C., L.C. Hayek, S. Murray, D. deAvila and J.L. Brown. 2012. Effects of a gonadotropin-releasing hormone vaccination on ovarian cyclicity and uterine morphology of an Asian elephant (*Elephas maximus*). J. Zoo Wildl. Med. 43:603-614.
55. Santymire, R.M., J.L. Brown, R.C. Santymire, R.A. Bauer and J.G. Howard. 2012. Reproductive activity in the fishing cat (*Prionailurus viverrinus*) assessed by fecal steroid analyses. Zoo Biol. 128:60-72.
56. Burgess, E.A., J.M. Lanyon, J.L. Brown, D. Blyde and T. Keeley. 2012. Determining pregnancy rates in a free-ranging dugong population using measurements of fecal progesterone metabolite concentrations and body morphometrics: a population perspective. Gen. Comp. Endocrinol. 177:82-92.
57. Ganswindt, A., J.L. Brown, E.W. Freeman, A.J. Kouba, L.M. Penfold, R.M. Santymire, M.M. Vick, N. Wielebnowski, E.L. Willis and M.R. Milnes. 2012. International Society for Wildlife Endocrinology: The future of endocrine measures for reproductive science, animal welfare, and conservation biology. Bio. Letters doi:10.1098/rsbl.2011.1181.
58. Conforti, V.A., R.G. Morato, A.M. Augusto, L. Souza, D.M. deAvila, J.L. Brown and J.J. Reeves. 2011. Noninvasive monitoring of adrenocortical function in captive jaguars (*Panthera onca*). Zoo Biol. 31:426–441.
59. Kersey, D.C., D.E. Wildt, J.L. Brown, R.J. Snyder, Y. Huang and S.L. Monfort. 2011. Rising fecal glucocorticoid concentrations track reproductive activity in the female giant panda (*Ailuropoda melanoleuca*). Gen. Comp. Endocrinol. 173:364-370.
60. Dow, T.L., Holaskova, I. and J.L. Brown. 2011. Results of the third reproductive assessment survey of North American Asian (*Elephas maximus*) and African (*Loxodonta africana*) female elephants. Zoo Biol. 30:699-711.
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201. Brown, J.L. and P.K. Chakraborty. 1988. Characterization of the effects of clomiphene citrate on reproductive physiology in male rats of various ages. Acta Endocrinol. (Copenh) 118:437-443.
202. Brown, J.L., L.D. Stuart and P.K. Chakraborty. 1987. Endocrine profiles, testicular gonadotropin receptors and sperm production in hemicastrated ram lambs. J. Anim. Sci. 65:1563-1570.
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<u>Manuscripts in Preparation/Review</u>

1. Prado-Oviedo NA, Bonaparte-Seller MK, Malloy E, Meehan C, Mench J, Brown JL. Demographic and life history evaluations of Asian (*Elephas maximus*) and African elephants (*Loxodonta africana*) in North American zoos. PLoS One.
2. Morfeld, K.A., C. Meehan, J. Hogan and J.L. Brown. Assessment of body condition in African (*Loxodonta africana*) and Asian (*Elephas maximus*) elephants in North American zoos and management practices associated with high body condition scores. PLoS One.
3. Mesa, B., J.L. Brown and M.J. Kelly. Population assessment of Belizean felids in a mosaic landscape through non-invasive genetic, parasite, diet, and stress-hormone analyses. J. Tropical Ecol.
4. Morfeld, K., C. Meehan, J. Hogan and J.L. Brown. Metabolic health assessment of zoo elephants: Management factors predicting leptin levels and the glucose-to-insulin ratio and their associations with health parameters. PLoS One.
5. Brown, M.E., S.J. Converse, J.N. Chandler, C. Shafer, J.L. Brown, C.L. Keefer and N. Songsasen. Reproductive hormones and behaviors are indicators of reproductive performance in female whooping cranes (*Grus americana*). Horm. Behav.
6. Dow, T.L., D. Cross and J.L. Brown. Determining the efficacy of cabergoline and domperidone for treating ovarian acyclicity in African elephants (*Loxodonta africana*).
7. Fourie, N.H., J.L. Brown, C.J. Jolly, J.E. Phillips-Conroy, J. Rogers and R. Bernstein. Sources of variation in hair cortisol in wild and captive non-human primates. Zoology
8. Buddhachat, K., S. Klinhom, P. Bansiddhi, K. Penchart, K. Ouitavon, K. Sriaksorn, C. Pa-in, B. Kanchanasaka, C. Somgird, C. Thitaram, J.L. Brown and K. Nganvongpanit. Using handheld X-ray fluorescence as a non-invasive method to distinguish between Asian and African elephant tusks.
9. Pushpakumara, P.G.A., R.C. Rajapakse, B.M.A.O. Perera and J.L. Brown. Reproductive performance of the largest semi-captive Asian elephant (*Elephas maximus*) population in Sri Lanka. Anim. Reprod. Sci.
10. Tennenhouse E.M., S. Putman, N.P. Boisseau and J.L. Brown. The relationships between steroid hormones and social behavior in ring-tailed lemurs (*Lemur catta*). Anim. Behav.
11. Ngama, S., C. Vermeulen, J.L. Brown, J.R. Poulsen and J. Bindelle. Ecophysiology to understand elephant crop raiding behavior: a review.
12. Prado-Oviedo, N.A., Malloy, E., Carlstead, K., Wielebnowski, N., Brown, J.L. The role of life history and temperament in hyperprolactinemia of African elephants (*Loxodonta africana*). Gen. Comp. Endocrinol.
13. Prado-Oviedo, N.A., Morfeld, K., Malloy, E., Brown, J.L. Hyperprolactinemia, metabolism and body condition in non-cycling African elephants (*Loxodonta africana).* Cons. Physiol.
14. Roberts, B., J. Brown, R. Snyder, B. Durrant, D. Kersey and A.J. Kouba. Characterizing urinary $PGF_{2\alpha}$ metabolites during the estrous cycle and pregnancy in the giant panda (*Ailuropoda melanoleuca*). Biol. Reprod.

15. Gocinski, B.L., K.K. Knott, B.M. Roberts, J.L. Brown and A.J. Kouba. Urinary androgen levels in the male giant panda (*Ailuropoda melanoleuca*) rise in response to both seasonal and aseasonal estrous signals.
16. Siengdee, P., T. Euppayo, S. Chomdej, J.L. Brown and K. Nganvongpanit. Two fluoroqinolones and their combinations with hyaluronan: Comparison of effects on canine chondrocyte culture.
17. Wojtusik, J., J.L. Brown, G. Birchard, B.S. Pukazhenthi. Reproductive seasonality in the critically endangered Addra gazelle (*Nanger dama ruficollis*).
18. Nganvongpanit, K., P. Siengdee, K. Buddhachat, S. Klinhom, T. Pitakarnop, T. Ankawanish, J.L. Brown and C. Thitaram. Intraosseous anatomy, histology and elemental profile in long bones of the Asian elephant (*Elephas maximus*). J. Anat.
19. Buddhachat, K., P. Siengdee, R. Nomsiri, P. Kaewmong, C. Thitaram, P. Mahakkanukraug, J.L. Brown and K. Nganvongpanit. Elemental analysis of bone, teeth, horn and antler in different species using non-invasive X-ray fluorescence. PLoS One.
20. Paudel, S., J.L. Brown, S. Thapaliya, I.P. Dhakal, S.K. Mikota, K.P. Gairhe, M. Sashika, M.Shimozuru and T. Tsubota. Comparison of cortisol and thyroid hormones among tuberculosis suspected and healthy elephants of Nepal. Wildl. Sci.

**CURRICULUM VITAE**

**Name**: Paul E. Marinari

**Address**: [redacted]

**Education**: [redacted]

**Professional Appointments**:

Biological Science Technician, Badlands National Park, National Park Service 1[redacted]6

Fish and Wildlife Biologist, National Black-footed Ferret Conservation Center, US Fish and Wildlife Service 1[redacted]

Senior Curator, Center for Species Survival, Smithsonian Conservation Biology Institute, National Zoological Park [redacted]t

**Selected Invited Conferences and Presentations (last 2 years):**

Smithsonian Natural History Museum, webinar presentation [redacted]

"Black-footed Ferret Recovery: A Multi-Partner Approach to Saving an Endangered Species". The Wildlife Society Annual Conference, Kona, Hawaii. [redacted]

**Selected Professionally Related Activities and Responsibilities**:

Steering Committee Member, Small Carnivore Taxon Advisory Group, Association of Zoos and Aquariums (AZA) 2[redacted]t

Black-footed Ferret Species Survival Plan (SSP) Studbook Keeper [redacted]

[redacted]

AZA Associate Member [redacted]

[redacted]

**Publication List (partial):**

Hurd, L.E., P.E. Marinari and R.M. Eisenberg. 1989. Influence of temperature and photo period on early developmental rate of Tenodera sinensis saussure. Proc. Entomol. Soc. Wash. 91(4), pp.529-533.

Lindzey, F.G. and P.E. Marinari. 1992. Spotlighting for Black-footed Ferrets. US Department of Interior, Fish and Wildlife Service Research Info. Bull. No. 74.

Plumb, G., B. Bessken and P.E. Marinari. 1995. Reopening a Niche at Badlands National Park: the Black-footed Ferret. National Park Service-Park Science. Vol 15, No. 2.

Marinari, P.E. and C. Bessken. 1996. Prairie Dog Trapping for Imprinting of Black-footed Ferrets as Reintroduction Candidates at Conata Basin-Badlands. Ppg 63-78 in Black-footed Ferret Reintroduction Year One Completion Report.

Marinari, P.E. and C. Bessken. 1996. Field Preparation Surrounding Black-footed Ferret Reintroduction at Conata Basin-Badlands. Ppg 79-93 in Black-footed Ferret Reintroduction Year One Completion Report.

Plumb, G. and P.E. Marinari. 1996. Black-footed Ferret Monitoring in Badlands National Park, 1994-1995. Ppg 94-115 in Black-footed Ferret Reintroduction Year One Completion Report.

Vargas, A., M. Lockhart, P. Marinari and P. Gober. 1996. The Reintroduction Process: Black-footed Ferrets as a Case Study. 1996 AZA Regional Conference Proceedings.

Marinari, P.E. 1997-2011. BFF Studbook in SPARKS.

Wolf, K.N., D.E. Wildt, A.Vargas, P.E. Marinari, J.S. Kreeger, M.A. Ottinger and J.G. Howard. 2000. Age dependent changes in sperm production,semen quality and testicular volume in black-footed ferret (Mustela nigripes). Biol. Repro. 63:179-187.

Wisely, S.M., R.M. Santymire, P. Marinari, J. Kreeger, D.E. Wildt and J.G. Howard. 2005. Environment influences morphology and development for in situ and ex situ populations of black-footed ferret (Mustela nigripes). Animal Conservation 8:321-328.

Howard, J.G., R.M. Santymire, P.E. Marinari, J.S. Kreeger, L. Williamson and D.E. Wildt. 2006. Use of reproductive technology for black-footed ferret recovery. In: Recovery of the Black-Footed Ferret: Progress and Continuing Challenges eds., J.E. Roelle, B.J. Miller, J.L. Godbey and D.E. Biggins, pp 28-36. USGS Investigations Report 2005-5293, Reston, VA.

Marinari, P. E. and J.S. Kreeger. 2006. An adaptive management approach for black-footed ferrets in captivity. In: Recovery of the Black-footed Ferret: Progress and Continuing Challenges. pp 23-27. USGS Investigations Report, Reston, VA.

Santymire, R.M., P.E. Marinari, J.S. Kreeger, D.E. Wildt and J.G. Howard. 2006. Determining semen osmolality and effect of medium osmolality on sperm viability in the black-footed ferret. Cryobiology 54:37-50.

Santymire, R.M., E. Lonsdorf, C. Lynch, P. Marinari, J. Kreeger, D.E. Wildt, and J.G. Howard. 2007. Increasing inbreeding results in declining seminal quality, pregnancy success and litter size in endangered black-footed ferret, Mustela nigripes. Proceedings: Society for Conservation Biology 21st Annual Meeting, South Africa, p. 127 (abstract #227).

Santymire, R.M., P.E. Marinari, J.S. Kreeger, D.E. Wildt and J.G. Howard. 2007. Slow Cooling Prevents Cold-induced Damage to Sperm Motlity and Acrosomal Integrity in the Black-footed Ferret. Reproduction, Fertility and Development 19:1-12

Rocke, T.E., S. Smith, P. Marinari, J. Kreeger, J.T. Enama and B.S. Powell. 2008. Vaccination with F1-V fusion protein protects black-footed ferrets (Mustela nigripes) against plague upon oral challenge with Yersinia pestis. Journal of Wildlife Diseases 44:53-64.

Santymire, R.M., P.E. Marinari, J.S. Kreeger, D.E. Wildt and J.G. Howard. 2008. Increased sensitivity to sperm cryopreservation in the black-footed ferret (Mustela nigripes) compared to the domestic ferret (Mustela putorius furo). Proceedings: Society for the Study of Reproduction, Biology of Reproduction p. 63 (abstract 19).

Santymire, R.M., P.E. Marinari and J.S. Kreeger. 2009. Determining the Relationship Among Serum Vitamin E and A Levels and Seminal Quality in Male Black-footed Ferrets. The Wildlife Society Annual Conference. Monterey, California.

Santymire, R.M., S. Lavin, P. Marinari and J. Kreeger. 2010. Influence of nutrition on fitness and reproduction in male black-footed ferrets. Proceedings: Society for the Study of Reproduction.

Sanymire, R.M., S. Lavin, P. Marinari and J. Kreeger. 2010. Influence of nutrition on fitness and reproduction in male black-footed ferrets. Proceedings: Comparative Nutrition Society.

Santymire, R.M., S. Lavin, P. Marinari, J. Kreeger, H. Branvold and M. Rafacz. 2011. Role of nutrition on reproduction and health in male black-footed ferrets. Proceedings of Association of Zoos and Aquariums National Conference. Atlanta, Georgia.

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Smithsonian's National Zoological Park
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## EDUCATION

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## PROFESSIONAL AND RESEARCH EXPERIENCE

[redacted]

Affiliate Professor, Department of Environmental Science and Policy
*George Mason University, Fairfax, VA (Dr. Robert Jonas)*
Biologist, Asia Trail/Giant Pandas (a newly merged unit)
*Smithsonian Institution, National Zoological Park, Washington, DC (Dr. Brandie Smith/Steve Sarro)*
Biologist, Asia Trail/Cheetah Conservation Station/Africa Trail
*Smithsonian Institution, National Zoological Park, Washington, DC (Tony Barthel)*
Interim Curator of Giant Pandas and Primates (Biologist Detailed to Curator Position)
*Smithsonian Institution, National Zoological Park, Washington, DC (Dr. Brandie Smith)*
Biologist, Kids Farm
*Smithsonian Institution, National Zoological Park, Washington, DC (Bob King)*
Animal Keeper (temporary) Asia Trail Exhibit
*Smithsonian Institution, National Zoological Park, Washington, DC (Tony Barthel)*
Fujifilm Curatorial Resident
*Smithsonian Institution, National Zoological Park, Washington, DC (Dr. Donald Moore)*
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Graduate Fellow, Psychology Department, Biopsychology
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Research Intern
*The Pittsburgh Zoo, Pittsburgh, PA (Dr. William Langbauer)*
Veterinary Clinic Coordinator
*The Animal Rescue League of Western Pennsylvania, Pittsburgh, PA (Drs. Gail Rapport, Mark Bridge and Dwayne Overby)*
Student Researcher, John Carroll Chimpanzee Research Team
*John Carroll University/Cleveland Metroparks Zoo, Cleveland, OH (Dr. Mark Bodamer)*

## INTERNATIONAL FIELD WORK

June-July 2004 **Chimfunshi Wildlife Orphanage**……Zambia, South Africa
*Primary investigator and supervising researcher collecting behavioral data on social play and social relationships in semi-captive chimpanzees, Pan troglodytes (dissertation research)*

June 2003 **Chimfunshi Wildlife Orphanage**……Zambia, South Africa
*Pilot study for my doctoral research on social play behavior and social relationships in chimpanzees, Pan troglodytes*

August 2002 **La Campana National Park…**……..……Santiago, Chile
*Research assistant for study on kin discrimination in wild degus, Octodon degu (Coordinating researcher: Stephanie Jesseau)*

## TEACHING EXPERIENCE

2010-present Graduate Student Thesis Committee Advisor (Jilian Fazio – PhD program)
*George Mason University, Fairfax, Virginia*

2015 Contributor, Animal Welfare online course
*San Diego Zoo Global Academy* https://collabornation.net/courses_cdn/SDZGA-WELFARECOURSE-REVIEW-072315/story.html

2012 Co-Instructor, Conservation Behavior
*George Mason University, Fairfax, Virginia*

2011 Instructor, Behavioral Research Methods Course for Zoo Keepers, National Chapter - American Association of Zoo Keepers
*Smithsonian's National Zoo, Washington, D.C.*

2010 Lecturer on Primate Evolution for OSHER Lifelong Learning Institute's Continuing Education Program
*George Mason University, Fairfax, Virginia*

2007-2009 Animal Behavior Research Intern Program Supervisor & Mentor
*Smithsonian's National Zoo, Washington, D.C.*

2003-2004 Teaching Assistant, Chimpanzee Behavior International Field Course in Zambia
*Pacific University, Forest Grove, Oregon*

2001-2002 Graduate Student Instructor, Psychology 111 – Introduction to Psychology
*University of Michigan, Ann Arbor, Michigan*

## AWARDS, GRANTS, HONORS

Oklahoma City Zoo Conservation Action Now Grant, 2011
American Association of Zoo Keepers Research Grant, 2011
Smithsonian Women's Committee Grant (for Digital Animal Behavior Laboratory), 2011
National Zoo Peer Recognition Award, 2009
Fujifilm Curatorial Residency Post-Doctoral Fellowship, 2007-2009
Barbara Perry Roberson Summer Research Fellowship, 2004
Psychology Dissertation Thesis Grants, Fall 2003 & Winter 2004
Joan Kessler Award, 2003
National Science Foundation Graduate Research Fellowship, 2002-2005
Barbara A. Oleshansky Award, 2002
American Psychological Foundation Graduate Research Scholarship, 2001
Research Fellowship, Psychology Department, University of Michigan, 2000-2002
Honors Program, John Carroll University, 1993-1997 (Honors Program Graduate 1997)
Dean's List, John Carroll University, 1993-1997
American Values Scholarship, John Carroll University, 1993-1997
President's Honor Scholarship, John Carroll University, 1993-1997

## PRINT PUBLICATIONS

Smuts, B., **Bauer, E.**, & Ward, C. (2015). Rollovers during play: Complementary perspectives. *Behavioral Processes* **116**: 50-52.

Moore, D., **Bauer, E.**, & Smith, B. (2013). "Animals First": Good communication may be the missing element in nonhuman animal welfare systems. *Journal of Applied Animal Welfare Science* **16**(4): 393.

**Bauer, E.,** Babitz, M., Boedeker, N. & Hellmuth, H. (2013). Approaches to understanding and managing pacing in sloth bears in a zoological setting. *International Journal of Comparative Psychology* **26**: 53-74.

Hellmuth, H., Shimm, A. & **Bauer, E.** (2010). Extreme Makeover - Cuttlefish Edition. *ABMA Wellspring* **10**(4)-**11**(1): 8-16.

Callicrate, T. & **Bauer, E.B.** (2009). Time budgets and behaviors of double-wattled cassowaries. *ABMA Wellspring* **10**(2): 17-24.

**Bauer, E.B.**, Ward, C. & Smuts, B.B. (2009). Play like a puppy, play like a dog. *Journal of Veterinary Behavior: Clinical Applications and Research* **4**(1): 68-69.

McLaughlan, C. & **Bauer, E.B.** (2009). Agonistic interaction and its indication of dominance structure between a pair of captive female Asian elephants. *ABMA Wellspring* **10**(1): 12-17.

Ward, C., **Bauer, E.B.** & Smuts, B.B. (2008). Partner preferences and asymmetries in social play among domestic dog, *Canis lupus familiaris*, littermates. *Animal Behaviour* ***76***(4): 1187-1199.

**Bauer, E.** & Hellmuth, H. (2007). Trying to reduce stereotypic pacing behavior in an adult male sloth bear: A scientific approach with environmental enrichment. *ABMA Wellspring* **8**(3): 8-13.

**Bauer, E.B.** & Smuts, B.B. (2007). Cooperation and competition during play in domestic dogs, *Canis familiaris. Animal Behaviour* **73**(3): 489-499.

**Bauer, E.B.** (2005). Dyadic play interactions and social relationships in three species of complex social mammals: domestic dogs (*Canis familiaris*), bonobos (*Pan paniscus*) and chimpanzees (*Pan troglodytes*). Doctoral dissertation, University of Michigan, Ann Arbor.

## POSTERS AND ORAL PRESENTATIONS

Babitz, M., **Bauer, E.** Boedeker, N. (2011) Use of fluoxetine to treat stereotypical pacing in a captive sloth bear (*Melursis ursinus*). Presented at Advancing Bear Care conference, Banff, Canada. [Poster Presentation]

**Bauer, E.**, Babitz, M. (2011). The effects of social companionship and seasonality on pacing behavior in an adult male sloth bear: a case study. Presented at Advancing Bear Care conference, Banff, Canada. [Poster Presentation]

**Bauer, E.**, Hellmuth, H. (2011). Trying to reduce stereotypic pacing behavior in an adult male sloth bear: an assessment of enrichment strategies. Presented at Advancing Bear Care conference, Banff, Canada. [Poster Presentation]

**Bauer, E.**, Babitz, M. (2011). The effects of social companionship and seasonality on pacing behavior in an adult male sloth bear: a case study. Presented at Smithsonian Conservation Biology Institute Science Convivium, Washington, D.C. [Poster Presentation]

**Bauer, E.**, Hellmuth, H. (2011). Trying to reduce stereotypic pacing behavior in an adult male sloth bear: an assessment of enrichment strategies. Presented at Smithsonian Conservation Biology Institute Science Convivium, Washington, D.C. [Poster Presentation]

Moore, D., **Bauer, E.**, Smith, B. (2011). Animals first: good communication may be the missing element in animal welfare systems. Presented at Detroit Zoological Society's Center for Zoo Animal Welfare "From Good Care to Great Welfare: Advancing Zoo Animal Welfare Science and Policy" Symposium, Royal Oak, Michigan. [Oral Presentation]

**Bauer, E.**, Babitz, M., Hellmuth H., Boedeker, N. (2011). Applied behavioral research for problem solving in a zoo setting. Presented at annual American Psychological Association Convention, Washington, DC. [Oral Presentation]

Hellmuth, H., **Bauer, E.,** Bruno, S. (2011). Does it work? Evaluating management strategies to enhance zoo animal welfare. Presented at annual American Psychological Association Convention, Washington, DC. [Oral Presentation]

Hellmuth, H., **Bauer, E.**, Hallager, S. (2011). Voyeuristic zoo keeping: using technology to support animal behavior research in a zoo setting. Presented at annual American Psychological Association Convention, Washington, DC. [Oral Presentation]

**Bauer, E.** (2010). The effects of social companionship and seasonality on pacing behavior in a captive adult male sloth bear: a case study. Presented at the 47$^{nd}$ annual Animal Behavior Society Meeting, Williamsburg, Virginia. [Poster Presentation]

Smuts, B.B. Ward, C. and **Bauer, E.B.** (2010). Social relations and emotional processes: conceptual background and illustrative case studies. Invited presentation for the conference *Impact of relationships on individual variation: Fifth Interdisciplinary Dialogue*, sponsored by the Bowen Center for the Study of the Family, Georgetown Family Center, Georgetown University. [Oral Presentation]

**Bauer, E.** (2010). A brief history of primates. Lecture to the George Mason University OSHER Lifelong Learning Institute's Continuing Education Program, Fairfax, Virginia. [Oral Presentation]

Hellmuth, H., **Bauer, E.**, DeWitt, T., Peters, A. & Shimm, A. (2009). Extreme makeover: cuttlefish edition. Presented at the annual meeting of the Animal Behavior Management Alliance, Providence, Rhode Island. [Oral Presentation]

**Bauer, E.B.** & Henley, M. (2009). At the Smithsonian's National Zoo we've got watching animals down to a science. Presented at the annual meeting of the National Science Teachers Association, New Orleans, Louisiana. [Oral Presentation]

**Bauer, E.B.**, Ward, C. & Smuts, B.B. (2008). Play like a puppy, play like a dog. Presented at the Canine Science Forum, Budapest, Hungary. [Oral Presentation]

Hellmuth, H. & **Bauer, E.** (2008). Trying to reduce stereotypic pacing behavior in an adult male sloth bear: an assessment of enrichment strategies. Presented at the National Zoological Park's Science Day, Smithsonian National Zoological Park Conservation and Research Center, Front Royal, Virginia. [Poster Presentation]

**Bauer, E.B.** (2005). A comparative study of play style in chimpanzees and bonobos. Dissertation Defense. Presented to the Biopsychology Area of the University of Michigan's Department of Psychology, Ann Arbor, Michigan. [Oral Presentation]

**Bauer, E.B.** & Smuts, B.B. (2005). Cooperative and competitive play strategies used by bonobos and chimpanzees. *Animal Behavior Society Abstracts*, 7. Presented at the 42nd annual Animal Behavior Society Meeting, Snowbird, Utah. [Oral Presentation]

**Bauer, E.B.** & Smuts, B.B. (2003). Individual and dyadic variation during play in domestic dogs, *Canis familiaris.* Presented at the Kyoto University International Symposium on Self, Cognition and Emotion, University of Michigan, Ann Arbor, Michigan. [Poster Presentation]

**Bauer, E.B.** & Smuts, B.B. (2003). Individual and dyadic variation during play in domestic dogs, *Canis familiaris. Animal Behavior Society Abstracts.* Presented at the 40th annual Animal Behavior Society Meeting, Boise State University, Boise, Idaho. [Poster Presentation]

Smuts, B.B. & **Bauer, E.B.** (2003). Individual variation in social play strategies: a study of domestic dogs. The Relationship System and Individual Variation in Functioning – Third Interdisciplinary Dialogue, Washington DC. [Invited Talk, Prepared by Bauer, presented by Smuts]

**Bauer, E.B.** & Smuts, B.B. (2002). Role reversal and self-handicapping during play-fighting in domestic dogs, *Canis familiaris*. *Animal Behavior Society Abstracts,* 6. Presented at the 39th annual Animal Behavior Society Meeting, University of Indiana, Bloomington, Indiana. [Poster Presentation]

**Bauer, E.B.** (2002). Variation in play strategies: a study of domestic dogs. Biopsychology Colloquium Series, University of Michigan, Ann Arbor, Michigan. [Oral Presentation]

Chik, K., **Bauer, E.B.** & Smuts, B.B. (2002). Development of role asymmetry and self-handicapping during the play of domestic dogs. Presented at the Psychology Honors Program Public Poster Session, University of Michigan, Ann Arbor, Michigan. [Poster Presentation]

**Bauer, E.**, Coleman, K., Clark, R., Kupfer, D.J. & Cameron, J.L. (2000). Social cognition in monkeys reared with maternal separation at one week of age. *Society for Neuroscience Abstracts* **26**, 490. Presented at the 30th annual Society for Neuroscience Meeting, New Orleans, Louisiana. [Poster Presentation]

## PROFESSIONAL SOCIETY MEMBERSHIPS

Animal Behavior Society
Association of Zoos and Aquariums
American Association of Zoo Keepers (National Organization)
American Association of Zoo Keepers (National Chapter)
Animal Behavior Management Alliance

## LEADERSHIP, SERVICE AND OTHER ACTIVITIES

2012-present Research & Technology Committee Member
*Association of Zoos and Aquariums*

2012-present Animal Welfare Committee Advisor
*Association of Zoos and Aquariums*

2012-present Manuscript Reviewer
*International Journal of Comparative Psychology*

2011-present Behavior Advisory Group Chair
*Association of Zoos and Aquariums*

| | |
|---|---|
| 2011-present | Manuscript Reviewer<br>*Zoo Biology* |
| 2007-present | Enrichment & Training Committee Member<br>*Smithsonian Institution, National Zoological Park* |
| 2011 | Science Convivia Planning Committee Member<br>*Smithsonian Institution, National Zoological Park* |
| 2010-2014 | Institutional Animal Care and Use Committee (IACUC) Inspection Coordinator<br>*Smithsonian Institution, National Zoological Park* |
| 2010-2011 | Peer Recognition Committee Member<br>*Smithsonian Institution, National Zoological Park* |
| 2008-2010 | Behavior Advisory Group Secretary<br>*Association of Zoos and Aquariums* |
| 2008-2010 | Green Team Member<br>*Smithsonian Institution, National Zoological Park* |
| 2008-2009 | Animal Programs Communications Improvements Team Member<br>*Smithsonian Institution, National Zoological Park* |
| 2008 | Science Day Planning Committee Member & Session Moderator<br>*Smithsonian Institution, National Zoological Park* |
| 2008 | Research Proposal Reviewer<br>*Chimfunshi Wildlife Orphanage* |
| 2007-2009 | Enrichment & Training Enrichment Database Working Group Leader<br>*Smithsonian Institution, National Zoological Park* |
| 2007-2009 | Enrichment & Training Enrichment Standards Working Group Member<br>*Smithsonian Institution, National Zoological Park* |
| 2007-2009 | Enrichment & Training Enrichment Events Working Group Member<br>*Smithsonian Institution, National Zoological Park* |
| 2007-2009 | Institutional Animal Care and Use Committee (IACUC) Member<br>*Smithsonian Institution, National Zoological Park* |
| 2006 | Volunteer Grant Writer<br>*Peabody High School, City of Pittsburgh Public Schools* |
| 2003-2004 | Biopsychology Recruitment Planning Committee Member & Weekend Host<br>*University of Michigan* |
| 2003-2004 | Visiting Educator<br>*Chimfunshi Wildlife Orphanage Education Center, Zambia* |
| 2003 | Pat Gurin Award Lecture Committee<br>*University of Michigan* |
| 2002-2003 | Graduate Council<br>*University of Michigan* |
| 2002 | Career Day Planning Committee<br>*University of Michigan* |
| 2002 | Exhibit Contributor to "Dogs! Wolf, Myth, Hero, Friend"<br>*Los Angeles Natural History Museum Exhibit premier 2002, subsequent tours in other U.S. cities* |
| 1996 | Earthwatch Research Volunteer<br>*Kewalo Basin Marine Mammal Laboratory* |
| 1991-1995 | Volunteer<br>*Animal Friends Animal Shelter, Pittsburgh, PA* |

## NOTABLE SPOTLIGHTS

Legge, J. (2009). *Zoogoer*. This feature article highlights the animal behavior research internship program which I established at the Smithsonian's National Zoo.

Swanbrow, D. (2002). In the Company of Dogs. *Michigan Today* 34 (3): 12-14. This cover story focuses on my research with dogs in collaboration with Dr. Barbara Smuts at the University of Michigan.

## PROFESSIONAL REFERENCES

*Please advise me before contacting references.*

[redacted]

**Jessica Erin Kordell**

[redacted]

| | |
|---|---|
| 2015 | EVPP 793 Investigating Red Panda Behavior and Hormones |
| 2014 | EVPP 793 Reproductive Behavior Analysis |
| 2013 | EVPP 524 Introduction to Environmental and Resource Economics |
| 2013 | EVPP 741 Challenge of Biodiversity |
| 2013 | CONS 697 Gaining Practical Skills for Climate Change Adaptation |
| 2013 | CONS 635 Non-Invasive Genetic Techniques in Wildlife Conservation |
| 2012 | EVPP 648 Population Ecology |
| 2012 | PUAD 611 Problem Solving and Data Analysis I |
| 2011 | EVPP 692 Endangered Species, George Mason University, Fairfax, VA |
| 2011 | EVPP 519 Marine Mammal Biology and Conservation, George Mason University, Fairfax, VA |
| 2010 | BIOL 575 Organic Evolution, George Mason University, Fairfax, VA |
| 2004 | BSCI 360 Principles of Animal Behavior, University of Maryland, College Park, MD |

## Positions

| | |
|---|---|
| 2007-present | Animal Keeper, National Zoological Park, Front Royal, VA |
| 2003-2007 | Senior Research Assistant. Henry M. Jackson Foundation, Bethesda, MD |

## Research Areas and Expertise

- Applies biological and behavioral facts, principles, and techniques to the management of carnivores in a zoological setting, especially in the areas of husbandry, reproduction and population management.
- Has the ability to oversee a complex animal care and management program for carnivores, such as red pandas, felids, canids and mustelids, including diet preparation, enrichment, monitoring behavior and health, weighing and cleaning.
- Works with other supervisory biologists to provide assistance when required on other teams such as hoof stock.
- Organizes individual animal records, including weight graphs, consumption data, milk-formula calculations, medical records etc. in Microsoft Excel and works with the team to ensure spreadsheets are being used effectively.
- Coordinates the weekly food order with the commissary and regularly works with staff nutritionist on diet adjustment and the body scoring of carnivores.
- Actively facilitates research activities and goals by collecting behavioral and physiological (weights, biological samples, etc.) data to ensure species fulfill their roles within the collection plan and on a wider scale to ensure viable animal populations:

  - Trained animals for procedures such as squeeze cage training male clouded leopards and training red panda females to stand for free-contact ultrasound and radiographs, reducing animal stress and saving time.
  - Coordinates with researchers on collecting and sending biological samples outside of SCBI.
- Provides enrichment, establishes training goals and performs training for behavioral management of collection animals.
- Assists with capture and restraint, veterinary procedures and administering medications.
- Oversees the reproduction and birth management program for carnivores by arranging shipments, setting up camera systems to observe births, organizing and scheduling birth watch volunteers, assessing behavior and health of dam and cubs for successful rearing either by dam or hand-rearing.
- Provides neonatal care as part of the hand-rearing team, including 12 clouded leopards and 11 red pandas over the last 7 years.
  - Supervised the hand-rearing of two sets of 5 red panda cubs and one clouded leopard cub during team supervisor's absence.
  - Continues to play a significant role in hand-rearing of other carnivores and ungulates.
- Assists in the development of species management plans by writing husbandry and hand-rearing protocols, and training other keepers in their correct use.
- Ensures the unit resources and personnel are utilized appropriately by actively training peers and lower level animal care staff and coordinating daily duties to guarantee our high standards of animal care and welfare are met.
- Supervises a diverse group of volunteers, interns and practicum students:
  - Interview and selection of volunteers and practicum students.
  - Plan and direct the full range of administrative activities related to the assignment and scheduling of work.
  - Creation of performance standards and deadlines for practicum students.
  - Training in the various aspects of animal care and determination of training needs.
  - Evaluation of performance for both students and interns, including feedback regarding performance.
- Acts as Point of Contact for the veterinary department, attending morning veterinary meetings as needed.
- Plans and implements animal escape safety drills, as well as having acted as recapture supervisor during actual escapes.
- Plans and directs animal area maintenance, improvements and design:
  - Integral part of the design team for both the new clouded leopard and red panda facilities, overseeing daily construction questions or concerns.
  - Continued research and input on improvements such as a chiller system for red panda dens and adding "howdy" screens for red panda introductions.
  - Assisted with plans for future carnivore area / keeper building.
- Communicates to the general public through public relations activities by serving as spokesperson and contact point for public information dissemination about animals in the collection, including local and national media, documentaries, and social media efforts.
  - Stories include Red Panda Cub Story for CBS Good Morning, Zoogoer Articles "Red Panda, Burning Bright" and "Raising Babies By Hand", and the ABC Story "National Zoo experts try to save species from extinction".
- Promotes public education and awareness programs by cooperating with SCBI / FONZ education staff to achieve their goals by helping the coordinator develop a training manual for tour-guides, campout outreach programs for our carnivore areas and giving lectures on our animal programs to tour-guides and volunteers.

**Jessica Erin Kordell**

[redacted]

- [redacted] Zoofari, leading high priority tours for donors and working with the development office to come up with innovative events and programs, such as enrichment day activities.
- Assists with the development and designing of course curriculum for the red panda Species Survival Plan husbandry course and presented a lecture on ongoing red panda research.
- Playing a leadership role in AZA programs, including appointment as the Red Panda SSP Research and Behavioral Liaison and SSP Institutional Representative for both the red panda and clouded leopard.

## Peer-Reviewed Publications

Kalinich, J.F., Emond, C.A., Dalton, T.K., Mog, S.R., Colman, G.D., **Kordell, J.E**., Miller, A.C., and McClain, D.E. Embedded weapons-grade tungsten alloy shrapnel rapidly induces metastatic high-grade rhabdomyosarcomas in F344 rats. Environmental Health Perspectives 113: 729-734 (2005).

## Professional Meetings and Courses

| | |
|---|---|
| 2015 | Red Panda SSP Meeting Virtual Attendee (Institutional Representative) |
| 2015 | Clouded Leopard SSP Meeting Presenter and Felid TAG Attendee |
| 2014 | Red Panda SSP Meeting Virtual Attendee (Institutional Representative) |
| 2014 | Felid TAG Attendee |
| 2013 | Red Panda SSP Meeting Virtual Attendee (Institutional Representative) |
| 2012 | Red Panda SSP Meeting, Husbandry Course Attendee & Presenter (Institutional Representa |
| 2011 | Red Panda SSP Meeting Virtual Attendee (Institutional Representative) |
| 2011 | Maned Wolf SSP Meeting Attendee |
| 2010 | Red Panda SSP Meeting and Husbandry Course Attendee |
| 2008 | Red Panda SSP Meeting and Husbandry Course Attendee |
| 2008 | Small Felid Course and Felid TAG Attendee |

## Other Professional Activities

| | |
|---|---|
| 2015 – Present | Red Panda SSP Appointed Research and Behavioral Liaison |
| 2012 – Present | Institutional Representative to the Red Panda Species Survival Plan |
| 2014 | Assisted in the execution of the Felid TAG Conference at SCBI |
| 2014 – Present | Enrichment and Training Committee - Grants Committee Member |
| 2007 - Present | Enrichment and Training Committee Member and Team Primary Contact |
| 2010 – 2012 | Chapter Liaison for the National Capital Chapter of AAZK |
| 2008 – Present | Chapter Member of the National Capital Chapter of AAZK |
| 2010 – Present | Smithsonian-Mason Practicum Student Mentor |
| 2008 - 2010 | Service as a voting member of the Peer Recognition Team of the National Zoological Park |

## Professional Associations & Honorary Societies

- American Association of Zoo Keepers
- Association of Zoos and Aquariums
- Animal Behavior Society

# Heather E. Robertson, DVM

[redacted]

[redacted]

Senior Veterinarian
2[redacted] **Nashville Zoo at Grassmere, Nashville TN USA**
As below, but including:

- Manage commissary and nutrition for the collection
- Oversee veterinary students and interns of all levels
- Manage veterinary and commissary budgets
- Supervise two licensed veterinary technicians and two Quarantine/Hospital keepers
- Instrumental in new hospital design and planning
- Give presentations to students and staff regarding zoo medicine
- SSP Veterinary Advisor for Clouded Leopards 2011-Present- Oversee and collaborate and share information related to Clouded Leopard medical and veterinary issues

Associate Veterinarian
[redacted] **Nashville Zoo at Grassmere, Nashville TN USA**

- Primary case responsibility for diverse collection including but not limited to primates, elephants, hoofstock, large carnivore, herptile, aquatics, avian and domestic farm species.
- Maintain a preventative health program
- Perform medical and surgical treatments
- Oversee quarantine staff and procedures
- Perform gross pathology
- Involved with field and in-house research
- Help to oversee management of the collection including, but not limited to, daily care and exhibit design

Director of Medical Operations, Tennessee
[redacted] **Animal Rescue Corp, Washington DC USA**

- Determine animal cruelty during onsite investigations
- Manage on site emergency medical care for various species
- Oversee medical staff and organization on site
- Perform as Shelter Medical Director, responsible for treatment/vaccinations prior to animal placement

Associate Veterinarian

[redacted] **Volunteer Veterinary Clinic, Hendersonville TN USA**

- Performed examinations and primary case responsibility for both small companion animals and exotics
- Performed surgery almost daily
- Management of medical cases

Contract Veterinarian

[redacted] **Nashville Zoo at Grassmere, Nashville TN, USA**

- Relief Veterinarian with primary and surgical case responsibilities while primary clinician was off duty

Associate Veterinarian

[redacted] **Indian Lake Animal Clinic, Hendersonville TN USA**

- Performed surgical and medical management, and primary case responsibility, for both small companion animals and exotics

## Education

[redacted]

## Research

- ESTABLISHING METRICS FOR FETAL DEVELOPMENT IN *Tamandua tetradactyla* USING SERIAL ULTRASOUND, Rachel Thompson,[1] Tiffany Wolf,[1] Heather Robertson, [2*] Lauren Revens[2,] Anne Elise Napier [3,] Sally Nofs [4]

  *[1]Minnesota Zoological Garden 13000 Zoo Blvd, Apple Valley MN 55124, USA,*
  *[2] Nashville Zoo at Grassmere 3777 Nolensville Rd, Nashville Tennessee, 37211, USA*
  *[3] Southside Animal Hospital[4] Baylor College of Medicine, Molecular Virology & Microbiology, One Baylor Plaza, Houston, Texas 77030, USA*

- Doro, McGinnity, Robertson et al. Hellbender reproductive study (in progress)
- **Giraffe genome sequence reveals clues to its unique morphology and physiology**

  Morris Agaba, Edson Ishengoma, Webb C. Miller, Barbara C. McGrath, Chelsea Hudson, Oscar C. Bedoya Reina, Aakrosh Ratan, Rico Burhans, Rayan Chikhi, Paul Medvedev, Craig A. Praul, Lan Wu-Cavener, Brendan Wood, Heather Robertson, Linda Penfold, and Douglas R. Cavener*

## Relevant Experience

[redacted] **Foothills Raptor Center, Maryville TN**

[redacted]ssisted in daily feeding and care of raptors

- Utilized skills acquired at [redacted] Wildlife Center to monitor conditions and aid in rehabilitation and re-introduction of raptors back into wild

[redacted] **The University of Tennessee, Knoxville TN**

- Worked with Dr. Eric Klaphake to research causes of feather picking in domesticated birds
- Evaluated client surveys and medical records to determine possible link between owner's interactions with their pets as a potential cause of feather picking

Work Study Student

Summer 2003 **The University of Tennessee, Knoxville TN**

- Assisted Dr. Sharon Patton in looking at fecal samples of Channel Island Foxes
- Set up zinc, sugar, and Baermann fecal samples to discover if parasites were playing a role in their decreasing numbers

Avian Zoo Keeper

[redacted]

[redacted] avian keeper

- Maintained daily upkeep of birds' exhibits
- Provided food preparation, feeding, care, and training of birds

Preceptor

Summer 2000 **Wildlife Center of Virginia, Waynesboro VA**

- Aided in medical treatment of various wildlife species
- Obtained and practiced [redacted] skill of catching and examining raptors
- Developed [redacted] skills needed to rehabilitate and release wildlife
- Assist in daily feeding and care of various indigenous wildlife species

## Activities/Memberships:

2003-2005 Vice President Avian, Wildlife and Exotics
2004 Chair for International Students for SAVMA Symposium
2006-Present Member of AAV
2006-present Member of AVMA
2010-present Member of AAZV

[redacted]

*Curriculum Vitae*

**ANA MARGARITA WOC COLBURN, DVM**

**PERSONAL INFORMATION:**

[redacted]owledge French

[redacted]

[redacted]

| | | |
|---|---|---|
| Nashville, TN | **Associate Veterinarian**<br>Nashville Zoo at Grassmere<br>Nashville, TN | [redacted] |
| Washington, DC: | **Associate Veterinarian**<br>Smithsonian's National Zoological Park &<br>Conservation Biology Institute,<br>Washington, DC & Front Royal, VA | |
| Towson, MD: | **Relief Emergency Veterinarian**<br>Pet ER<br>Towson, MD | |
| Washington, DC: | **Residency, Zoological Medicine**<br>Smithsonian's National Zoological Park &<br>Conservation Biology Institute,<br>Washington, DC & Front Royal, VA | |
| Oklahoma City, OK: | **Residency, Zoological Medicine**<br>Oklahoma City Zoo, OK | |
| Seattle, WA: | **Emergency Veterinarian**<br>Animal Critical Care & Emergency Center<br>Seattle, WA | |

Springfield, MA: **Internship, Small Animal Medicine & Surgery**
MSPCA-Angell Animal Medical Center-
Western New England, Springfield, MA

**OTHER PROFESSIONAL INVOLVEMENT**:

SSP Southern Tamandua Veterinary Advisor
AZA Accreditation Inspector

**VETERINARY VOLUNTEER EXPERIENCE:**

New York: **Supervisor, Wildlife Clinic**
Supervised and trained veterinary students
Assisted in care and release of native wildlife
Supervisor: N. Abou-Madi, DVM, DACZM
College of Veterinary Medicine, Cornell University

New York: **Volunteer, New York River Otter Project**
Supervisor: George Kollias, DVM, DACZM
College of Veterinary Medicine, Cornell University

Other Volunteer Experience:

Cornell University, NY **Treasurer**, Student Chapter of AAZV, ARAV, AAV, IAAM
Cornell University, NY **Committee Member**, Special Species Symposium
Cornell University, NY **Volunteer**, Petloss Support Hotline
Utah University, UT **Wildlife Technician**, Dept of US Fish & Wildlife

**PUBLICATIONS & PRESENTATIONS:**

Marrow JC, **M Woc-Colburn**, LAC Hayek, L Marker, S Murray. 2015. Comparison of two alpha 2-adrenergic agonists on urine contamination of semen collected by electroejaculation in captive and semi-free ranging cheetah (*Acinonyx jubatus*). JZWM 46(2) 417-420.

Buice R, Brown J, Robertson H**, Woc-Colburn M.** 2015. The Effect of Housing in a Communal Barn on concentrations of stress and reproductive hormones in female Giant Anteaters (*Myrmecophaga tridactyla*). AAZVT 2015 conference.

**Woc Colburn M**. 2015. Deep Breath: the Art of Reptile and Avian Anesthesia. Music City Conference.

**Woc Colburn M**. 2015. Don't Panic! Tips and Tricks for Pocket Pet Anesthesia. Music City Conference.

Thomspon R, Wolf T, Robertson H, Revens L, **Woc Colburn M,** Moreno A, and Napier AE. 2013. Establishing metrics for fetal development in *Tamandua tetradactyla***.** Proc Am. Assoc. Zoo Vet: 99.

Clancy M, **Woc-Colburn M,** Viner T, Sanchez C, and Murray S. 2013. Retrospective analysis of mortalities in elephant shrews (Marcoscelididae) and tree shrews (Tupaiidae) at the Smithsonian National Zoological Park. J Zoo Wild Med 44(2): 302-309.

**Woc-Colburn M**, Murray S, Lock J, Dragoo JW, Guglielmo D, Maldonado J. 2012. A minimally invasive method for gender determination in the Prehensile-tailed porcupine (*Coendou prehensilis*) Zoo Bio 32(4): 463-466.

Boedeker N, Calo A, Saylor DK, Stites RK, **Woc-Colburn**, M, and Viner TC. 2011. Metronomic chemotherapy in a lion (*Panthera leo*) with spindle cell carcinoma: continuous low-dose antiangiogenic protocol. Proc of the AAZV: 79-80.

**Woc-Colburn M**, Murray S, Boedeker N, Viner, T, Fleetwood M, Barthel T, Newman, K, Sanchez, C. 2010. Embryonal rhabdomyosarcoma in a Rothschild's giraffe (*Giraffa camelopardalis rothschildi*). J. Zoo and Wildlife Med. 41(4): 717-720.

**Woc-Colburn M**, Sanchez C, Murray M. 2009. Comparison of two fentanyl/propofol anesthesia protocols in the Cheetah (*Acinonyx jubatus*) anesthesia in cheetahs (*Acinonyx jubatus*). Proc Am. Assoc. Zoo Vet. 2009: 97.

**Woc-Colburn M.**, M. M. Garner, D. Bradway, G. West, J. D'Agostino, J. Trupkiewicz, B. Barr, S. E. Anderson, F. R. Rurangirwa and R. W. Nordhausen 2008. Fatal Coxiellosis in Swainson's Blue Mountain Rainbow Lorikeets (*Trichoglossus haematodus moluccanus*) Vet Path 45:247-254.

**Woc-Colburn M**, Sanchez C, Murray M. 2008. Fentanyl-propofol total intravenous anesthesia in cheetahs (*Acinonyx jubatus*). Poster presented at CRC Science Day.

Garner M.M., **Colburn M.**, G. West, R. Scott, J. Trupkiewicz, D. Bradway, B. Barr, S. E. and R. W. Nordhausen. 2007. A fatal disease caused by a *Coxiella*- like bacteria in psittacines. Proc AAZV, AAWV, AZA/NAG 160-161.

## IN PROGRESS:

**Woc Colburn M**, Sanchez C, Hayek, LA, Marker L, Murray S. 2010 – Present. Dexmedetomidine-butorphanol-midazolam anesthesia in the cheetah (*Acinonyx jubatus*). (Manuscript submitted to J Zoo Wildl Med).

**Woc Colburn M**, Napier AN, Jesty S, Hayek, LA. 2012 - Present. Cardiac evaluation in awake giant anteaters (*Myrmecophaga tridactyla*) (Study in progress, to be submitted to JAVMA).

**Woc-Colburn M,** S Skeba, S Pfaller, D McGinnity. 2014- Present. Hematology, Blood Chemistry, and Ionized Calcium values in Captive-bred Giant Hispaniolan galliwasp (*Celestus warreni*). Submit to JAVMA.

## PROFESSIONAL MEMBERSHIPS:

| | |
|---|---|
| American Association of Zoo Veterinarians | 2003 – Present |
| American Veterinary Medical Association | 1999 – Present |
| Veterinary Emergency and Critical Care Society | 2005 – Present |
| Wildlife Disease Association | 2006 – Present |
| Association of Zoos and Aquariums | 2010 – Present |

## AWARDS & HONORS:

| | | |
|---|---|---|
| Cornell University, NY | Pamela Shank Award for Avian Medicine | 2002 |
| Front Royal, VA: | Science Day Post-graduate 2nd place for poster | 2008 |

# Jennifer Rupright

[redacted]

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**PROFESSIONAL EXPERIEN**[redacted]

Nashville Zoo, Nashville, TN [redacted]

Supervisor of Carnivore Department

- Supervising and mentoring 9 keepers, and their daily routines/training sessions and exhibit maintenance of all Carnivore exhibits and the Historic Farm
- Scheduling, quarterly evaluations of staff, time cards
- Scheduling transport Vaccinations, Quarantine exams and Transports of all Carnivore species. Responsible for transporting arraignments of Andean Bears and Sumatran Tigers
- Exhibit design input on the back area and exhibit space of the Andean Bear exhibit and Sumatran Tiger exhibit.
- Design of Horse encounter space for out front of the Historic Farm barn

Lead Mammal Keeper – Mammal department [redacted]

- Trained in husbandry routines of four mammal department areas with multiple routines strings in each area. Species worked with include Clouded leopards, hand rearing of clouded leopard cubs, Bengal Tigers, Cougars, Eurasian Lynx, Red Panda, Andean Bear, Giant Anteaters, Tamandua, Siamang Gibbon, White Cheeked Gibbon, Ring tail & Red Ruffed Lemurs, Meerkat, Bongo, Okapi, Giraffe, Ostrich, Spring Bok, Yellow-backed Duiker, Bontebok, Red river hog, Eland, African Porcupine, Tapir, Zebra, and African Elephant.
- Mentor for 35 mammal department keepers, supervisor aide, currently working on the department Procedure manual and DART team, Assisting monthly scheduling of keepers, address HR issues with staff/ supervisors and HR, and responsibilities as Interim Carnivore supervisor.
- Primary Tiger trainer- Created the plan and implemented hand injection training of both tigers as well as crate training for both transports of dispositioning the tiger girls to another facility

Knoxville Zoo, Knoxville, TN [redacted]

Lead Keeper - Bird and Small Mammals Department

- Daily husbandry, medications, record keeping and supervisor of the department team of keepers, volunteers and interns, organization of opening new exhibit, maintenance of current exhibits and AZA beautification projects, enrichments, and Diet preparation. Animals under care in the area included; 7.6 African Penguins, 0.1 Two-toed Sloth, Rosette Spoonbills, Boat Bill Herons, Condors, Eagles, Eurasian Eagle Owls, Spectacle Owls, Red-Legged Seriemas, White Nape Cranes, and Macaws

- Dart Team Representative- with the team of elected keepers coordinated response team efforts for capture and recovery in the unlikely event of an escape

Elephant Keeper 2 [redacted]

- Daily Duties include husbandry, medicating, bathing of 2.1 African Elephants, Record keeping and training logs, Assist in training behaviors, Trained painting behavior for Zoo Art, Assist in Foot Work, Keeper chats daily, Diet preparation, Browse collection, Barn and facility maintenance Training of interns and volunteers on safety and husbandry, Hay delivery, and Diet preparation
- Enrichment Committee representative- attending meetings, organizing the staff's enrichment goals, budget, enrichment schedules, obtaining donated enrichment items, and computer data entry to the zoo's shared drive.

Sarasota Jungle Gardens, Sarasota, FL [redacted]

Curator of Wildlife and Birds of Prey

- Daily Duties: Keeper scheduling, 3 Educational Shows, animal husbandry, diet predation, medications, enrichment, and overseeing 6 keepers on the team, restraint and animal handling, Community and school outreach programs
- Yearly Permit renewal and Fish & Game Officer training - Alligator handling, restraint and transport.
- Operant Conditioning Training with all types of large and small Parrots, 2.0 Spider Monkeys, 2.2.1 Ring-tailed Lemurs, 1.1 Brown Lemurs, 2.0 American Alligator, 1.1 American Crocodiles, 1.1 Aldabra Tortoises, 2.0 Red Tailed Hawks, 1.0 Great Horned Owls, 4.0 Screech Owls and 2.0 Barred Owls, Hand rearing of baby Blue & Gold parrot

Wildlife Center of Venice, Venice, FL

Assistant Direction/Wildlife Rehabilitator [redacted]06

- Daily duties included: husbandry of injured or orphaned native Florida birds, mammals and reptiles, record keeping, rescue, triage incoming patients, dispatch. Some rehab patient species included, 2.0 Cougar, 1.2 Bobcats, Deer, Raccoons, and Otters.
- Hand rearing wildlife included: 0.1 Deer, 0.1 Bob Cat, 1.0 Cougar, 3 Otters, Raccoons, Squirrels, and Baby Birds
- Duties also included: volunteer/rescue coordinator; sign up, welcome, organize and scheduling after-hours rescue, nocturnal animal care. Communication and public interaction; interviewed by TV and newspaper reporters. Education programs; elementary school summer camp, adult groups, Avian Society of Sarasota.

Lions Tigers & Bears, Arcadia, FL [redacted]

Part-time keeper

- Husbandry and enrichment for a 3.1 American Black bear, 2.3 African Lions, 0.1 Siberian tiger, 7.2 Bengal tigers, 2.3 Sumatran Tigers, 1.0 Ocelot, 7.5 Savannah cats, 2.3 Bob cats, and 1.1 Coyotes
- Implemented training program with keeper staff that helped vet procedures on tigers. Specifically, Open command for inspection of teeth, tactile inspection of paws, hand injection training and crate training.
- Public guides tours and on/off site education programs

Zoo Atlanta, Atlanta, GA [redacted]

[redacted] Great Apes

- Husbandry duties of 1.1 Giant Panda, 1.1 African Lion, 1.1 Sumatran Tiger, 3.0 African elephants in protected contact, 1.1 Bongo, 3.1 giraffe, 1.1 black rhino and 7.2.2 gorilla exhibits, assisting training session with primary keepers

Primary Keeper Area August'01 – January '04

Birds & Small Mammal Department/Education animal care collection

- Education animal care collection: Daily duties included; husbandry, reports, medications, and Keeper Chats. Small mammals, reptiles and birds (Tamandua, Snakes and Parrots).
  - Operant Conditioning Training of Asian Crested Porcupine and Tamandua.
- Birds & Small Mammal: Daily duties included; husbandry, reports, medications and Keeper Chats. Species included Flamingo Flock, Wreathed Horn bill, Ostrich, Pea Fowl, Guinea Fowl, Kori Bustard.
  - Operant Conditioning Training of Guinea and Pea Fowl, Ostrich, Kori Bustard, and Wreathed Horn Bill.

[redacted]

- [redacted]
- [redacted]
- [redacted]nkeys, [redacted].

**COMPUTER BASED SKILLS AND ASSOCIATIONS:**

- Proficient in: WORD, EXCEL, POWER POINT, OUTLOOK
    - AZA American Association of Aquariums and Zoos.
    - AAZK American Association of Zookeepers

References available upon request

***Jennifer von Dohlen***

[redacted]

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## PROFESSIONAL EXPERIENCE.

***Nashville Zoo ([redacted]***
*Nashville, TN*

*ZOO KEEPER. Care and enrichment of clouded leopards, Eurasian lynx, cougars, tigers, red panda and Andean Bears. Involved with clouded leopard breeding and multiple clouded leopard introductions. Maintain animal areas. Administer medication and other various jobs.*

***Aquarium Restaurant (March[redacted]***
*Nashville, TN*

*Biologist. Care and enrichment of a variety of saltwater marine life and stingrays. Performed water analysis, maintained tanks and a variety of other jobs.*

***Pygmy Rabbit Breeding Project [redacted]***
*Pullman, WA*

*ANIMAL KEEPER. Bred endangered species, care and enrichment of rabbits, maintained animal areas, immobilized animals, administered medication and other various jobs.*

***Bighorn Project ([redacted]***
*Pullman, WA*

*ANIMAL TECH. Hand reared bighorn lambs, general care of lambs and other various jobs*

***Internship @ International Exotic Animal Sanctuary ([redacted]***
*Boyd, TX*

*Animal Keeper. Oversight of carnivore diets, care and enrichment of animals, maintained animal areas, record keeping, administered medications, provided environmental enrichment all for a variety of species of large cats. Bottle fed and care of three tiger cubs. Gave tours to guests. Participated in a behavioral study, wrote grants and proposals.*

***Bear Research Facility (Mar[redacted]***
*Pullman, WA*

*ANIMAL KEEPER. Maintained animal areas. Fed adult bears and cubs, drew blood and immobilized bears for transfer*

***Pet Emergency Clinic (Aug. 2[redacted]***
*Spokane, WA*

*VETERINARIAN ASSISTANT. Assisted technicians and doctors, administered medication, took and developed radiographs and other various responsibilities.*

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[redacted]

## VOLUNTEER WORK.

***Wildlife Ungulate Facility (WUF) (June 2004 – Dec 2006)***
*Pullman WA*

*CARE OF MULE DEER FAWNS AND BLUE DUIKERS, FED, ADMINISTER MEDS, PERFORMED ULATRASOUNDS, DREW BLOOD AND OTHER VARIOUS JOBS.*

***Pygmy Rabbit Breeding Project (Nov. 2002)***
*Pullman WA*

*MAINTAINED PYGMY RABBIT ANIMAL AREAS. FED RABBITS AND WEIGHED OUT FOOD.*

***Conner Museum (Dec. 1996-May 1997)***
*Pullman WA*

*PREPARED SPECIMENS FOR THE MUSEUM, PERFORMED RESEARCH FOR THE MUSEUM, AND GAVE TOURS TO GUESTS*

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[redacted]

## PROFEESSIONAL ZOOLOGICAL EXPERIENCE

**Nashville Zoo at Grassmere** **Nashville, TN**
*Anteater and Carnivore Keeper* [redacted]

- Responsible for the daily care of the following species: *giant anteater, tamandua, Bengal tiger, clouded leopard, Eurasian lynx, Andean bear, cougar, and red panda.*
- Clean and maintain exhibit/holding areas, prepare diets, administer medications when necessary, observe animal behavior, and participate in animal research studies.
- Responsible for managing interns and volunteers.
- Interact with public during backstage pass tours, VIP tours, and keeper talks.
- Hand-reared 2.0 giant anteater pups.
- Conditioned giant anteaters for voluntary blood draws, ultrasounds, and echocardiograms.
- Used operant condition training with clouded leopards.
- Work free contact with clouded leopards.
- Assisted with clouded leopard introductions.
- Cross-trained in primate department.
- Nashville Zoo AAZK chapter president (January 2016 – present)

## ZOOLOGICAL INTERNSHIP AND VOLUNTEER EXPERIENCE

**Nashville Zoo at Grassmere** **Nashville, TN**
*Hoofstock and Anteater Volunteer* [redacted]

- Assist Hoofstock keeper with the daily care of the following wild, exotic, and/or endangered species: Damara Zebras, Elands, Bongos, Ostrich, Red River Hogs, Baird's Tapirs, Double-Wattled Cassowary, Camels, and Giraffes.
- Support Anteater keeper with the daily care of the following wild, exotic, and/or endangered species: Giant Anteaters and Tamanduas.

**Smithsonian Conservation Biology Institute** **Front Royal, VA**
*Mammal Keeper Aide* [redacted]

- Assisted Mammal keeper with daily care of the following species: *clouded leopards, red pandas, maned wolves, black-footed ferrets, Przewalski's horses, cheetahs, and Eld's deer*.
- Participated in behavior and birth watches.
- Worked on deconstruction and construction of animal enclosures.

**Smithsonian National Zoo** **Washington D.C**
*Primate Keeper Aide* [redacted]

- Assisted Primate keeper with daily care of the following species: *western lowland gorillas, orangutans, lemurs, and gibbons.*

- Provided informal interpretative education information for Zoo visitors and monitored O line (orangutan transit system).
- Construct and prepare daily enrichment items.

*Lion Behavior Intern* [redacted]

- Collected and compiled lion behavior research data.
- Assisted Great Cat keepers with daily care of the following species: *Sumatran tigers, African lions, giant anteaters, coatis, caracals, prairie dogs, and Andean bears.*
- Trained lion cubs on new behaviors through operant conditioning.

[redacted]

[redacted]

# Faren Healey

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

**Nashville Zoo**
**Carnivore/Anteater keeper**

- daily care and husbandry of a variety of carnivores including clouded leopards, Eurasian lynx, Bengal tigers, cougars, Andean bear, and binturong
- hand-rearing of numerous mammal species including clouded leopards, giant anteaters, and tamandua
- proficiency in environmental enrichment and operant conditioning methods
- main focus on husbandry, training, and enrichment of the zoos entire giant anteater collection
- extensive record keeping for behavioral, medical, and operational purposes
- provision of high quality guest services including leading VIP tours and participation in special events

**Craven Pamlico Animal Services Center**
**Animal Control Officer**

- respond to stray animal and dangerous animal requests
- perform excellent customer service skills in order to increase the amount of adoptions and decrease the number of animals surrendered

- educate the public about the benefits of spaying and neutering their pets
- daily care and husbandry of all the animals in the shelter
- Certified Euthanasia Technician- awarded January 2015

**roward County Animal Care and Adoption Center**

**nimal Care Specialist**

- daily care and husbandry of all the animals in the shelter
- performed excellent customer service skills in order to increase the amount of adoptions and decrease the number of animals surrendered
- educated the public about the benefits of spaying and neutering their pets
- performed euthanasia according to FACA standards
- Certified Euthanasia Technician- awarded November 2013
- Animal Control Officer certification- awarded February 2013

**oo Miami**

**arnivore Keeper**

- husbandry of large exotic carnivores, including but not limited to, Asiatic black bears, sloth bears, sun bears, jaguars, tigers, African lions, giant river otters, and spotted hyenas
- extensive experience in public speaking, educating the guests about the animals under my care.
- proficiency in environmental enrichment and operant conditioning methods
- extensive record keeping for behavioral, medical, and operational purposes
- experience in conservation education through daily talks and encounters

**alm Beach Zoo**

**eeper II**

- provision of high quality guest services including leading VIP tours and participation in special events
- experience in conservation education through daily talks and encounters
- husbandry of exotic animals with significant experience with carnivores including North American black bears, jaguars, bush dogs, North American river otters, panthers, as well as, tapirs, capybara, various primate species, and numerous avian species
- main focus on husbandry, training, and enrichment of the zoos entire giant anteater collection

- hand-rearing of numerous mammal species including Baird's tapir and bush dog
- experienced in capture and restraint techniques for husbandry and medical purposes
- proficiency in environmental enrichment and operant conditioning methods
- proficiency in diet preparation and commissary operations
- extensive record keeping for behavioral, medical, and operational purposes

## References

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[redacted] rvices Center

# Laura Lovely

[redacted]

**Lifetime goal:**

My objective is to work in a responsible position that involves the care and management of animals at a progressive AZA accredited zoo.

**Work experience:**

[redacted]: Nashville Zoo at Grassmere

- Direct care and maintenance for carnivore animal collection
- Animal trainer: See attached list for trained animal behaviors

[redacted]: Tampa's Lowry Park Zoo

- Direct care and maintenance for animal collection in Asian Gardens and Australia
- Animal Trainer: See attached list for trained animal behaviors
- Assisted in several animal work-ups, transfers and introductions
- Koala and Indian rhino weekly keeper talks as well as behind the scenes tours with several species and impromptu keeper talks
- Asian Gardens Intern Coordinator
- Keeper level 3

[redacted]2010: Substitute teacher at Yankeetown School:

- Worked as a substitute in every class for middle and elementary school.

[redacted]: Santa Fe College, Zookeeper:

- Direct care and maintenance for over 70 species
- Target, station and shift training for several species.

[redacted]

Rentals:

- Worked with the public for rentals of water sport equipment and accessories.
- Sold water sports and accessories

[redacted]

May 2010-November 2010: Lowry Park Zoo, Animal Department Volunteer

January 2010- May 2010: Lowry Park Zoo, Animal Internship

January 2009- August 2009: East African Crown Crane Trainer

May 2009- August 2009: Springbok Trainer

- Shifting procedure with Springbok

January 2009- May 2009: Guanaco, Common Rhea Trainer

Trained:

- Stationing procedure with Guanaco, Common Rhea, and East African Crown Crane

September 1999- June 2006: Yankeetown Elementary School, Volunteer

- Over 450 volunteer hours working as a teachers aid with Elementary School children

# Jennifer Wu

[redacted]

## Summary

Highly motivated and hard working zookeeper at the Nashville Zoo for six years. Four years were spent caring for 0.4 African elephants and the rest of the time was spent with a variety of smaller animals, especially Eurasian lynx, clouded leopards, and cougars. Skilled in operant conditioning techniques and public [redacted]

## Experience

**Carnivore Keeper,** Nashville Zoo, Nashville, TN [redacted]

- Primary trainer for 0.1 Clouded leopard
- Secondary trainer for 1.1 Eurasian lynx

**Elephant Keeper**, Nashville Zoo, Nashville, TN 2[redacted]

- Document daily care, monthly photos, foot care, and research
- Scheduled and documented enrichment
- Took a lead role in all research projects, including documentation and coordinating with the research institutions
- Created staff monthly schedules
- Created tour and special keeper talk schedule
- Gave presentations, keeper chats, and tours
- Primary trainer for 0.1 African Elephant and maintained behaviors for 0.2 others
- Exceled in both free and protected contact management

**Education Animal Keeper**, Nashville Zoo, Nashville, TN 2[redacted]

- Presented animal shows and other educational programs. including some off site programs
- Primary trainer for 1.0 Eurasian Lynx and 1.0 Flemish Giant Rabbit
- Part of a team that hand reared, including taking home for night feeds, a Eurasian Lynx and a

[redacted]

**Elephant Managers Association** 2015

## Additional Accomplishments

**Planned the 2015 Elephant Managers Association Conference**

Included planning meals and activities, purchasing needed items, organizing volunteers, setting up and managing registration website, and hosting during the conference. This involved communicating and organizing with staff and other companies.

**The Spirit of Alexandria Nature Bus**

Designed the educational program, including many of the activities, that became part of the off site program that is currently used today to teach students about birds of prey.

**Independent Study**

Completed a behavioral study of 2.0 bobcats and 1.0 coyote during times with tactile and food enrichment and also during times where no items were added. The study showed an increase in activity when enrichment items were added to the animals' enclosures. Designed and completed the study during a winter internship at the Howell Nature Center.

## Internships

Mammal Department Intern, Detroit Zoological Society

Wild Wonders Wildlife Park Intern, Howell Nature Center

# Executive Summary
# A Decade (2002-2012) of US-Thai Collaboration on Clouded Leopard

## Introduction and Background

The clouded leopard *(Neofelis nebulosa)* is found only in Southeast Asia and is among the most charismatic and least understood cat species in the region. At present, the species is listed as 'Vulnerable' in the IUCN Red Data Book, an Appendix 1 species under CITES and 'Endangered' under the United States Endangered Species Act. Human population growth and alteration of pristine habitats (primarily into oil palm plantations) continue to be threats to clouded leopards. Poaching of clouded leopards for pelts, teeth and bone also is a major concern. Most experts agree that the clouded leopard is in decline throughout its historic range in Southeast Asia. Thus, *ex situ* populations are important 'insurance' for threatened species, and can be used to understand species biology, produce genetically valuable offspring, and be a resource for possible reintroductions.

However, the clouded leopard has proven to be one of the most difficult cat species to breed and manage in captivity, primarily because of stress sensitivity, male aggression, lack of reproductive activity between paired animals, and infanticide. The hostile behavior between animals is often so extreme that a male kills the female, frequently without warning or provocation. Thus, introduction of individuals for breeding must proceed cautiously and carefully, and there are no guarantees that successful pairs will be established. The Species Survival Plan (SSP) population in North America is particularly at risk because of these problems, which prompted the creation of a consortium in 2002 between the Zoological Park Organization of Thailand (ZPO), Smithsonian's National Zoological Park (NZP), Nashville Zoo (NZ), Point Defiance Zoo & Aquarium (PDZA) and the Clouded Leopard SSP to establish a clouded leopard breeding and research program at the Khao Kheow Open Zoo (KKOZ) in Chonburi, Thailand. This coalition of international partners (the Clouded Leopard Consortium) works towards developing improved nutrition, husbandry and breeding programs for felids in zoos in Thailand, as well as contributing to field conservation.

Thailand was the ideal site to initiate such a program. The Smithsonian Institution has a long history of scientific and capacity building collaboration in Thailand. Plus, the Thailand ZPO was interested in forming an international consortium to focus on preserving this treasured species. In response to a formal Thai invitation, an international and collaborative partnership was established with the general goal of learning more about the species and creating a viable, self-sustaining population of clouded leopards. Among the objectives were producing more cubs, maintaining adequate genetic diversity within Thailand and the North American SSP, improving management guidelines to enhance welfare and reproductive success and, as needed, building capacity to support both *ex situ* and *in situ* clouded leopard populations.

## Major Findings and Accomplishments

Over the last 10 years, research in both Thailand and North America have revealed that three major factors are involved in poor reproductive performance of clouded leopards: 1) imbalanced diets; 2) stress associated with inappropriate housing facilities; and 3) inability to create and maintain compatible, long-term mated pairs. In the early years of the project, nutritionally poor diets containing high fat, low protein, low calcium and no vitamins were changed to include high quality meat and balanced vitamin/mineral supplementation. Clouded leopards also were moved from cages suspected of inducing stress (small size, lack of nest boxes and hiding places, adjacent to large carnivores) to state-of-the-art large, vegetation-rich enclosures with hiding places and nest boxes. Lastly, hand rearing of cubs was initiated as a strategy to minimize stress potentially induced by human activity, with young male cubs (~6 months old) being paired with young, unrelated females to bond prior to puberty and future breeding encounters. These changes in basic husbandry combined with new strategies for pairing animals have proven to be extremely successful for producing calm, breeding pairs of clouded leopards. Since, 2002, 51 cubs have been born and 71% (n = 36) of these have survived. A subset of these (n = 10) have been imported by the Consortium into the USA to begin reinvigorating the North American Clouded Leopard SSP population. In the USA, 27 cubs (22 F1, 5 F2) have been produced from the imported stock and now are being used as breeders and/or ambassadors to tell the successful story of Thailand's conservation efforts.

The overall number of scholarly and practical achievements from this project has been substantial:

1) Established a full-time on-site manager position to coordinate Consortium activities at KKOZ.
2) Constructed and moved cats from small cages to larger, vegetation-enriched, off-exhibit cages to reduce stress and promote normal behaviors.
3) Improvements in husbandry, including daily cage cleanings and water changes, improved diets that are low in fat, high in protein and supplemented with minerals and vitamins, and regular animal weighings to assess body condition.
4) Building and use of specialized nest boxes to remove cubs for safe hand-rearing, a method that has proven effective for producing animals that are more socialized to people and noise, more adaptive to new environments (e.g., shipping, exhibits) and easier to pair for breeding.
5) Training of Thai keeper staff in cub rearing and management protocols.
6) Production of 51 cubs with 36 surviving.
7) Importation of 10 cubs to facilities in the SSP.
8) Cryopreservation of clouded leopard sperm yielding >30% motility post-thawing.
9) Conducted pilot studies demonstrating that radiocollars did not increase stress hormone levels (based on fecal corticoid measures) and that excreted gonadal and adrenal steroids are stable up to ~2 days after defecation.
10) Finding of a relationship between lower fecal corticoid concentrations and improved mate introduction success (in preparation for publication in Zoo Biology).
11) Production and distribution of the *Clouded Leopard's Secret* conservation storybook, a wild cat teaching kit produced by PDZA.

12) Training of more than 1,000 Thai students and veterinarians in clouded leopard conservation and research activities.
13) Jilian Fazio Master's Thesis publication (George Mason University) (Fazio, J.M. 2010. Behavioral Assessment of the Clouded Leopard (*Neofelis nebulosa*); A Comparative Analysis of Reproductive Success).
14) At least six poster and nine oral presentations at national and international venues, and eight abstracts published.
15) Thailand Small Carnvivore and Clouded Leopard Workshop, held in 2009 at Kasetasrt University, which brought together 40 international specialists with relevant field-collected datasets and recent photo-trapping experience to review the current status of small carnivores across range countries in Southeast Asia.
16) *In situ* activities that included camera-trap surveys of Huai Kha Khaeng Wildlife Sanctuary, Tapraya Wildlife Sanctuary, and Khao Ang Rue Nai Wildlife Sanctuary, and the training of one USA Masters student.

**Remaining Challenges**

Despite substantial progress, we are far from reaching our overall aim of creating self-sustaining populations (in Thailand or the USA), salvaging all valuable genetic diversity or applying what is known about this species to studying and conserving it in nature. The priority is to ensure that every genetically valuable specimen reproduces. We believe this is achievable by using a combination of natural breeding approaches and assisted reproductive technologies, including by artificial insemination, *in vitro* fertilization/embryo transfer and through genome resource banking (the systematic freezing of gametes and embryos). We also are at a fortuitous time because these innovative approaches can be examined in available 'surplus' clouded leopards, that is individuals that already are well represented in the captive collection (as determined by the International Studbook Keeper in conjunction with the AZA Population Management Center at Lincoln Park Zoo). This makes for an important research and training opportunity, including for young Thai and USA students. Finally, the collective work involving the Consortium will generate new knowledge and tools that can have application to learning more about and protecting remaining clouded leopards in the wild – and in the future, perhaps even lead to reintroductions. For all of these reasons, a new Memorandum of Understanding will be signed for 5 more years.

# MEMORANDUM OF UNDERSTANDING

## Between

**1. THE ZOOLOGICAL PARK ORGANIZATION**
**UNDER the ROYAL PATRONAGE OF H.M. THE KING, THAILAND**
**And**
**2. SMITHSONIAN CONSERVATION BIOLOGY INSTITUTE**
**3. NASHVILLE ZOO, INC.**
**4. POINT DEFIANCE ZOO & AQUARIUM**
**5. CLOUDED LEOPARD SPECIES SURVIVAL PLAN, UNITED STATES OF AMERICA**

This Memorandum of Understanding (MOU) is entered into by and between the Zoological Park Organization under the Royal Patronage of H.M. the King, (ZPO), Smithsonian Conservation Biology Institute (SCBI), Nashville Zoo, Inc. (NZ), Point Defiance Zoo & Aquarium (PDZA), and the Clouded Leopard Species Survival Plan (SSP) of the United States of America (USA). Under this agreement, all parties comprise the Clouded Leopard Consortium that is dedicated to the long-term sustainability of clouded leopards through breeding, research, training, and conservation programs in Thailand.

**The specific purpose of the Consortium is to:**

1) Create a sustainable insurance population of clouded leopards in Thailand and the USA while generating new knowledge applicable to the conservation of the species both *ex situ* and *in situ*;
2) Provide annual breeding recommendations based on population genetic analysis to maintain maximal genetic diversity in the global *ex situ* clouded leopard population;
3) Conduct innovative, collaborative and high quality research on this species that has maximal management and conservation impact, the results of which will be published and widely disseminated;
4) Build additional capacity by training Masters and Ph.D. students in Thailand and the USA;
5) Provide an exchange of professionals for research, management and education purposes;
6) Conduct scientific, conservation and husbandry training workshops in Thailand;
7) Work collaboratively to establish and maintain a Genome Resource Bank for clouded leopards at ZPO's Genome Resource Bank located at KKOZ;
8) Facilitate the development of assisted reproductive techniques for clouded leopards, including artificial insemination (AI), *in vitro* fertilization/embryo transfer and improved cryopreservation of gametes and embryos; and
9) Prepare annual progress reports that summarize the status of research and training projects, and publications.

**The Parties agree to the following responsibilities:**

1) <u>USA members' responsibilities (the responsible USA institution(s) is identified in parentheses):</u>
   a) Offer and collaborate on innovative ideas that improve the successful management, breeding and conservation of the clouded leopard. Among these will be:
      i. More assertive approaches to introducing adult males and females for breeding (SCBI, NZ, PDZA).

ii. A new course on reproductive technologies as applied to studying and conserving clouded leopards and other native wildlife species (SCBI).
iii. Provide advice on distribution of surplus specimens to other regions (e.g., other Asian countries, Europe) (SSP).
iv. Support an exchange program for Thai keepers to receive on-site training in clouded leopard husbandry techniques at one or more partner USA facilities (SCBI, NZ, PDZA).
v. Produce a clouded leopard husbandry manual specific for KKOZ (SCBI, NZ, PDZA).

b) Provide and financially support an on-site Manager for the clouded leopard breeding program at KKOZ, and up to two Thai keepers to conduct animal care (SCBI, NZ, PDZA).
c) Develop breeding recommendations for ZPO/SSP clouded leopards, including record-keeping to establish genetically and demographically appropriate breeding pairs at all holding institutions (SSP).
d) Assist in maintaining existing clouded leopard enclosures and making appropriate modifications, as necessary (SCBI, NZ, PDZA).
e) Provide financial support for 50% of the beef diet and supplemental bones (for dental health and enrichment) and cub-rearing formulas, and all vitamin and mineral supplements for clouded leopards in the managed program at KKOZ (SCBI, NZ, PDZA).
f) Provide upkeep and maintenance of the Project vehicle (previously purchased for the Thailand Clouded Leopard Consortium) (SCBI, NZ, PDZA).
g) Provide funding for shipment of captive-born cubs to the USA (SCBI, NZ, PDZA).
h) Provide funding for international and local travel expenses when USA team members travel to and within Thailand (SCBI, NZ, PDZA).
i) Work with staff, scientists and veterinarians at ZPO and local universities to establish a Clouded Leopard Genome Resource Bank at KKOZ (SCBI).
j) Conduct research on KKOZ animals to develop and/or optimize assisted reproductive techniques for clouded leopards, including artificial insemination (AI), *in vitro* fertilization/embryo transfer and gamete and embryo cryopreservation (SCBI).
k) Conduct at least one husbandry training workshop at KKOZ for appropriate ZPO staff (SCBI).
l) Conduct at least one Endocrine Training Workshop at KKOZ and provide additional training, advice and consultation in noninvasive hormone monitoring techniques for tracking animal reproduction and welfare as necessary (SCBI).
m) Identify and designate a point person(s) to serve as the US Coordinator(s) to the Consortium to work with ZPO Clouded Leopard Coordinator listed below (2 e).

2) <u>Zoological Park Organization responsibilities:</u>
a) Offer and collaborate on innovative ideas that improve the successful management, breeding and conservation of the clouded leopard (as in #1 above).
b) Provide access to the ZPO clouded leopard collection for the breeding program, and follow breeding recommendations of the Thailand Clouded Leopard Population Management Plan.
c) Acquire appropriate permits to export cats to the USA.

d) Provide financial support for 50% of the beef diet and supplemental bones (for dental health and enrichment and cub-rearing formulas) for clouded leopards in the managed program at KKOZ.
e) Provide logistical support for project activities, including identifying a named and designated point person(s) to serve as the Thai Coordinator(s) to the Consortium, a veterinarian for routine and emergency procedures, assistance in accounting and monthly expense records, housing at no charge for on-site foreign project manager, and e-mail access for USA staff.
f) Discuss with consortium partners and local point-of-contact persons for both KKOZ and USA (to be designated) any projected changes in keeper staff and reach mutual consensus before changes are made.
g) Facilitate collaborative reproductive research projects (e.g., development of AI and *in vitro* fertilization and embryo transfer) and genome resource banking of clouded leopards at KKOZ with USA partners.
h) Develop a plan for placing ZPO owned cats at other Thailand (and other country) institutions to create space at KKOZ to actively breed most genetically valuable specimens.
i) Participate in the International Clouded Leopard Studbook by providing updates on births, deaths, moves, and reproduction events.

3) <u>Consortium responsibilities:</u>
a) Offer and collaborate on innovative ideas that improve the successful management, breeding and conservation of the clouded leopard (as identified in #1 above).
b) Work collaboratively on approved breeding and research projects that maximize the sustainable genetic and demographic management of the population.
c) Divide ownership of captive-bred clouded leopard offspring as follows: 60% to the ZPO and 40% to the Clouded Leopard SSP. The permitting process for export of cubs that are the responsibility of the Clouded Leopard SSP will begin as soon as compatible pairs are identified, with a goal of having animals available for export 8 to 9 months after birth.
d) Work together to facilitate the timely export of cats to the USA; both parties will actively support the permit process at the appropriate stage in the process.
e) Work together to find and breed new founder animals.
f) Work together in the effective use of surplus specimens to improve species knowledge.
g) Work together to deaccsess adult clouded leopards that are no longer needed to support Consortium breeding or research activities.
h) Work together to establish a Clouded Leopard Genome Resource Bank at KKOZ.
i) Obtain mutual agreement of all partners before initiating research projects on Consortium animals, including those involving the use of assisted reproductive techniques. Projects will be conducted only on surplus animals as designated by the International Studbook Keeper in conjunction with Population Management Center at Lincoln Park Zoo.
j) Ensure local point-of-contact persons for both KKOZ and the USA (to be designated) are notified in advance of and are in agreement with any planned procedures (e.g., anesthesia, electroejaculation, artificial insemination, other invasive procedures)

involving Consortium clouded leopards.

k) Identify and participate in *in situ* conservation projects, as coordinated and/or identified by PDZA, for clouded leopards in Thailand.
l) Work jointly to create an annual progress report that summarizes the status of research projects, training activities, workshops, publications and presentations for administrative and fundraising purposes.
m) Seek financial assistance for the Program from both national and international funding sources.

**Terms:**

This Memorandum of Understanding shall be active, and all participants shall offer the resources and participation described herein, for a period of five (5) years from the date of execution. At the conclusion of this term, the agreement shall be reviewed by all parties and may be extended for an additional term of five (5) years with the agreement of all related parties and with any mutually agreed amendments.

Signed by:

29/7/14

Dr. Wisid Wichasilp (Date)
Acting Director General
Zoological Park Organization
Thailand

29/7/14

Mr. Suriya Saengpong (Date)
Director
Khao Kheow Open Zoo
Thailand

29/7/14

Dr. Sumate Kamolnorranath (Date)
Director
Bureau of Conservation and Research
Thailand

5/8/14

Dr. Steven Monfort (Date)
Director
Smithsonian Conservation Biology Institute
United States of America

8/7/14

Mr. Richard Schwartz (Date)
Director
Nashville Zoo, Inc.
United States of America

14 Aug 2014

Dr. Karen Goodrowe-Beck (Date)
General Curator
Point Defiance Zoo & Aquarium
United States of America

8/16/2014

Ms. Bonnie Breitbeil (Date)
Coordinator
Clouded Leopard Species Survival Plan
United States of America

# Appendix G-Clouded Leopard Support

**The following is a summary of the Clouded Leopard Projects that have been supported by each institution.**

| ex situ | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Project** | **$$/Resource dedicated - PDZA** | **$$/Resource dedicated - National Zoo** | **$$/Resource dedicated - Nashville Zoo** | **In kind PDZA** | **In kind- National Zoo** | **In kind- Nashville Zoo** |
| **2000** | | | | | | 16 weeks | |
| | | | | | | | |
| **2001** | | | | | | 16 weeks | |
| | | | | | | | |
| **2002** | Thailand Clouded Leopard Consortium | 5000 | 35,000 | | | 3 weeks | |
| | | | | | | | |
| **2003** | Thailand Clouded Leopard Consortium | 2500 | 35,000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader: August - Nov (12 weeks) | | | | 12 weeks | | |
| | Point Defiance keepers to National Zoo to allow Ken Lang to serve as project leader in Thailand: Nov 2003-March 2004 | | | | | 16 weeks | |
| | | | | | | | |
| **2004** | Thailand Clouded Leopard Breeding Consortium | 3500 | 35,000 | 25000 | | 3 weeks | |
| | | | | | | | |
| **2005** | Thailand Clouded Leopard Breeding Consortium | | 35,000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 8 weeks | 3 weeks | |
| | | | | | | | |
| **2006** | Thailand Clouded Leopard Breeding Consortium | | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 12 weeks | | 12 weeks |
| | | | | | | | |

| ex situ | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Project** | **$$/Resource dedicated - PDZA** | **$$/Resource dedicated - National Zoo** | **$$/Resource dedicated - Nashville Zoo** | **In kind PDZA** | **In kind- National Zoo** | **In kind- Nashville Zoo** |
| **2007** | Thailand Clouded Leopard Breeding Consortium | | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | | | 5 weeks |
| | | | | | | | |
| **2008** | Thailand Clouded Leopard Breeding Consortium | | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 8 weeks | | 4 weeks |
| | | | | | | | |
| **2009** | Thailand Clouded Leopard Breeding Consortium | | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 8 weeks | 3 weeks | |
| | | | | | | | |
| **2010** | Thailand Clouded Leopard Breeding Consortium | 8200 | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 4 weeks | | 2 weeks |
| | Thailand Clouded Leopard Consortium - Project leader | | | | | 4 weeks | |
| **2012** | The Clouded Leopard Consortium – Support and Strategic Planning for Breeding Programs in Thailand and AZA Zoos | 14200 | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 2.5 weeks | | |
| | | | | | | | |
| **2013** | The Clouded Leopard Consortium – Support and Strategic Initiatives for Breeding Programs in Thailand and AZA Zoos | 12100 | 35000 | 25000 | | | |

| ex situ | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Project** | **$$/Resource dedicated - PDZA** | **$$/Resource dedicated - National Zoo** | **$$/Resource dedicated - Nashville Zoo** | **In kind PDZA** | **In kind- National Zoo** | **In kind- Nashville Zoo** |
| **2013** | PDZA staff (1) to Thailand for Strategic Planning meeting | | | | 1 week | | |
| | National Zoo staff (2) to Thailand for Strategic Planning meeting | | | | | 1 week | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 9.5 weeks | | |
| | | | | | | | |
| **2014** | The Clouded Leopard Consortium – Support and Strategic Initiatives for Breeding Programs in Thailand and AZA Zoos | 14300 | 35000 | 25000 | | | |
| | Thailand Clouded Leopard Consortium - Project leader | | | | 6 weeks | | |
| **2014** | PDZA staff (1) to Thailand for follow-up and implementation of Strategic Plan for Consortium | | | | 1 week | | |
| | National Zoo staff (1) to Thailand for follow-up and implementation of Strategic Plan for Consortium | | | | | 1 week | |
| | | | | | | | |
| **2015** | Thailand Clouded Leopard Consortium - Project leader | ?? | ??? | ?? | 4 weeks | 4 weeks | |

| in situ | Point Defiance Zoo & Aquarium | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2002** | | |
| | | |
| **2003** | Conservation genetics of wild and captive cats in Thailand | 500 |
| | Monitoring habitat and species density of wild felids in Khao Yai National Park | 1,000 |
| | Carnivore Monitoring and Wildlife Protection in Khao Yai National Park | 9,250 |
| | | |
| **2004** | Carnivore Monitoring and Wildlife Protection in Khao Yai National Park | 6,500 |
| | | |
| **2005** | Distribution, population status and conservation genetics of threatened and endangered felids in Phu Khieo Wildlife Sanctuary, Thailand. | 3,680 |
| | Carnivore Monitoring and Wildlife Protection in Khao Yai National Park | 17,153 |
| | Protecting Clouded Leopards in Thailand using Systematic Field Surveys | 5,000 |
| | | |
| **2006** | Survey of Wild Clouded Leopards in Thailand's Khao Yai National Park | 3658 |
| | Carnivore Monitoring and Wildlife Protection in Khao Yai National Park | 3658 |
| | Southeast Asia Wild Cat Education Initiative | 9260 |
| | | |
| **2007** | Carnivore Monitoring and Wildlife Protection in Khao Yai National Park | 6084 |
| | | |
| **2008** | Clouded Leopard Summit | 6000 |
| | Bornean Wild Cat & Clouded Leopard Project | 4835 |

| in situ | Point Defiance Zoo & Aquarium | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2008** | Conservation Genetics of Threatened and Endangered Bornean Wild Cats in Sabah, Malysia | 5000 |
| | Southeast Asia Wild Cat Education Initiative | 6322 |
| | Survey for Small Felid Species in Select Thailand Reserves and Evidence for Competitive Exclusion by Larger Felids | 5000 |
| | Consequences of different forest management strategies for clouded leopards and other felids and viverrids in Sabah, Malaysia | 5000 |
| | | |
| **2009** | Clouded Leopard Summit | 2 weeks staff time to travel to Thailand and participate in Summit |
| | Clouded Leopard Consortium | signed MOU as a member of the consortium |
| | Consequences of different forest management strategies for clouded leopards and other felids and viverrids in Sabah, Malaysia | 4980 |
| | Southeast Asia Wild Cat Education Initiative | 3320 |
| | Ranging behavior, and demography of a little known solitary felid: An intensive, long-term camera-trap investigation of the Ulu Segama Sunda clouded leopard population | 5000 |
| | The Clouded Leopards and Small Cats of Sumatra: Conflict Mitigation in the Face of a Quickly Rising Human Population | 2290 |
| | Conservation Genetics of Threatened and Endangered Bornean Wild Cats in Sabah, Malaysia | 4000 |
| | Status & Conservation Needs of the Sunda Clouded Leopard on Borneo | 1000 |
| | | |
| **2010** | Status and Conservation Needs of the Sunda Clouded Leopard (*Neofelis diardi*) on Borneo: A Comprehensive Threat & Distribution Assessment, including Implications for Regional and Transnational Habitat Connectivity (YEAR 2) | 5000 |

| in situ | Point Defiance Zoo & Aquarium | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2010** | Survey for Small Felid Species in Select Thailand Reserves and Evidence for Competitive Exclusion by Larger Felids | 5000 |
| | Status Assessment of Wild Felids with a focus on Clouded Leopard in Hugu-Kori Biodiversity Hotspot, Nepal | 2368 |
| | SABANGAU FELID PROJECT | 4000 |
| | Southeast Asia Carnivore Education Initiative: Borneo Planning Meeting and Field Site Visit | 5050 |
| | 1st Borneo Carnivore Symposium – Road towards conservation action plans | 5000 |
| | | |
| **2011** | SEA Education Initiative - Sumatra | 7430 |
| | Bornean Clouded Leopard Programme: Ecology and conservation of a sympatric tropical forest felid guild | 5000 |
| | Status and Conservation Needs of the Sunda Clouded Leopard (Neofelis diardi) on Borneo: A Comprehensive Threat & Distribution Assessment, including Implications for Regional and Transnational Habitat Connectivity (YEAR 3) | 5000 |
| | Cats of Kalimantan – Landscape-wide surveys of Indonesian Borneo | 4700 |
| | Assessment of the impact of hunting on the Clouded Leopard and its prey and felid population status in and around Bukit Batikap Protection Forest, Central Kalimantan, Indonesia | 4600 |
| | A Survey for Large and Small Carnivores in Salak Phra Wildlife Sanctuary, Thailand | 5000 |
| | Protecting the Sunda clouded leopard and its critical habitat in East Kalimantan, Indonesian Borneo | 4450 |
| | Kinabatangan Carnivore Education | 2250 |
| | | |
| **2012** | Kinabatangan Carnivore Education Partnership | 3800 |
| | Sabangau Field Project | 4776 |

| in situ | Point Defiance Zoo & Aquarium | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2012** | Mapping landscape resistance to identify corridors and barriers for Sunda clouded leopard movements in an anthropogenically modified habitat | 5000 |
| | Sumatran Carnivore Conservation Education Program in Kerinci Seblat National Park, Sumatra | 5555 |
| | The impact of habitat disturbance on the Sunda clouded leopard in and around Wehea Forest, East Kalimantan Borneo | 4650 |
| | Identification of Disease Threats for the Bornean Clouded Leopard and Endangered Bornean Wild Cats – The Bornean Wild Cat Veterinary Project | 2245 |
| | Status of wild felids and other carnivores in Long Ketrok Protected Forest, Malinau District, East Kalimantan, Indonesian Borneo | 3500 |
| | Preliminary survey on the importance of evergreen forest outside of Preah Vihear Protected Forest for Clouded leopard Neofelis nebulosa, Northern Cambodia | 4720 |
| | | |
| **2013** | Kinabatangan Carnivore Education Partnership | 10750 |
| | Optimizing field protocols for the detection and density estimation of Sunda clouded leopards and Bornean felids | 5000 |
| | Secret Cats of Sabangau: Behavioural Ecology of Borneo's Clouded Leopard | 4000 |
| | Tracking the Sunda clouded leopard in and around Wehea Forest, East Kalimantan Borneo | 8200 |
| | Winners and losers of global change: Assessing consequences of forest management on carnivores and their prey in Sabah, Malaysian Borneo | 7270 |
| | The population density of the Sunda clouded leopard in a fragmented ecosystem | 4000 |
| | Investigating intraguild relation amongst Sumatra's medium sized-carnivores; Sumatran clouded leopard (Neofelis diardi diardi) and Asiatic golden cat (Pardofelis teminckii) and their prey in the Kerinci Seblat Landscape, Sumatra | 11900 |
| | | |

| in situ | Point Defiance Zoo & Aquarium | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2014** | Kinabatangan Carnivore Education Partnership | 3000 |
| | Expanding Partnerships with the Danau Girang Field Centre through Veterinary Collaboration | 5886 |
| | Mapping landscape resistance to identify corridors and barriers for Sunda clouded leopard movements in an anthropogenically modified habitat | 4790 |
| | Winners and losers of global change - Assessing consequences of forest management on carnivores and their prey in Sabah Malaysian Borneo | 8250 |
| | | |
| **2015** | The Clouded Leopard Consortium – Support and Strategic Initiatives for Breeding Programs in Thailand and AZA Zoos | 12000 |
| | Monitoring movements of translocated clouded leopards in Peninsular Malaysia to assess the efficacy of a management option | 5708 |
| | Direct responses of carnivores to reduced-impact logging | 8000 |
| | Research, Conservation, Breeding, and Cultural Exchange involving In Situ and Ex Situ Asian Elephants, Asian Rhinos, and Clouded Leopards | 3000 |
| | Kalimantan Cat Conservation: Identifying Hotspots for Cryptic Predators | 4900 |
| | Assessing the mammal community of Xe Sap NPA: systematic surveys in an unexplored biogeographic hotspot | 6880 |
| | | |
| **2016** | Grant review begins in late April/early May | 6500 (min) |
| | | |

| in situ | National Zoo | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2013** | Camera trapping of carnivores in Khao Ang Rue Nai Wildlife Sanctuary and Salakpra, Thailand | 16742 |
| | | |
| **2014** | Camera trapping of carnivores in Khao Ang Rue Nai Wildlife Sanctuary and Salakpra, Thailand | 16742 |
| | | |
| **2015** | Camera trapping of carnivores in Khao Ang Rue Nai Wildlife Sanctuary and Salakpra, Thailand | 16742 |
| | Camera trapping of carnivores in Sarawak, Borneo | 6000 |
| | Publication of Field Guide to Wildlife of Southwest China - in Mandarin | 38000 |
| | | |
| **2016** | Carnivore field studies in Thailand | 3000 |
| | | |
| **Next 5 Years** | Field surveys in Thailand | 10000-20000 |

| in situ | Nashville Zoo | |
|---|---|---|
| **Year** | **Project** | **$$** |
| **2016** | Money has been allocated for in situ support, though no specific projects have been desinated | 20000 |
| | | |
| | | |

# Appendix H-Historical Taxon Report-PDZA

## MIG12-29404008 | Local ID: 98M006

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Jul/1998 | Purchase HEXAGON/UNK | In | In | TACOMA / 98M006 | Death | Out | Out | 01/Aug/2013 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Hexagon Farm (Bill & Penny Andrews) (extinct) |
| **Enclosure** | - | **Birth Date/Age** | 07/Jun/1998 / 15Y,1M,25D at the time of death |
| **Rearing** | Hand | **House Name** | [Raja/TACOMA] |
| **Dam** | [1025 / HEXAGON] | **Intl Stdbk#** | [1079/TACOMA] |
| **Sire** | [1024 / HEXAGON] | **Local ID** | [98M006/TACOMA] |
| | | **Transponder** | [000-632-13E9/TACOMA] [00-0630-F9C4/TACOMA] |

## 2425883 | House Name: Josie

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Jul/1998 | Birth/Hatch | In | In | CLEVELAND / 980716 | Loan Out To TACOMA/98M018 | Out | - | 31/Oct/1998 |
| 01/Nov/1998 | Loan In From Sender: CLEVELAND/980716 Vendor: CLEVELAND/980716 | In | - | TACOMA / 98M018 | - | - | - | - |
| - | - | - | - | CLEVELAND / 980716 | Donation To (Ownership Only) TACOMA/98M018 | - | Out | 13/Feb/2015 |
| 13/Feb/2015 | Donation From Vendor: CLEVELAND/980716 | - | In | TACOMA / 98M018 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Cleveland Metroparks Zoo |
| **Enclosure** | WWOT | **Birth Date/Age** | 11/Jul/1998 / 18Y,8M,3D |
| **Rearing** | Hand | **House Name** | [Josie/CLEVELAND] [Josie/TACOMA] |
| **Dam** | [GAN: MIG12-28977178 \| CLEVELAND / 880911] | **Intl Stdbk#** | [1082/CLEVELAND] [1082/TACOMA] |
| **Sire** | [GAN: MIG12-29022792 \| CLEVELAND / 880910] | **Local ID** | [980716/CLEVELAND] [98M018/TACOMA] |
| | | **Transponder** | [000-632-00B7/TACOMA] |

## MIG12-8647753 | Local ID: T03M01

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | - | In | CLEVELAND / M30414 | Death | - | Out | 03/Apr/2003 |
| 03/Apr/2003 | Birth/Hatch Owner: CLEVELAND/M30414 | In | - | TACOMA / T03M01 | Death | Out | - | 03/Apr/2003 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 03/Apr/2003 / 0Y,0M,0D at the time of death |
| **Rearing** | None | **Local ID** | [M30414/CLEVELAND] [T03M01/TACOMA] |
| **Dam** | [GAN: 2425883 \| TACOMA / 98M018] | **Regional Studbook #** | [1215-AZA /TACOMA] |
| **Sire** | [GAN: MIG12-29404008 \| TACOMA / 98M006] | | |

## MIG12-11904827 | Local ID: T03M02

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | In | In | TACOMA / T03M02 | Loan Out To NASHV ZOO/2317 | Out | - | 17/Feb/2005 |
| 17/Feb/2005 | Loan In From Sender: TACOMA/T03M02 Vendor: TACOMA/T03M02 | In | - | NASHV ZOO / 2317 | Death | Out | - | 06/Oct/2006 |
| - | - | - | - | TACOMA / T03M02 | Death (Ownership Only) | - | Out | 06/Oct/2006 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 03/Apr/2003 / 3Y,6M,3D at the time of death |
| **Rearing** | Hand | **House Name** | [Kwanjai/NASHV ZOO] [KWAN JAI/TACOMA] |
| **Dam** | [GAN: 2425883 \| TACOMA / 98M018] | **Intl Stdbk#** | [1212/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29404008 \| TACOMA / 98M006] | **Local ID** | [2317/NASHV ZOO] [T03M02/TACOMA] |
| | | **Regional Studbook #** | [1210-AZA /TACOMA] |
| | | **Tattoo** | [00-0630-F740/NASHV ZOO] |
| | | **Transponder** | [00-0630-F740/TACOMA] |



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## MIG12-30090037 | Local ID: T03M03

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | - | In | CLEVELAND / M30413 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 03/Apr/2003 | Birth/Hatch Owner: CLEVELAND/M30413 | In | - | TACOMA / T03M03 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 17/Feb/2005 | Loan Transfer From Sender: TACOMA/T03M03 Vendor: CLEVELAND/M30413 | In | - | NASHV ZOO / 2318 | Loan Transfer To NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | TACOMA / T03M03 | Loan Transfer To (Physical Only) NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) NZP-CRC/113958 | - | - | 24/Feb/2005 |
| 24/Feb/2005 | Loan In From Vendor: CLEVELAND/M30413 | In | - | NZP-CRC / 113958 | Loan Transfer To HOUSTON/22865 | Out | - | 20/Feb/2007 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 22/Feb/2007 | Loan In From Sender: NZP-CRC/113958 Vendor: CLEVELAND/M30413 | In | - | HOUSTON / 22865 | Loan Transfer To LITTLEROC/7282 | Out | - | 01/Oct/2012 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 01/Oct/2012 | Loan In From Sender: HOUSTON/22865 Vendor: CLEVELAND/M30413 | In | - | LITTLEROC / 7282 | - | - | - | - |
| - | - | - | - | CLEVELAND / M30413 | Donation To (Ownership Only) LITTLEROC/7282 | - | Out | 01/Oct/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 03/Apr/2003 / 13Y,11M,11D |
| **Rearing** | Hand | **House Name** | [RAMA/TACOMA] [Rama/LITTLEROC] [RAMA/NZP-CRC] [Rama/NASHV ZOO] [Rama/CLEVELAND] [Rama/HOUSTON] |
| **Dam** | [GAN: 2425883 \| TACOMA / 98M018] | **Intl Stdbk#** | [1211/LITTLEROC] [1211/CLEVELAND] [1211/HOUSTON] [1211/NZP-CRC] [1211/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29404008 \| TACOMA / 98M006] | **Local ID** | [T03M03/TACOMA] [7282/LITTLEROC] [113958/NZP-CRC] [2318/NASHV ZOO] [M30413/CLEVELAND] [22865/HOUSTON] |
| | | **Old Accession Number** | [2318 at Nashville Zoo/NZP-CRC] [M30413 at Cleveland/NZP-CRC] |
| | | **Regional Studbook #** | [1211-AZA /TACOMA] |
| | | **Tattoo** | [1211/LITTLEROC] [1211/NZP-CRC] [1211/HOUSTON] |
| | | **Transponder** | [00-0630-DEA1/TACOMA] [00-0630-DEA1 Trovan/LITTLEROC] [00-0630-DEA1/NZP-CRC] [00-0630-DEA1/NASHV ZOO] [00-0630-DEA1/HOUSTON] |

## MIG12-29404340 | House Name: Jao Ying

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/2007 | Birth/Hatch | In | In | KHAOKHEOW / 500071 | Trade To TACOMA/T10M02 | Out | Out | ~ from 24/Feb/2010 to 24/Apr/2010 |
| 26/Mar/2010 | Donation From KHAOKHEOW/1295 | In | In | TACOMA / T10M02 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 30/May/2007 / 9Y,9M,14D |
| **Rearing** | Hand | **House Name** | [Jao Ying/KHAOKHEOW] [Jao Ying/TACOMA] |
| **Dam** | [GAN: MIG12-28430016 \| KHAOKHEOW / 420028] | **Intl Stdbk#** | [1295/KHAOKHEOW] [1295/TACOMA] |
| **Sire** | [GAN: MIG12-28430043 \| KHAOKHEOW / 470008] | **Local ID** | [500071/KHAOKHEOW] [T10M02/TACOMA] |
| | | **Transponder** | [900006000007385/KHAOKHEOW] [900006000007385/TACOMA] |

## MIG12-29405564 | House Name: Nah Fun

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 15/Jul/2009 | Birth/Hatch | In | In | KHAOKHEOW / 520051 | Trade To TACOMA/T10M03 | Out | Out | ~ from 24/Feb/2010 to 24/Apr/2010 |
| 26/Mar/2010 | Donation From KHAOKHEOW/1447 | In | In | TACOMA / T10M03 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 15/Jul/2009 / 7Y,7M,27D |
| **Rearing** | Hand | **House Name** | [Nah Fun/TACOMA] [Nafon/KHAOKHEOW] |
| **Dam** | [GAN: MIG12-28430016 \| KHAOKHEOW / 420028] | **Intl Stdbk#** | [1447/TACOMA] [1447/KHAOKHEOW] |
| **Sire** | [GAN: MIG12-28430043 \| KHAOKHEOW / 470008] | **Local ID** | [T10M03/TACOMA] [520051/KHAOKHEOW] |
| | | **Transponder** | [900012000571016/TACOMA] [900012000571016/KHAOKHEOW] |

## MIG12-29405563 | House Name: Chai Li

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jul/2009 | Birth/Hatch | In | In | KHAOKHEOW / 520049 | Trade To TACOMA/T10M04 | Out | Out | ~ from 24/Feb/2010 to 24/Apr/2010 |
| 16/Mar/2010 | Donation From KHAOKHEOW/1446 | In | In | TACOMA / T10M04 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 12/Jul/2009 / 7Y,8M,2D |
| **Rearing** | Hand | **House Name** | [Chai Li/KHAOKHEOW] [Chai Li/TACOMA] |
| **Dam** | [UNK / KHAOKHEOW] | **Intl Stdbk#** | [1446/KHAOKHEOW] [1446/TACOMA] |
| **Sire** | [GAN: MIG12-28430022 \| KHAOKHEOW / 470005] | **Local ID** | [520049/KHAOKHEOW] [T10M04/TACOMA] |
| | | **Transponder** | [900012000572697/KHAOKHEOW] [900012000572697/TACOMA] |



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### MIG12-28503933 | House Name: Chee-Wit

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Feb/2010 | Birth/Hatch | In | In | NZP-CRC / 114537 | Donation To TACOMA/ | Out | Out | 12/Jul/2010 |
| 12/Jul/2010 | Donation From NZP-CRC/114537 | In | In | TACOMA / T10M10 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian National Zoological Park |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 14/Feb/2010 / 7Y,1M,0D |
| **Rearing** | Hand | **House Name** | [Chee-Wit/TACOMA] [Chee-Wit/NZP-CRC] |
| **Dam** | [114297 / NZP-WASH] | **Intl Stdbk#** | [1460/TACOMA] [1460/NZP-CRC] |
| **Sire** | [114296 / NZP-WASH] | **Local ID** | [T10M10/TACOMA] [114537/NZP-CRC] |
| | | **Transponder** | [4B0859A1F/TACOMA] [4B08596A1F/NZP-CRC] |

### MIG12-29907963 | Local ID: T11M16

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Jun/2011 | Birth/Hatch | In | In | TACOMA / T11M16 | Donation To DENVER/UNK | Out | Out | 15/Nov/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 14/Jun/2011 / 0Y,5M,1D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Taji/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Intl Stdbk#** | [1505/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Local ID** | [T11M16/TACOMA] |

### MIG12-29607527 | Local ID: T11M17

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Jun/2011 | Birth/Hatch | In | In | TACOMA / T11M17 | Donation To SANFORD/11C172 | Out | Out | 26/Jan/2012 |
| 27/Jan/2012 | Donation From TACOMA/T11M17 | In | In | SANFORD / 11C172 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 14/Jun/2011 / 5Y,9M,0D |
| **Rearing** | Hand | **House Name** | [SUMALEE/SANFORD] [Sumalee/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| T10M04/TACOMA] | **Intl Stdbk#** | [1506/SANFORD] [1506/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| T10M03/TACOMA] | **Local ID** | [T11M17/TACOMA] [11C172/SANFORD] |
| | | **Old Accession Number** | [1642/SANFORD] [FCH13-00204/SPECIE360] |
| | | **Transponder** | [052*837*806/SANFORD] [052*837*806/TACOMA] |

### MIG12-29908024 | Local ID: T11M21

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Mar/2011 | Birth/Hatch | In | In | NZP-CRC / 114658 | Donation To TACOMA/T11M21 | - | Out | 09/Sep/2011 |
| - | - | - | - | NZP-CRC / 114658 | Loan Transfer To (Physical Only) NASHV ZOO/3598 | Out | - | 09/Sep/2011 |
| 09/Sep/2011 | Loan In From Vendor: TACOMA/T11M21 | In | - | NASHV ZOO / 3598 | Loan Transfer To TACOMA/T11M21 | Out | - | 22/Sep/2011 |
| 22/Sep/2011 | Donation From NZP-WASH/114658 | In | In | TACOMA / T11M21 | Donation To SANFORD/11C171 | Out | Out | 26/Jan/2012 |
| 27/Jan/2012 | Donation From TACOMA/T11M21 | In | In | SANFORD / 11C171 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Mar/2011 / 5Y,11M,14D |
| **Rearing** | Hand | **House Name** | [SABAH/SANFORD] [Sabah/TACOMA] |
| **Dam** | [114487 / SMITHSON] [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1477/SANFORD] [1477/TACOMA] |
| **Sire** | [114393 / SMITHSON] [GAN: MIG12-29565971 \| 114393/NZP-CRC] | **Local ID** | [3598/NASHV ZOO] [11C171/SANFORD] [114658/NZP-CRC] [T11M21/TACOMA] |
| | | **Old Accession Number** | [1641/SANFORD] [FCH13-00203/SPECIE360] |
| | | **Transponder** | [4B1B242911/NASHV ZOO] [4B1B242911/TACOMA] [4B1B242911/SANFORD] [4B1B242911/NZP-CRC] |

### MIG12-29472273 | Local ID: T11M23

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Mar/2011 | Birth/Hatch | In | In | NASHV ZOO / 3483 | Loan Out To TACOMA/UNKNOWN | Out | - | 22/Sep/2011 |
| 22/Sep/2011 | Loan In From Sender: NASHV ZOO/3483 Vendor: NASHV ZOO/3483 | In | - | TACOMA / T11M23 | Loan Transfer To DENVER/UNK | Out | - | 15/Nov/2011 |
| - | - | - | - | NASHV ZOO / 3483 | Loan Out To (Change in Reported Holder) DENVER/A11300 | - | - | 15/Nov/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 19/Mar/2011 / 5Y,11M,23D |
| **Rearing** | Hand | **House Name** | [Lisu/NASHV ZOO] [Lisu/TACOMA] |
| **Dam** | [GAN: MIG12-29615646 \| NASHV ZOO / 2810] | **Intl Stdbk#** | [1502/NASHV ZOO] [1502/TACOMA] |
| **Sire** | [GAN: MIG12-29823526 \| NASHV ZOO / 2809] | **Local ID** | [3483/NASHV ZOO] [T11M23/TACOMA] |
| | | **Transponder** | [052*845*284/TACOMA] |



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### FRZ12-00033 | Local ID: T12M04

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Mar/2012 | Birth/Hatch | In | In | TACOMA / T12M04 | Donation To HOUSTON/27288 | Out | Out | 06/Sep/2012 |
| 06/Sep/2012 | Donation From TACOMA/T12M04 | In | In | HOUSTON / 27288 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 05/Mar/2012 / 0Y,6M,1D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Suksn/HOUSTON] [Suksn/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [27288/HOUSTON] [T12M04/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1591-AZA /HOUSTON] [1591-AZA /TACOMA] |
| | | **Transponder** | [068*778*631/HOUSTON] |

### FRZ12-00034 | Local ID: T12M05

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 06/Mar/2012 | Birth/Hatch | In | In | TACOMA / T12M05 | Loan Out To FOUTS J/UNDETERM+ | Out | - | 06/Sep/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 06/Mar/2012 / 5Y,0M,8D |
| **Rearing** | Hand | **House Name** | [Chan Sung/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [T12M05/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1592-AZA /TACOMA] |

### FRZ13-00166 | House Name: Tien

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 01/May/2013 | Birth/Hatch | In | In | TACOMA / T13M13 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 01/May/2013 / 3Y,10M,13D |
| **Rearing** | Hand | **House Name** | [Tien/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| KHAOKHEOW / 520049] | **Local ID** | [T13M13/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| KHAOKHEOW / 520051] | | |

### FRZ13-00269 | House Name: Sang Dao

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Sep/2013 | Loan In From Sender: TANGAN WP/UNDETERM+ Vendor: TANGAN WP/UNDETERM+ | In | - | TACOMA / T13M28 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Tanganyika Wildlife Park |
| **Enclosure** | Clouded Leopard Building | **Birth Date/Age** | 27/Mar/2013 / 3Y,11M,15D |
| **Rearing** | - | **House Name** | [Sang Dao/TACOMA] |
| **Dam** | [Undetermined / TACOMA] | **Local ID** | [T13M28/TACOMA] |
| **Sire** | [Undetermined / TACOMA] | | |

### FRZ14-00627 | Local ID: T14M06

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Jul/2014 | Birth/Hatch | In | In | TACOMA / T14M06 | Death | Out | Out | 06/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 05/Jul/2014 / 0Y,0M,1D at the time of death |
| **Rearing** | - | **Local ID** | [T14M06/TACOMA] |
| **Dam** | [GAN: MIG12-29404340 \| TACOMA / T10M02] | | |
| **Sire** | [GAN: MIG12-28503933 \| TACOMA / T10M10] | | |

### FRZ14-00628 | Local ID: T14M07

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Jul/2014 | Birth/Hatch | In | In | TACOMA / T14M07 | Death | Out | Out | 07/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 05/Jul/2014 / 0Y,0M,2D at the time of death |
| **Rearing** | - | **Local ID** | [T14M07/TACOMA] |
| **Dam** | [GAN: MIG12-29404340 \| TACOMA / T10M02] | | |
| **Sire** | [GAN: MIG12-28503933 \| TACOMA / T10M10] | | |



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### FRZ15-01450 | House Name: Kapok

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/May/2015 | Birth/Hatch | In | In | TACOMA / T15M11 | Donation To FOUTS J/A15299 | Out | Out | 08/Oct/2015 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 12/May/2015 / 0Y,4M,26D at the time of lost ISIS tracking |
| **Rearing** | - | **House Name** | [Kapok/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [T15M11/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1787-AZA /TACOMA] |

### FRZ15-01447 | House Name: Orchid

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/May/2015 | Birth/Hatch | In | In | TACOMA / T15M12 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | WWOT | **Birth Date/Age** | 12/May/2015 / 1Y,10M,2D |
| **Rearing** | - | **House Name** | [Orchid/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [T15M12/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1790-AZA /TACOMA] |

### FRZ15-01448 | House Name: Banyan

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/May/2015 | Birth/Hatch | In | In | TACOMA / T15M13 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | WWOT | **Birth Date/Age** | 12/May/2015 / 1Y,10M,2D |
| **Rearing** | - | **House Name** | [Banyan/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [T15M13/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1788-AZA /TACOMA] |

### FRZ15-01449 | House Name: Teak

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/May/2015 | Birth/Hatch | In | In | TACOMA / T15M14 | Donation To FOUTS J/A15300 | Out | Out | 08/Oct/2015 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 12/May/2015 / 0Y,4M,26D at the time of lost ISIS tracking |
| **Rearing** | - | **House Name** | [Teak/TACOMA] |
| **Dam** | [GAN: MIG12-29405563 \| TACOMA / T10M04] | **Local ID** | [T15M14/TACOMA] |
| **Sire** | [GAN: MIG12-29405564 \| TACOMA / T10M03] | **Regional Studbook #** | [1789-AZA /TACOMA] |

### FRZ16-01674 | Local ID: T15M24

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Mar/2015 | Birth/Hatch | - | In | TACOMA / T15M24 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Tanganyika Wildlife Co (animal supply) |
| **Enclosure** | - | **Birth Date/Age** | 11/Mar/2015 / 2Y,0M,3D |
| **Rearing** | - | **Local ID** | [T15M24/TACOMA] |
| **Dam** | [Undetermined / TACOMA] | | |
| **Sire** | [GAN: FRZ12-00034 \| TACOMA / T12M05] | | |

### FRZ16-01689 | House Name: Masala

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Mar/2016 | Birth/Hatch | In | In | TACOMA / T16M07 | Loan Out To JNGLARY F/16C093 | Out | - | 19/Sep/2016 |
| 19/Sep/2016 | Loan In From Sender: TACOMA/T16M07 Vendor: TACOMA/T16M07 | In | - | JNGLARY F / 16C093 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 30/Mar/2016 / 0Y,11M,14D |
| **Rearing** | - | **House Name** | [Masala/JNGLARY F] [Masala/TACOMA] |
| **Dam** | [GAN: FRZ13-00269 \| TACOMA / T13M28] | **Local ID** | [16C093/JNGLARY F] [T16M07/TACOMA] |
| **Sire** | [GAN: FRZ13-00166 \| TACOMA / T13M13] | **Regional Studbook #** | [1803-AZA /TACOMA] |



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## FRZ16-01690 | House Name: Saffron

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Mar/2016 | Birth/Hatch Owner: FOUTS J/UNDETERMINED | In | - | TACOMA / T16M08 | Loan Transfer To LUFKIN/10690 | Out | - | 12/Sep/2016 |
| 13/Sep/2016 | Loan Transfer From Sender: TACOMA/T16M08 Vendor: FOUTS J/UNDETERM+ | In | - | LUFKIN / 10690 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 30/Mar/2016 / 0Y,11M,14D |
| **Rearing** | - | **House Name** | [Saffron/TACOMA] |
| **Dam** | [GAN: FRZ13-00269 \| TACOMA / T13M28] | **Local ID** | [T16M08/TACOMA] [10690/LUFKIN] |
| **Sire** | [GAN: FRZ13-00166 \| TACOMA / T13M13] | **Regional Studbook #** | [1804-AZA /TACOMA] |
| | | **Transponder** | [*840*080*065/TACOMA] |

## FRZ16-01691 | House Name: Coriander

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Mar/2016 | Birth/Hatch | In | In | TACOMA / T16M09 | Donation To SYRACUSE/UNDETERM+ | Out | Out | 05/Oct/2016 |
| 05/Oct/2016 | Donation From TACOMA/T16M09 | In | In | SYRACUSE / M16180 | Death | Out | Out | 26/Oct/2016 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 30/Mar/2016 / 0Y,6M,26D at the time of death |
| **Rearing** | - | **House Name** | [Coriander/TACOMA] |
| **Dam** | [GAN: FRZ13-00269 \| TACOMA / T13M28] | **Local ID** | [M16180/SYRACUSE] [T16M09/TACOMA] |
| **Sire** | [GAN: FRZ13-00166 \| TACOMA / T13M13] | **Regional Studbook #** | [1805-AZA /TACOMA] |



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# Appendix H-Historical Taxon Report-National Zoo -CRC

## 27134826 | [NZP-CRC/114246]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/Feb/2004 | Birth/Hatch | In | In | KHAOKHEOW / 470006 | Trade To NASHV ZOO/UNK | Out | Out | 25/Jan/2005 |
| 26/Jan/2005 | Donation From KHAOKHEOW/NONE | In | In | NASHV ZOO / 2313 | Loan Out To NZP-CRC/114246 | Out | - | 16/Sep/2007 |
| 17/Sep/2007 | Loan In From Vendor: NASHV ZOO/2313 | In | - | NZP-CRC / 114246 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [1188 / KHAOKHEOW] [NONE / KHAOKHEOW] [GAN: 27134835 | 450066/KHAOKHEOW]
**Sire** [1186 / KHAOKHEOW] [NONE / KHAOKHEOW] [GAN: 27134834 | 450105/KHAOKHEOW]

**Birth Type** Captive Born
**Birth Location** Khao Kheow Open Zoo
**Birth Date/Age** 25/Feb/2004 / 13Y,0M,17D
**House Name** [dao/KHAOKHEOW] [Dao/NASHV ZOO] [Dao/NZP-CRC]
**Intl Stdbk#** [1218/KHAOKHEOW] [1218/NASHV ZOO]
**Local ID** [470006/KHAOKHEOW] [114246/NZP-CRC] [2313/NASHV ZOO]
**Old Accession Number** [2313/NZP-CRC]
**Transponder** [122919677/KHAOKHEOW] [122-919-677A/NZP-CRC] [122919677A/NASHV ZOO]

## MIG12-28321584 | [NZP-CRC/104275]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Apr/1971 | Purchase CHANPOANN/UNK | In | In | CINCINNAT / M9543 | Loan Out To SEDGWICK/180 | Out | - | 24/Oct/1978 |
| 24/Oct/1978 | Loan In From Sender: CINCINNAT/M9543 Vendor: CINCINNAT/M9543 | In | - | SEDGWICK / 180 | Loan Transfer To NZP-CRC/104275 | Out | - | 07/Oct/1981 |
| - | - | - | - | CINCINNAT / M9543 | Loan Out To (Change in Reported Holder) NZP-CRC/104275 | - | - | 07/Oct/1981 |
| 07/Oct/1981 | Loan In From Vendor: CINCINNAT/M9543 | In | - | NZP-CRC / 104275 | Death | Out | - | 13/Jan/1984 |
| - | - | - | - | CINCINNAT / M9543 | Death (Ownership Only) | - | Out | 13/Jan/1984 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Wild Born
**Birth Location** Selangor (ms) (state) (MY)
**Birth Date/Age** ~ from 01/Jan/1964 to 31/Dec/1964 / 19Y,9M,7D at the time of death
**Death Number** [35269/NZP-CRC]
**House Name** [CINCY/SEDGWICK] [CINNCI/NZP-CRC]
**Local ID** [180/SEDGWICK] [M9543/CINCINNAT] [104275/NZP-CRC]
**Regional Studbook #** [196-AZA /NZP-CRC]

## MIG12-28621254 | [KHAOKHEOW/490012]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 31/Aug/2006 | Birth/Hatch | In | In | KHAOKHEOW / 490012 | Donation To NZP-CRC/114296 | Out | Out | 19/Feb/2008 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-28713286 | 470011/KHAOKHEOW]
**Sire** [GAN: MIG12-28430022 | 470005/KHAOKHEOW]

**Birth Type** Captive Born
**Birth Location** Khao Kheow Open Zoo
**Birth Date/Age** 31/Aug/2006 / 1Y,5M,19D at the time of lost ISIS tracking
**House Name** [Haniball/KHAOKHEOW]
**Intl Stdbk#** [1278/KHAOKHEOW]
**Local ID** [490012/KHAOKHEOW]
**Tag** [900006000006325/KHAOKHEOW]

## MIG12-29565950 | [NZP-CRC/114297]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Jun/2006 | Birth/Hatch | In | In | KHAOKHEOW / 500011 | Trade To NZP-CRC/114297 | Out | Out | 19/Feb/2008 |
| 21/Feb/2008 | Donation From KHAOKHEOW/1276 | In | In | NZP-CRC / 114297 | - | - | - | - |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [1165 / KHAOKHEOW] [GAN: MIG12-28430016 | 420028/KHAOKHEOW]
**Sire** [1232 / KHAOKHEOW] [GAN: MIG12-28430043 | 470008/KHAOKHEOW]

**Birth Type** Captive Born
**Birth Location** Khao Kheow Open Zoo
**Birth Date/Age** 24/Jun/2006 / 10Y,8M,18D
**House Name** [Jao Chu/NZP-CRC] [Jao Chu/KHAOKHEOW]
**Intl Stdbk#** [1276/NZP-CRC] [1276/KHAOKHEOW]
**Local ID** [114297/NZP-CRC] [500011/KHAOKHEOW]
**Transponder** [900006000006849/NZP-CRC] [900006000006849/KHAOKHEOW]



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## 12373803 | [NZP-CRC/113959]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Jan/2005 | Trade From KHAOKHEOW/460049 | In | In | NASHV ZOO / 2314 | Donation To NZP-CRC/113959 | Out | Out | 24/Feb/2005 |
| 24/Feb/2005 | Donation From NASHV ZOO/2314 | In | In | NZP-CRC / 113959 | Donation To NASHV ZOO/2314 | Out | Out | 20/Sep/2006 |
| 20/Sep/2006 | Donation From NZP-CRC/113959 | In | In | NASHV ZOO / 2314 | Loan Out To NZP-CRC/113959 | Out | - | 16/Sep/2007 |
| 17/Sep/2007 | Loan In From Vendor: NASHV ZOO/2314 | In | - | NZP-CRC / 113959 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Medical method- surgical(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 23/Feb/2003 / 14Y,0M,19D |
| **Rearing** | Hand | **House Name** | [Jo Gayle/NASHV ZOO] [Jo Gayle/NZP-CRC] |
| **Dam** | [1148 / KHAOKHEOW] [1148 / KHAOKHEOW] | **Intl Stdbk#** | [1214/NASHV ZOO] [1214/NZP-CRC] |
| **Sire** | [1147 / KHAOKHEOW] [1147 / KHAOKHEOW] | **Local ID** | [2314/NASHV ZOO] [113959/NZP-CRC] |
| | | **Old Accession Number** | [2314 at Nashville Zoo/NZP-CRC] |
| | | **Tattoo** | [1214/NZP-CRC] |
| | | **Transponder** | [115324716A/NASHV ZOO] [115-324-716A/NZP-CRC] |

## 2086918 | [NZP-CRC/104821]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Jan/1982 | Birth/Hatch | In | In | MINNESOTA / 2844 | Trade To NZP-CRC/104821 | Out | Out | 22/Jul/1982 |
| 22/Jul/1982 | Trade From MINNESOTA/2844 | In | In | NZP-CRC / 104821 | Death | Out | Out | 22/Apr/1995 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Minnesota Zoological Garden |
| **Enclosure** | - | **Birth Date/Age** | 02/Jan/1982 / 13Y,3M,20D at the time of death |
| **Rearing** | Undetermined | **House Name** | [MINNIE/NZP-CRC] |
| **Dam** | [GAN: MIG12-29761457 \| 271/MINNESOTA] | **Local ID** | [2844/MINNESOTA] [104821/NZP-CRC] |
| **Sire** | [GAN: MIG12-29762431 \| 272/MINNESOTA] | **Regional Studbook #** | [460-AZA /MINNESOTA] [460-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [460 R THIGH/NZP-CRC] |

## 234913 | [NZP-CRC/110361]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/May/1989 | Birth/Hatch | In | In | SAN ANTON / 891516 | Loan Out To NZP-CRC/110361 | Out | - | 11/Dec/1991 |
| 12/Dec/1991 | Loan In From Vendor: SAN ANTON/891516 | In | - | NZP-CRC / 110361 | - | - | - | - |
| - | - | - | - | SAN ANTON / 891516 | Donation To (Ownership Only) NZP-CRC/110361 | - | Out | 12/Feb/2002 |
| 12/Feb/2002 | Donation From Vendor: SAN ANTON/891516 | - | In | NZP-CRC / 110361 | Death | Out | Out | 08/Jul/2004 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Antonio Zoological Gardens & Aquar |
| **Enclosure** | - | **Birth Date/Age** | 25/May/1989 / 15Y,1M,13D at the time of death |
| **Rearing** | Undetermined | **House Name** | [ISABEAU/SAN ANTON] [ISABEAU/NZP-CRC] |
| **Dam** | [GAN: 6079937 \| 840944/SAN ANTON] | **Intl Stdbk#** | [823/SAN ANTON] |
| **Sire** | [GAN: 1651834 \| 841214/SAN ANTON] | **Local ID** | [891516/SAN ANTON] [110361/NZP-CRC] |
| | | **Regional Studbook #** | [823-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [823/NZP-CRC] |

## 25349789 | [NZP-CRC/104114]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/Jun/1981 | Birth/Hatch | In | In | NZP-CRC / 104114 | Death | Out | Out | 29/Jun/1981 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 16/Jun/1981 / 0Y,0M,13D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [33019/NZP-CRC] |
| | | **Local ID** | [104114/NZP-CRC] |
| | | **Regional Studbook #** | [458-UNKNOWN /NZP-CRC] |

## 25349790 | [NZP-CRC/104532]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Mar/1982 | Birth/Hatch | In | In | NZP-CRC / 104532 | Death | Out | Out | 28/Mar/1982 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Mar/1982 / 0Y,0M,6D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [33689/NZP-CRC] |
| | | **Local ID** | [104532/NZP-CRC] |
| | | **Regional Studbook #** | [468-UNKNOWN /NZP-CRC] |



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### 25349791 | [NZP-CRC/104533]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Mar/1982 | Birth/Hatch | In | In | NZP-CRC / 104533 | Death | Out | Out | 26/Mar/1982 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Mar/1982 / 0Y,0M,4D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [33688/NZP-CRC] |
| | | **Local ID** | [104533/NZP-CRC] |
| | | **Regional Studbook #** | [469-UNKNOWN /NZP-CRC] |

### 25349792 | [NZP-CRC/104788]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Jul/1982 | Birth/Hatch | In | In | NZP-CRC / 104788 | Death | Out | Out | 13/Jul/1982 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Jul/1982 / 0Y,0M,5D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [34020/NZP-CRC] |
| | | **Local ID** | [104788/NZP-CRC] |
| | | **Regional Studbook #** | [475-UNKNOWN /NZP-CRC] |

### 25349793 | [NZP-CRC/104924]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/Sep/1982 | Birth/Hatch | In | In | NZP-CRC / 104924 | Sale HONG KONG/ | Out | Out | 14/Nov/1984 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 16/Sep/1982 / 2Y,1M,29D at the time of last unconfirmed disposition |
| **Rearing** | Undetermined | **House Name** | [REMUS/NZP-CRC] |
| | | **Local ID** | [104924/NZP-CRC] |
| | | **Regional Studbook #** | [480-UNKNOWN /NZP-CRC] |

### 25349961 | [NZP-CRC/105212]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Mar/1983 | Birth/Hatch | In | In | NZP-CRC / 105212 | Death | Out | Out | 12/Mar/1983 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 09/Mar/1983 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [34521/NZP-CRC] |
| | | **Local ID** | [105212/NZP-CRC] |
| | | **Regional Studbook #** | [556-UNKNOWN /NZP-CRC] |

### 25349962 | [NZP-CRC/105841]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 10/Feb/1984 | Birth/Hatch | In | In | NZP-CRC / 105841 | Death | Out | Out | 11/Feb/1984 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 10/Feb/1984 / 0Y,0M,1D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [35351/NZP-CRC] |
| | | **Local ID** | [105841/NZP-CRC] |
| | | **Regional Studbook #** | [559-UNKNOWN /NZP-CRC] |

### 25349963 | [NZP-CRC/105865]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1984 | Birth/Hatch | In | In | NZP-CRC / 105865 | Death | Out | Out | 07/Mar/1984 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1984 / 0Y,0M,8D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [35384/NZP-CRC] |
| | | **Local ID** | [105865/NZP-CRC] |
| | | **Regional Studbook #** | [561-UNKNOWN /NZP-CRC] |



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### 25349964 | [NZP-CRC/106392]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Mar/1985 | Birth/Hatch | In | In | NZP-CRC / 106392 | Death | Out | Out | 11/Mar/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Mar/1985 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36177/NZP-CRC] |
| | | **Local ID** | [106392/NZP-CRC] |
| | | **Regional Studbook #** | [564-UNKNOWN /NZP-CRC] |

### 25349965 | [NZP-CRC/106393]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Mar/1985 | Birth/Hatch | In | In | NZP-CRC / 106393 | Death | Out | Out | 11/Mar/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Mar/1985 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36178/NZP-CRC] |
| | | **Local ID** | [106393/NZP-CRC] |
| | | **Regional Studbook #** | [565-UNKNOWN /NZP-CRC] |

### 25349966 | [NZP-CRC/106394]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Mar/1985 | Birth/Hatch | In | In | NZP-CRC / 106394 | Death | Out | Out | 11/Mar/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Mar/1985 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36179/NZP-CRC] |
| | | **Local ID** | [106394/NZP-CRC] |
| | | **Regional Studbook #** | [566-UNKNOWN /NZP-CRC] |

### 25349967 | [NZP-CRC/106539]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Jun/1985 | Birth/Hatch | In | In | NZP-CRC / 106539 | Death | Out | Out | 08/Jun/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 04/Jun/1985 / 0Y,0M,4D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36355/NZP-CRC] |
| | | **Local ID** | [106539/NZP-CRC] |
| | | **Regional Studbook #** | [567-UNKNOWN /NZP-CRC] |

### 25349968 | [NZP-CRC/106540]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Jun/1985 | Birth/Hatch | In | In | NZP-CRC / 106540 | Death | Out | Out | 08/Jun/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 04/Jun/1985 / 0Y,0M,4D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36356/NZP-CRC] |
| | | **Local ID** | [106540/NZP-CRC] |
| | | **Regional Studbook #** | [568-UNKNOWN /NZP-CRC] |

### 25349969 | [NZP-CRC/106699]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Aug/1985 | Birth/Hatch | In | In | NZP-CRC / 106699 | Death | Out | Out | 27/Aug/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Aug/1985 / 0Y,0M,5D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36618/NZP-CRC] |
| | | **Local ID** | [106699/NZP-CRC] |
| | | **Regional Studbook #** | [569-UNKNOWN /NZP-CRC] |



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### 25349970 | [NZP-CRC/106701]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Aug/1985 | Birth/Hatch | In | In | NZP-CRC / 106701 | Death | Out | Out | 25/Aug/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Aug/1985 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36619/NZP-CRC] |
| | | **Local ID** | [106701/NZP-CRC] |
| | | **Regional Studbook #** | [571-UNKNOWN /NZP-CRC] |

### 25349971 | [NZP-CRC/106707]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Aug/1985 | Birth/Hatch | In | In | NZP-CRC / 106707 | Death | Out | Out | 01/Sep/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 26/Aug/1985 / 0Y,0M,6D at the time of death |
| **Rearing** | Undetermined | **Local ID** | [106707/NZP-CRC] |
| | | **Regional Studbook #** | [572-UNKNOWN /NZP-CRC] |

### 25349972 | [NZP-CRC/106708]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Aug/1985 | Birth/Hatch | In | In | NZP-CRC / 106708 | Death | Out | Out | 31/Aug/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 26/Aug/1985 / 0Y,0M,5D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36625/NZP-CRC] |
| | | **Local ID** | [106708/NZP-CRC] |
| | | **Regional Studbook #** | [573-UNKNOWN /NZP-CRC] |

### 25349973 | [NZP-CRC/106756]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Oct/1985 | Birth/Hatch | In | In | NZP-CRC / 106756 | Death | Out | Out | 10/Oct/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Oct/1985 / 0Y,0M,2D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36714/NZP-CRC] |
| | | **Local ID** | [106756/NZP-CRC] |
| | | **Regional Studbook #** | [605-UNKNOWN /NZP-CRC] |

### 25349974 | [NZP-CRC/107213]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Jun/1986 | Birth/Hatch | In | In | NZP-CRC / 107213 | Death | Out | Out | 07/Jul/1986 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 30/Jun/1986 / 0Y,0M,7D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [37303/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [107213/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [616-UNKNOWN /NZP-CRC] |

### 25349994 | [NZP-CRC/107032]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Mar/1986 | Birth/Hatch | In | In | NZP-CRC / 107032 | Sale CROWN/ | Out | Out | 07/Jan/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 02/Mar/1986 / 0Y,10M,5D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [JOSEPH/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Local ID** | [107032/NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [611-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7032/NZP-CRC] |



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### 25350089 | [NZP-CRC/107106]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/May/1986 | Birth/Hatch | In | In | NZP-CRC / 107106 | Sale HOLIDAY/ | Out | Out | 09/Mar/1988 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 18/May/1986 / 1Y,9M,20D at the time of lost ISIS tracking |
| **Rearing** | Parent | **House Name** | [D.R./NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [107106/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [614-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7106/NZP-CRC] |

### 25350090 | [NZP-CRC/105630]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Sep/1983 | Trade From CENTERHIL/SHANGA | In | In | NZP-CRC / 105630 | Death | Out | Out | 05/Apr/1984 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 21/Feb/1983 / 1Y,1M,15D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [35441/NZP-CRC] |
| | | **House Name** | [SHANGIA/NZP-CRC] |
| | | **Local ID** | [105630/NZP-CRC] |
| | | **Regional Studbook #** | [557-UNKNOWN /NZP-CRC] |

### 25350129 | [NZP-CRC/106906]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Feb/1986 | Birth/Hatch | In | In | NZP-CRC / 106906 | Death | Out | Out | 13/Feb/1986 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 11/Feb/1986 / 0Y,0M,2D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36971/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [106906/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [609-UNKNOWN /NZP-CRC] |

### 25350233 | [NZP-CRC/106700]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Aug/1985 | Birth/Hatch | In | In | NZP-CRC / 106700 | Death | Out | Out | 25/Aug/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Aug/1985 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36600/NZP-CRC] |
| | | **Local ID** | [106700/NZP-CRC] |
| | | **Regional Studbook #** | [570-UNKNOWN /NZP-CRC] |

### 25350234 | [NZP-CRC/106755]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Oct/1985 | Birth/Hatch | In | In | NZP-CRC / 106755 | Death | Out | Out | 10/Oct/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 08/Oct/1985 / 0Y,0M,2D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36713/NZP-CRC] |
| | | **Local ID** | [106755/NZP-CRC] |
| | | **Regional Studbook #** | [604-UNKNOWN /NZP-CRC] |

### 25350235 | [NZP-CRC/106768]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 10/Oct/1985 | Birth/Hatch | In | In | NZP-CRC / 106768 | Death | Out | Out | 11/Oct/1985 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 10/Oct/1985 / 0Y,0M,1D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36717/NZP-CRC] |
| | | **Local ID** | [106768/NZP-CRC] |
| | | **Regional Studbook #** | [606-UNKNOWN /NZP-CRC] |



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### 25350236 | [NZP-CRC/106895]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 31/Jan/1986 | Birth/Hatch | In | In | NZP-CRC / 106895 | Death | Out | Out | 03/Feb/1986 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 31/Jan/1986 / 0Y,0M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36938/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [106895/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [608-UNKNOWN /NZP-CRC] |

### 25350242 | [NZP-CRC/106894]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 31/Jan/1986 | Birth/Hatch | In | In | NZP-CRC / 106894 | Death | Out | Out | 04/Feb/1986 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 31/Jan/1986 / 0Y,0M,4D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [36939/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [106894/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [607-UNKNOWN /NZP-CRC] |

### 25350416 | [NZP-CRC/108552]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108552 | Death | Out | Out | 27/Feb/1991 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/1989 / 2Y,0M,22D at the time of death |
| **Rearing** | Parent | **Death Number** | [41001/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **House Name** | [SIMBA/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Local ID** | [108552/NZP-CRC] |
| | | **Regional Studbook #** | [792-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [792/NZP-CRC] |

### 25350481 | [NZP-CRC/108844]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/1989 | Birth/Hatch | In | In | NZP-CRC / 108844 | Death | Out | Out | 18/Jan/1991 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 30/May/1989 / 1Y,7M,19D at the time of death |
| **Rearing** | Parent | **House Name** | [BRET/NZP-CRC] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **Local ID** | [108844/NZP-CRC] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [831-UNKNOWN /NZP-CRC] |

### 25350567 | [NZP-CRC/110902]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jan/1993 | Birth/Hatch | In | In | NZP-CRC / 110902 | Donation To HEXAGON/199302 | Out | Out | 22/Sep/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 20/Jan/1993 / 0Y,8M,2D at the time of lost ISIS tracking |
| **Rearing** | Parent | **Local ID** | [110902/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Regional Studbook #** | [965-UNKNOWN /NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | | |

### 25350579 | [NZP-CRC/107482]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 23/Jan/1987 | Birth/Hatch | In | In | NZP-CRC / 107482 | Death | Out | Out | 24/Jan/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 23/Jan/1987 / 0Y,0M,1D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [37770/NZP-CRC] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **Local ID** | [107482/NZP-CRC] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [674-UNKNOWN /NZP-CRC] |



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### 25350580 | [NZP-CRC/107506]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Feb/1987 | Birth/Hatch | In | In | NZP-CRC / 107506 | Death | Out | Out | 26/Feb/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 22/Feb/1987 / 0Y,0M,4D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [37805/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [107506/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [676-UNKNOWN /NZP-CRC] |

### 25350581 | [NZP-CRC/107521]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107521 | Sale HEXAGON/HFCL4 | Out | Out | 04/Jun/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1987 / 0Y,3M,0D at the time of lost ISIS tracking |
| **Rearing** | Parent | **Local ID** | [107521/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Regional Studbook #** | [667-UNKNOWN /NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Tattoo** | [7521 R THIGH/NZP-CRC] |

### 25350582 | [NZP-CRC/107524]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107524 | Death | Out | Out | 16/Mar/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 13/Mar/1987 / 0Y,0M,3D at the time of death |
| **Rearing** | Parent | **Death Number** | [37846/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [107524/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [678-UNKNOWN /NZP-CRC] |

### 25350583 | [NZP-CRC/107525]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107525 | Death | Out | Out | 16/Mar/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 13/Mar/1987 / 0Y,0M,3D at the time of death |
| **Rearing** | Parent | **Death Number** | [37847/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [107525/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [679-UNKNOWN /NZP-CRC] |

### 25350584 | [NZP-CRC/107526]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107526 | Death | Out | Out | 17/Mar/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 13/Mar/1987 / 0Y,0M,4D at the time of death |
| **Rearing** | Hand | **Death Number** | [37848/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [107526/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [680-UNKNOWN /NZP-CRC] |

### 25350585 | [NZP-CRC/107961]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107961 | Death | Out | Out | 16/Feb/1988 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 11/Feb/1988 / 0Y,0M,5D at the time of death |
| **Rearing** | Parent | **Death Number** | [38670/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [107961/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [740-UNKNOWN /NZP-CRC] |



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### 25350586 | [NZP-CRC/107962]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107962 | Death | Out | Out | 16/Feb/1988 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 11/Feb/1988 / 0Y,0M,5D at the time of death |
| **Rearing** | Parent | **Death Number** | [38671/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [107962/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [741-UNKNOWN /NZP-CRC] |

### 25350587 | [NZP-CRC/107963]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107963 | Death | Out | Out | 16/Feb/1988 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 11/Feb/1988 / 0Y,0M,5D at the time of death |
| **Rearing** | Parent | **Death Number** | [38672/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [107963/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [742-UNKNOWN /NZP-CRC] |

### 25350588 | [NZP-CRC/108154]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 15/Jun/1988 | Birth/Hatch | In | In | NZP-CRC / 108154 | Death | Out | Out | 22/Jun/1988 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 15/Jun/1988 / 0Y,0M,7D at the time of death |
| **Rearing** | Parent | **Death Number** | [83954/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Local ID** | [108154/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [747-UNKNOWN /NZP-CRC] |

### 25350593 | [NZP-CRC/110903]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jan/1993 | Birth/Hatch | In | In | NZP-CRC / 110903 | Death | Out | Out | 18/Sep/1994 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 20/Jan/1993 / 1Y,7M,29D at the time of death |
| **Rearing** | Parent | **House Name** | [ROSE/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Local ID** | [110903/NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [966-UNKNOWN /NZP-CRC] |

### 25350664 | [NZP-CRC/107483]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 23/Jan/1987 | Birth/Hatch | In | In | NZP-CRC / 107483 | Sale HEXAGON/HFCL3 | Out | Out | 04/Jun/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 23/Jan/1987 / 0Y,4M,12D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [ROBERTA/NZP-CRC] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **Local ID** | [107483/NZP-CRC] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [668-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7483 L THIGH/NZP-CRC] |

### 25350812 | [NZP-CRC/103363]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Mar/1980 | Purchase CENTERHIL/UNK | In | In | NZP-CRC / 103363 | Death | Out | Out | 23/Sep/1997 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 25/Sep/1979 / 17Y,11M,29D at the time of death |
| **Rearing** | Undetermined | **House Name** | [MING/NZP-CRC] |
| **Sire** | [363 / UNK] [367 / UNK] | **Local ID** | [103363/NZP-CRC] |
| | | **Regional Studbook #** | [418-UNKNOWN /NZP-CRC] |



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### 25350813 | [NZP-CRC/105631]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Sep/1983 | Trade From CENTERHIL/LOTUS | In | In | NZP-CRC / 105631 | Death | Out | Out | 13/Dec/1995 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 26/Feb/1983 / 12Y,9M,17D at the time of death |
| **Rearing** | Undetermined | **House Name** | [LOTUS/NZP-CRC] |
| **Sire** | [524 / UNK] [529 / UNK] | **Local ID** | [105631/NZP-CRC] |
| | | **Regional Studbook #** | [558-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [558 R THIGH/NZP-CRC] |

### 25350873 | [NZP-CRC/103364]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Mar/1980 | Purchase CENTERHIL/UNK | In | In | NZP-CRC / 103364 | Death | Out | Out | 31/Jul/1995 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Inactive) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 01/Oct/1979 / 15Y,9M,30D at the time of death |
| **Rearing** | Undetermined | **House Name** | [BIEN/NZP-CRC] |
| | | **Local ID** | [103364/NZP-CRC] |
| | | **Regional Studbook #** | [419-UNKNOWN /NZP-CRC] |

### 25351088 | [NZP-CRC/111015]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Jun/1993 | Birth/Hatch | In | In | NZP-CRC / 111015 | Donation To HEXAGON/199301 | Out | Out | 22/Sep/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 07/Jun/1993 / 0Y,3M,15D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [BONK/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [111015/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [968-UNKNOWN /NZP-CRC] |

### 25351089 | [NZP-CRC/105863]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1984 | Birth/Hatch | In | In | NZP-CRC / 105863 | Death | Out | Out | 06/Feb/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1984 / 16Y,11M,9D at the time of death |
| **Rearing** | Undetermined | **House Name** | [OMAR/NZP-CRC] |
| | | **Local ID** | [105863/NZP-CRC] |
| | | **Regional Studbook #** | [560-UNKNOWN /NZP-CRC] |

### 25351091 | [NZP-CRC/107105]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/May/1986 | Birth/Hatch | In | In | NZP-CRC / 107105 | Sale BOTHELL/1 | Out | Out | 19/Mar/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 18/May/1986 / 0Y,10M,1D at the time of lost ISIS tracking |
| **Rearing** | Parent | **House Name** | [B.D./NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [107105/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [613-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7105/NZP-CRC] |

### 25351261 | [NZP-CRC/104495]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Feb/1982 | Birth/Hatch | In | In | NZP-CRC / 104495 | Death | Out | Out | 27/Dec/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 24/Feb/1982 / 19Y,10M,3D at the time of death |
| **Rearing** | Undetermined | **House Name** | [HANNIBAL/NZP-CRC] |
| | | **Local ID** | [104495/NZP-CRC] |
| | | **Regional Studbook #** | [464-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [464/NZP-CRC] |



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## 25351424 | [NZP-CRC/108845]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/1989 | Birth/Hatch | In | In | NZP-CRC / 108845 | Death | Out | Out | 18/Oct/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / Medical method- surgical(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 30/May/1989 / 16Y,4M,18D at the time of death |
| **Rearing** | Parent | **House Name** | [BART/NZP-CRC] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **Local ID** | [108845/NZP-CRC] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [832-UNKNOWN /NZP-CRC] |

## 25603259 | [NZP-CRC/113297]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 06/Mar/1991 | Birth/Hatch | In | In | SAN ANTON / 910307 | Loan Out To CLEVELAND/911202 | Out | - | 11/Dec/1991 |
| 11/Dec/1991 | Loan In From Sender: SAN ANTON/910307 Vendor: SAN ANTON/910307 | In | - | CLEVELAND / 911202 | Loan Transfer To NZP-CRC/113297 | Out | - | 16/Apr/1998 |
| - | - | - | - | SAN ANTON / 910307 | Donation To (Ownership Only) NZP-CRC/113297 | - | Out | 15/Apr/1998 |
| 16/Apr/1998 | Donation From SAN ANTON/910307 | In | In | NZP-CRC / 113297 | Death | Out | Out | 11/Jan/2002 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Antonio Zoological Gardens & Aquar |
| **Enclosure** | - | **Birth Date/Age** | 06/Mar/1991 / 10Y,10M,5D at the time of death |
| **Rearing** | Undetermined | **House Name** | [MATHIAS/NZP-CRC] [MATHIAS/CLEVELAND] [MATHIAS/SAN ANTON] |
| **Dam** | [GAN: 6079937 \| 840944/SAN ANTON] | **Intl Stdbk#** | [864/SAN ANTON] [864/CLEVELAND] |
| **Sire** | [GAN: MIG12-29074722 \| 890913/SAN ANTON] | **Local ID** | [113297/NZP-CRC] [910307/SAN ANTON] [911202/CLEVELAND] |
| | | **Regional Studbook #** | [864-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [864/NZP-CRC] |

## 26979184 | [NZP-CRC/114487]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/2009 | Birth/Hatch | In | In | NASHV ZOO / 3147 | Donation To NZP-CRC/UNK | Out | Out | 28/Oct/2009 |
| 30/Oct/2009 | Donation From NASHV ZOO/3147 | In | In | NZP-CRC / 114487 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 30/May/2009 / 7Y,9M,14D |
| **Rearing** | Hand | **House Name** | [Sita/NASHV ZOO] [Sita/NZP-CRC] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1444/NASHV ZOO] [1444/NZP-CRC] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Local ID** | [3147/NASHV ZOO] [114487/NZP-CRC] |

## 27069057 | [NZP-CRC/114798]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jun/2002 | Birth/Hatch | In | In | OAKHILL / 222217 | Donation To NASHV ZOO/1822 | Out | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From OAKHILL/222217 | In | In | NASHV ZOO / 1822 | Loan Out To CINCINNAT/105034 | Out | - | 10/Jun/2005 |
| 10/Jun/2005 | Loan In From Sender: NASHV ZOO/1822 Vendor: NASHV ZOO/1822 | In | - | CINCINNAT / 105034 | Loan Transfer To NZP-CRC/UNK | Out | - | 22/May/2012 |
| - | - | - | - | NASHV ZOO / 1822 | Loan Out To (Change in Reported Holder) NZP-CRC/114798 | - | - | 22/May/2012 |
| 22/May/2012 | Loan In From Vendor: NASHV ZOO/1822 | In | - | NZP-CRC / 114798 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 1822 | Donation To (Ownership Only) NZP-WASH/114798 | - | Out | 06/Jun/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Jun/2002 / 14Y,9M,2D |
| **Rearing** | Hand | **House Name** | [Kiri/NASHV ZOO] [Kiri/CINCINNAT] [Kiri/NZP-CRC] |
| **Dam** | [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] | **ID Elsewhere** | [105034/NZP-CRC] |
| | | **Intl Stdbk#** | [1181/NZP-CRC] [1181/CINCINNAT] [1181/NASHV ZOO] [1181/OAKHILL] |
| | | **Local ID** | [114798/NZP-CRC] [105034/CINCINNAT] [222217/OAKHILL] [1822/NASHV ZOO] |
| **Sire** | [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] | **Transponder** | [061-827-568/NZP-CRC] [061-827-568/NASHV ZOO] [061*827*568/CINCINNAT] |



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## 27681104 | [ROSAMOND/191]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/1984 | Birth/Hatch | In | In | NZP-CRC / 106005 | Sale SANDIEGOZ/028661 | Out | Out | 11/Jun/1985 |
| 11/Jun/1985 | Purchase NZP-CRC/106005 | In | In | SANDIEGOZ / 028661 | Trade To FOUTS J/UNK | Out | Out | 06/Apr/1989 |
| 27/May/1990 | Donation From PRIVATE/NONE | In | In | ROSAMOND / 191 | Death | Out | Out | 14/Dec/1990 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 27/May/1984 / 6Y,6M,17D at the time of death |
| **Rearing** | Hand | **House Name** | [SUSIE/NZP-CRC] [SUSIE/ROSAMOND] [SUSIE/SANDIEGOZ] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **Intl Stdbk#** | [563/ROSAMOND] [563/SANDIEGOZ] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Local ID** | [106005/NZP-CRC] [028661/SANDIEGOZ] [191/ROSAMOND] |
| | | **Regional Studbook #** | [563-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [BK05/SANDIEGOZ] |

## 3588668 | [NZP-CRC/101600]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/May/1976 | Donation From CENTERHIL/UNK | In | In | NZP-WASH / 101600 | Donation To NZP-CRC/101600 | Out | Out | 25/Aug/1980 |
| 25/Aug/1980 | Donation From NZP-WASH/101600 | In | In | NZP-CRC / 101600 | Death | Out | Out | 09/Nov/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1976 / 17Y,8M,5D at the time of death |
| **Rearing** | Undetermined | **House Name** | [TUT/NZP-CRC] [TUT/NZP-WASH] |
| | | **Local ID** | [101600/NZP-CRC] [101600/NZP-WASH] |
| | | **Regional Studbook #** | [347-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [347 R THIGH/NZP-CRC] |

## 4367846 | [NZP-CRC/111128]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Mar/1992 | Birth/Hatch | In | In | SAN ANTON / 920308 | Donation To NZP-CRC/111128 | Out | Out | 19/Oct/1993 |
| 19/Oct/1993 | Donation From SAN ANTON/920308 | In | In | NZP-CRC / 111128 | Death | Out | Out | 28/Mar/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Antonio Zoological Gardens & Aquar |
| **Enclosure** | - | **Birth Date/Age** | 05/Mar/1992 / 13Y,0M,23D at the time of death |
| **Rearing** | Parent | **House Name** | [ABEL/SAN ANTON] [ABEL/NZP-CRC] |
| **Dam** | [GAN: 6079937 \| 840944/SAN ANTON] [GAN: 6079937 \| 840944/SAN ANTON] | **Intl Stdbk#** | [935/SAN ANTON] |
| | | **Local ID** | [920308/SAN ANTON] [111128/NZP-CRC] |
| **Sire** | [GAN: MIG12-29074722 \| 890913/SAN ANTON] [GAN: MIG12-29074722 \| 890913/SAN ANTON] | **Regional Studbook #** | [935-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [935/NZP-CRC] |

## 4367847 | [NZP-CRC/111129]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Mar/1992 | Birth/Hatch | In | In | SAN ANTON / 920384 | Donation To NZP-CRC/111129 | Out | Out | 19/Oct/1993 |
| 19/Oct/1993 | Donation From SAN ANTON/920384 | In | In | NZP-CRC / 111129 | Death | Out | Out | 04/Jun/2006 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / Medical method- surgical(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Antonio Zoological Gardens & Aquar |
| **Enclosure** | - | **Birth Date/Age** | 05/Mar/1992 / 14Y,2M,30D at the time of death |
| **Rearing** | Parent | **House Name** | [KANE/SAN ANTON] [KANE/NZP-CRC] |
| **Dam** | [GAN: 6079937 \| 840944/SAN ANTON] [GAN: 6079937 \| 840944/SAN ANTON] | **Intl Stdbk#** | [936/SAN ANTON] |
| | | **Local ID** | [920384/SAN ANTON] [111129/NZP-CRC] |
| **Sire** | [GAN: MIG12-29074722 \| 890913/SAN ANTON] [GAN: MIG12-29074722 \| 890913/SAN ANTON] | **Regional Studbook #** | [936-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [936/NZP-CRC] |

## 4942580 | [NZP-CRC/103791]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Nov/1980 | Purchase CENTERHIL/UNK | In | In | NZP-CRC / 103791 | Loan Out To NORFOLK/910028 | Out | - | 16/May/1991 |
| 16/May/1991 | Loan In From Sender: NZP-CRC/103791 Vendor: NZP-CRC/103791 | In | - | NORFOLK / 910028 | Loan Return To Owner NZP-CRC/103791 | Out | - | 13/Feb/1992 |
| 13/Feb/1992 | Loan Return to Us Sender: NORFOLK/910028 | In | - | NZP-CRC / 103791 | Death | Out | Out | 02/Oct/1997 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 27/Mar/1980 / 17Y,6M,5D at the time of death |
| **Rearing** | Undetermined | **House Name** | [TUCKER/NZP-CRC] [TUCKER/NORFOLK] |
| | | **Local ID** | [103791/NZP-CRC] [910028/NORFOLK] |
| | | **Regional Studbook #** | [442-UNKNOWN /NZP-CRC] [442-UNKNOWN /NORFOLK] |



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## 4942828 | [NZP-CRC/103792]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Nov/1980 | Purchase CENTERHIL/UNK | In | In | NZP-CRC / 103792 | Loan Out To NORFOLK/910029 | Out | - | 16/May/1991 |
| 16/May/1991 | Loan In From Sender: NZP-CRC/103792 Vendor: NZP-CRC/103792 | In | - | NORFOLK / 910029 | Loan Return To Owner NZP-CRC/103792 | Out | - | 13/Feb/1992 |
| 13/Feb/1992 | Loan Return to Us Sender: NORFOLK/910029 | In | - | NZP-CRC / 103792 | Death | Out | Out | 23/Sep/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 05/Apr/1980 / 12Y,5M,18D at the time of death |
| **Rearing** | Undetermined | **House Name** | [KELSEY/NZP-CRC] [KELSEY/NORFOLK] |
| | | **Local ID** | [103792/NZP-CRC] [910029/NORFOLK] |
| | | **Regional Studbook #** | [443-UNKNOWN /NZP-CRC] [443-UNKNOWN /NORFOLK] |
| | | **Tattoo** | [443 R THIGH/NZP-CRC] |

## 6079934 | [COLUMBIA/SJ0720]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Mar/1983 | Birth/Hatch | In | In | NZP-CRC / 105211 | Sale COLUMBIA/SJ0720 | Out | Out | 24/Jul/1983 |
| 25/Jul/1983 | Purchase NZP-CRC/105211 | In | In | COLUMBIA / SJ0720 | Death | Out | Out | 12/Jul/1999 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 09/Mar/1983 / 16Y,4M,3D at the time of death |
| **Rearing** | Parent | **Death Number** | [99-152/COLUMBIA] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] | **House Name** | [LUCKY/COLUMBIA] [LUCKY/NZP-CRC] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] | **Intl Stdbk#** | [514/COLUMBIA] |
| | | **Local ID** | [105211/NZP-CRC] [SJ0720/COLUMBIA] |
| | | **Old Accession Number** | [JQQ16-11894-IC/COLUMBIA] [JQQ14-09821-IC/COLUMBIA] |
| | | **Regional Studbook #** | [514-EAZA /COLUMBIA] [514-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [3279/COLUMBIA] |
| | | **Undetermined** | [Local ID: SJ0720/COLUMBIA] [Local ID: SJ0720/COLUMBIA] |

## 6079937 | [SAN ANTON/840944]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1984 | Birth/Hatch | In | In | NZP-CRC / 105864 | Sale SAN ANTON/840944 | Out | Out | 20/Sep/1984 |
| 21/Sep/1984 | Purchase NZP-CRC/105864 | In | In | SAN ANTON / 840944 | Death | Out | Out | 22/Apr/1998 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1984 / 14Y,1M,25D at the time of death |
| **Rearing** | Undetermined | **House Name** | [TUYET/NZP-CRC] [TUYET/SAN ANTON] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] | **Intl Stdbk#** | [512/SAN ANTON] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] | **Local ID** | [105864/NZP-CRC] [840944/SAN ANTON] |
| | | **Regional Studbook #** | [512-UNKNOWN /NZP-CRC] |
| | | **Studbook Name** | [NZ-12/SAN ANTON] |

## 6079969 | [NY BRONX/861343]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/May/1986 | Birth/Hatch | In | In | NZP-CRC / 107107 | Sale NY BRONX/861343 | Out | Out | 19/Nov/1986 |
| 19/Nov/1986 | Purchase NZP-CRC/107107 | In | In | NY BRONX / 861343 | Sale ZEEHANDLR/NONE | Out | Out | 17/Dec/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 18/May/1986 / 1Y,6M,29D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [CANDY/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [861343/NY BRONX] [107107/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [615-AZA /NY BRONX] [615-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7107/NY BRONX] [7107/NZP-CRC] |

## 6079978 | [COLO SPRG/860039]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Mar/1986 | Birth/Hatch | In | In | NZP-CRC / 107039 | Sale COLO SPRG/860039 | Out | Out | 19/Nov/1986 |
| 02/Mar/1986 | Purchase NZP-CRC/107039 | In | In | COLO SPRG / 860039 | Death | Out | Out | 28/Feb/1987 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 02/Mar/1986 / 0Y,11M,26D at the time of death |
| **Rearing** | Undetermined | **House Name** | [JUBILEE/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Local ID** | [860039/COLO SPRG] [107039/NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [612-UNKNOWN /COLO SPRG] [612-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7039/NZP-CRC] |



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## 6080039 | [DENVER/10321]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Mar/1986 | Birth/Hatch | In | In | NZP-CRC / 107031 | Sale DENVER/10321 | Out | Out | 19/Nov/1986 |
| 20/Nov/1986 | Purchase NZP-WASH/107031 | In | In | DENVER / 10321 | Death | Out | Out | 14/Jun/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 02/Mar/1986 / 15Y,3M,12D at the time of death |
| **Rearing** | Undetermined | **House Name** | [JEREMY/DENVER] [JEREMY/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [610/DENVER] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Local ID** | [10321/DENVER] [107031/NZP-CRC] |
| | | **Regional Studbook #** | [610-UNKNOWN /NZP-CRC] |
| | | **Studbook Name** | [NZ 33/DENVER] |
| | | **Tattoo** | [7031/DENVER] [7031/NZP-CRC] |

## 6080384 | [JACKSON/002084]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108568 | Sale JACKSON/002084 | Out | Out | 06/Dec/1989 |
| 06/Dec/1989 | Purchase NZP-CRC/108568 | In | In | JACKSON / 002084 | Death | Out | Out | 15/Nov/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 12/Feb/1989 / 16Y,9M,3D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [5870-06/JACKSON] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] [GAN: 25350813 \| 105631/NZP-CRC] | **House Name** | [SHABAZZ/JACKSON] |
| | | **Intl Stdbk#** | [795/JACKSON] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] [GAN: 25351089 \| 105863/NZP-CRC] | **Local ID** | [108568/NZP-CRC] [002084/JACKSON] |
| | | **Regional Studbook #** | [795-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [759/JACKSON] |
| | | **Transponder** | [*064*551*848/JACKSON] |

## 6080479 | [METROZOO/M01296]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108554 | Sale METROZOO/M01296 | Out | Out | 23/Jul/1990 |
| 23/Jul/1990 | Purchase NZP-CRC/108554 | In | In | METROZOO / M01296 | Death | Out | Out | 07/Nov/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/1989 / 3Y,9M,2D at the time of death |
| **Rearing** | Parent | **Intl Stdbk#** | [794/METROZOO] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] [GAN: 2086918 \| 104821/NZP-CRC] | **Local ID** | [108554/NZP-CRC] [M01296/METROZOO] |
| | | **Regional Studbook #** | [794-UNKNOWN /NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] [GAN: 25351261 \| 104495/NZP-CRC] | **Tattoo** | [794/NZP-CRC] [794/METROZOO] |

## 6080484 | [METROZOO/M01295]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108569 | Sale METROZOO/M01295 | Out | Out | 23/Jul/1990 |
| 23/Jul/1990 | Purchase NZP-CRC/108569 | In | In | METROZOO / M01295 | Donation To CHATHAM/ | Out | Out | 26/May/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 12/Feb/1989 / 4Y,3M,14D at the time of lost ISIS tracking |
| **Rearing** | Parent | **Intl Stdbk#** | [796/METROZOO] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] [GAN: 25350813 \| 105631/NZP-CRC] | **Local ID** | [108569/NZP-CRC] [M01295/METROZOO] |
| | | **Regional Studbook #** | [796-UNKNOWN /NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] [GAN: 25351089 \| 105863/NZP-CRC] | **Tattoo** | [759 R THIGH/NZP-CRC] [796 R THIGH/NZP-CRC] [759/METROZOO] |

## 6080917 | [OMAHA/5129]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107577 | Sale OMAHA/5129 | Out | Out | 18/Nov/1987 |
| 18/Nov/1987 | Purchase NZP-CRC/107577 | In | In | OMAHA / 5129 | Death | Out | Out | 18/Oct/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1987 / 18Y,7M,14D at the time of death |
| **Rearing** | Undetermined | **House Name** | [SWEETPEA/NZP-CRC] [Cirrus, Sweatpea/OMAHA] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [682/OMAHA] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Local ID** | [107577/NZP-CRC] [5129/OMAHA] |
| | | **Regional Studbook #** | [682-UNKNOWN /NZP-CRC] |
| | | **Studbook Name** | [NZ-45/OMAHA] |
| | | **Tattoo** | [7571/OMAHA] |
| | | **Transponder** | [0001219138/OMAHA] |



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## 6080918 | [WUPPERTAL/89047]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107948 | Sale WUPPERTAL/89047 | Out | Out | 19/Jul/1989 |
| 21/Jul/1989 | Purchase NZP-CRC/107948 | In | In | WUPPERTAL / 89047 | Death | Out | Out | 19/Aug/1994 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 07/Feb/1988 / 6Y,6M,12D at the time of death |
| **Rearing** | Undetermined | **House Name** | [LYNDSAY/WUPPERTAL] [LYNDSAY/NZP-CRC] |
| **Dam** | [103792 / UNKNOWN] [GAN: 4942828 \| 103792/NZP-CRC] | **Intl Stdbk#** | [739/WUPPERTAL] |
| | | **Local ID** | [89047/WUPPERTAL] [107948/NZP-CRC] |
| **Sire** | [103791 / UNKNOWN] [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [739-UNKNOWN /NZP-CRC] |

## 6080922 | [DUISBURG/930]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107978 | Sale DUISBURG/930 | Out | Out | 19/Jul/1989 |
| 21/Jul/1989 | Purchase NZP-CRC/107978 | In | In | DUISBURG / 930 | Death | Out | Out | 19/Aug/2006 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1988 / 18Y,5M,22D at the time of death |
| **Rearing** | Undetermined | **House Name** | [KAYAM/NZP-CRC] [KAYAM/DUISBURG] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [743/DUISBURG] |
| | | **Local ID** | [107978/NZP-CRC] [930/DUISBURG] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [743-UNKNOWN /NZP-CRC] |

## 6080923 | [BUFFALO/89M16]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107979 | Sale BUFFALO/89M16 | Out | Out | 24/Jan/1989 |
| 24/Jan/1989 | Purchase NZP-CRC/107979 | In | In | BUFFALO / 89M16 | Donation To FOUTS J/UNK | Out | Out | 20/Sep/1989 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1988 / 1Y,6M,23D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [NEKO/BUFFALO] [NEKO/NZP-CRC] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [744/BUFFALO] |
| | | **Local ID** | [89M16/BUFFALO] [107979/NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [744-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7979 R THIGH/NZP-CRC] |

## 6080924 | [WUPPERTAL/89048]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 107980 | Sale WUPPERTAL/89048 | Out | Out | 19/Jul/1989 |
| 21/Jul/1989 | Purchase NZP-CRC/107980 | In | In | WUPPERTAL / 89048 | Death | Out | Out | 11/Feb/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1988 / 12Y,11M,14D at the time of death |
| **Rearing** | Undetermined | **House Name** | [JASMINE/NZP-CRC] [JASMINE/WUPPERTAL] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [745/WUPPERTAL] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] | **Local ID** | [107980/NZP-CRC] [89048/WUPPERTAL] |
| | | **Regional Studbook #** | [745-UNKNOWN /NZP-CRC] |

## 6080925 | [DUISBURG/931]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Feb/1988 | Birth/Hatch | In | In | NZP-CRC / 108030 | Sale DUISBURG/931 | Out | Out | 19/Jul/1989 |
| 21/Jul/1989 | Purchase NZP-CRC/108030 | In | In | DUISBURG / 931 | Death | Out | Out | 13/May/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 07/Feb/1988 / 17Y,3M,6D at the time of death |
| **Rearing** | Undetermined | **House Name** | [CHARMIAN/NZP-CRC] [CHARMIAN/DUISBURG] |
| **Dam** | [GAN: 4942828 \| 103792/NZP-CRC] [GAN: 4942828 \| 103792/NZP-CRC] | **Intl Stdbk#** | [746/DUISBURG] |
| | | **Local ID** | [108030/NZP-CRC] [931/DUISBURG] |
| **Sire** | [GAN: 4942580 \| 103791/NZP-CRC] [GAN: 4942580 \| 103791/NZP-CRC] | **Regional Studbook #** | [746-UNKNOWN /NZP-CRC] |



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## 6080927 | [CHICAGOBR/900011]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108551 | Donation To CHICAGOBR/900011 | Out | Out | 24/Jan/1990 |
| 24/Jan/1990 | Donation From NZP-CRC/108551 | In | In | CHICAGOBR / 900011 | Death | Out | Out | 11/Nov/2004 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/1989 / 15Y,9M,6D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [04-376/CHICAGOBR] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] [GAN: 2086918 \| 104821/NZP-CRC] | **House Name** | [BAC NINH/CHICAGOBR] |
| | | **Intl Stdbk#** | [791/CHICAGOBR] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] [GAN: 25351261 \| 104495/NZP-CRC] | **Local ID** | [900011/CHICAGOBR] [108551/NZP-CRC] |
| | | **Regional Studbook #** | [791-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [791 R REAR THIGH/NZP-CRC] |

## 6080928 | [BUFFALO/90M86]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Apr/1990 | Birth/Hatch | In | In | NZP-CRC / 109504 | Donation To BUFFALO/90M86 | Out | Out | 02/May/1990 |
| 03/May/1990 | Donation From NZP-CRC/109504 | In | In | BUFFALO / 90M86 | Death | Out | Out | 14/Oct/2006 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Apr/1990 / 16Y,5M,16D at the time of death |
| **Rearing** | Undetermined | **House Name** | [Bela / BELLA/BUFFALO] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] [GAN: 25350873 \| 103364/NZP-CRC] | **Intl Stdbk#** | [829/BUFFALO] |
| | | **Local ID** | [109504/NZP-CRC] [90M86/BUFFALO] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [829-UNKNOWN /NZP-CRC] |

## 6821866 | [NZP-CRC/113730]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Aug/1997 | Birth/Hatch | In | In | PITTSBORO / 0045 | Donation To NZP-CRC/ | Out | Out | 01/Feb/2002 |
| 28/Mar/2002 | Donation From PITTSBORO/0045 | In | In | NZP-CRC / 113730 | Death | Out | Out | 10/Feb/2009 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Carnivore Preservation Trust |
| **Enclosure** | - | **Birth Date/Age** | 13/Aug/1997 / 11Y,5M,28D at the time of death |
| **Rearing** | Hand | **House Name** | [Brandon/PITTSBORO] [BRANDON/NZP-CRC] |
| **Dam** | [GAN: 5040288 \| 0044/PITTSBORO] [GAN: 5040288 \| 0044/PITTSBORO] | **Intl Stdbk#** | [1087/PITTSBORO] [1087/NZP-CRC] |
| | | **Local ID** | [0045/PITTSBORO] [113730/NZP-CRC] |
| **Sire** | [GAN: MIG12-29613016 \| 87M400/BUFFALO] [GAN: MIG12-29613016 \| 0043/PITTSBORO] | **Tattoo** | [1087/NZP-CRC] |
| | | **Transponder** | [40255B7339/PITTSBORO] [40255B7339/NZP-CRC] |

## 8642275 | [SACRAMNTO/100843]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/1989 | Birth/Hatch | In | In | NZP-CRC / 108553 | Sale SACRAMNTO/100843 | Out | Out | 11/Dec/1990 |
| 11/Dec/1990 | Purchase NZP-CRC/108553 | In | In | SACRAMNTO / 100843 | Death | Out | Out | 08/Sep/1991 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / Undetermined(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/1989 / 2Y,7M,3D at the time of death |
| **Rearing** | Parent | **House Name** | [Sushma/SACRAMNTO] [SUSHMA/NZP-CRC] |
| **Dam** | [GAN: 2086918 \| 104821/NZP-CRC] [GAN: 2086918 \| 104821/NZP-CRC] | **Intl Stdbk#** | [793/SACRAMNTO] |
| | | **Local ID** | [100843/SACRAMNTO] [108553/NZP-CRC] |
| **Sire** | [GAN: 25351261 \| 104495/NZP-CRC] [GAN: 25351261 \| 104495/NZP-CRC] | **Regional Studbook #** | [793-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [793/SACRAMNTO] [793 R HIND THIGH/NZP-CRC] |

## 964330 | [NZP-CRC/112778]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Aug/1994 | Birth/Hatch | In | In | CLEVELAND / 940820 | Loan Out To NZP-CRC/112778 | Out | - | 27/Mar/1996 |
| 27/Mar/1996 | Loan In From Vendor: CLEVELAND/940820 | In | - | NZP-CRC / 112778 | - | - | - | - |
| - | - | - | - | CLEVELAND / 940820 | Donation To (Ownership Only) NZP-CRC/112778 | - | Out | 02/May/2011 |
| 02/May/2011 | Donation From Vendor: CLEVELAND/940820 | - | In | NZP-CRC / 112778 | Death | Out | Out | 05/Dec/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / Medical method- hormonal(Undetermined) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Cleveland Metroparks Zoo |
| **Enclosure** | - | **Birth Date/Age** | 09/Aug/1994 / 18Y,3M,26D at the time of death |
| **Rearing** | Hand | **Death Number** | [N2012-0301/NZP-CRC] |
| **Dam** | [GAN: MIG12-28977178 \| 880911/CLEVELAND] [GAN: MIG12-28977178 \| 880911/CLEVELAND] | **House Name** | [XING XING/NZP-CRC] [XING XING/CLEVELAND] |
| | | **Intl Stdbk#** | [1015/CLEVELAND] |
| **Sire** | [GAN: MIG12-29022792 \| 880910/CLEVELAND] [GAN: MIG12-29022792 \| 880910/CLEVELAND] | **Local ID** | [112778/NZP-CRC] [940820/CLEVELAND] |
| | | **Regional Studbook #** | [1015-AZA /NZP-CRC] |
| | | **Tattoo** | [1015/CLEVELAND] [1015/NZP-CRC] |
| | | **Transponder** | [00001457AC/CLEVELAND] |



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## MGH13-00079 | [TORONTO/47588]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/2013 | Birth/Hatch | In | In | NZP-CRC / 114879 | Donation To NASHV ZOO/4087 | Out | Out | 20/Jun/2013 |
| 20/Jun/2013 | Donation From NZP-CRC/114879 | In | In | NASHV ZOO / 4087 | Loan Out To NZP-CRC/UNDETERM+ | Out | - | 27/Feb/2014 |
| 27/Feb/2014 | Loan In From Vendor: NASHV ZOO/4087 | In | - | NZP-CRC / 114879 | Loan Transfer To TORONTO/47588 | Out | - | 30/Jul/2014 |
| 30/Jul/2014 | Donation From Sender: NZP-CRC/114879 Vendor: NASHV ZOO/4087 | In | In | TORONTO / 47588 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 4087 | Donation To (Ownership Only) TORONTO/UNDETERM+ | - | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/2013 / 4Y,1M,9D |
| **Rearing** | Hand | **House Name** | [MINGMA/TORONTO] [Mingma/NZP-CRC] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1609/TORONTO] [1609/NZP-CRC] |
| | | **Local ID** | [47588/TORONTO] [4087/NASHV ZOO] [114879/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] | **Transponder** | [4B001A096A/TORONTO] [4B001A096A/NZP-CRC] |

## MGH13-00080 | [NASHV ZOO/4088]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/2013 | Birth/Hatch | In | In | NZP-CRC / 114880 | Donation To NASHV ZOO/UNK | Out | Out | 20/Jun/2013 |
| 20/Jun/2013 | Donation From NZP-CRC/114880 | In | In | NASHV ZOO / 4088 | Donation To SANDWICH/UNDETERM+ | Out | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/2013 / 1Y,5M,25D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Kali/NZP-CRC] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1610/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] | **Local ID** | [114880/NZP-CRC] [4088/NASHV ZOO] |
| | | **Transponder** | [4B1400356D/NZP-CRC] |

## MGH14-00171 | [PITTSBURG/102934]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 10/Apr/2014 | Birth/Hatch | In | In | NZP-CRC / 115037 | Donation To DENVER/UNK | Out | Out | 17/May/2014 |
| 03/Dec/2014 | Donation From DENVER/A14115 | In | In | PITTSBURG / 102934 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 10/Apr/2014 / 2Y,11M,4D |
| **Rearing** | Hand | **House Name** | [Saya/PITTSBURG] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Local ID** | [115037/NZP-CRC] [102934/PITTSBURG] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Regional Studbook #** | [1719-AZA /PITTSBURG] |
| | | **Transponder** | [000724679C/[Interscapular/-]/PITTSBURG] |

## MGH15-00280 | [NZP-CRC/115176]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Apr/2015 | Birth/Hatch | In | In | NZP-CRC / 115176 | Death | Out | Out | 24/Apr/2015 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 24/Apr/2015 / 0Y,0M,0D at the time of death |
| **Rearing** | None | **Local ID** | [115176/NZP-CRC] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] | | |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] | | |

## MIG12-25350237 | [NZP-CRC/101968]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Aug/1972 | Purchase FERNDALE/UNK | In | In | DENVER / 00363 | Loan Out To NZP-WASH/101968 | Out | - | 11/May/1977 |
| 11/May/1977 | Loan In From Vendor: DENVER/00363 | In | - | NZP-WASH / 101968 | Loan Transfer To NZP-CRC/101968 | Out | - | 18/Oct/1978 |
| 18/Oct/1978 | Loan In From Vendor: DENVER/00363 | In | - | NZP-CRC / 101968 | Death | Out | - | 07/Apr/1986 |
| - | - | - | - | DENVER / 00363 | Death (Ownership Only) | - | Out | 07/Apr/1986 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Wild Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | - |
| **Enclosure** | - | **Birth Date/Age** | ~ from 31/May/1971 to 02/Jun/1971 / 14Y,10M,6D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [37070/NZP-CRC] |
| | | **House Name** | [CHANTAR/NZP-WASH] [CHANTAR/NZP-CRC] [CHANTAR/DENVER] |
| | | **Intl Stdbk#** | [223/DENVER] |
| | | **Local ID** | [101968/NZP-WASH] [101968/NZP-CRC] [00363/DENVER] |
| | | **Regional Studbook #** | [223-UNKNOWN /NZP-CRC] |



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## MIG12-25350401 | [SACRAMNTO/100842]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/May/1988 | Birth/Hatch | In | In | BUFFALO / 88M168 | Donation To NZP-CRC/109558 | Out | Out | 02/May/1990 |
| 02/May/1990 | Donation From BUFFALO/88M168 | In | In | NZP-CRC / 109558 | Sale SACRAMNTO/100842 | Out | Out | 11/Dec/1990 |
| 11/Dec/1990 | Purchase NZP-CRC/109558 | In | In | SACRAMNTO / 100842 | Loan Out To SIMAS D/NONE | Out | - | 13/Apr/2002 |
| - | - | - | - | SACRAMNTO / 100842 | Death (Ownership Only) | - | Out | 23/Mar/2006 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [GAN: MIG12-29613033 | 85M98/BUFFALO] [GAN: MIG12-29613033 | 85M98/BUFFALO]
**Sire** [GAN: MIG12-29613034 | 85M24/BUFFALO] [GAN: MIG12-29613034 | 85M24/BUFFALO]

**Birth Type** Captive Born
**Birth Location** Buffalo Zoo
**Birth Date/Age** 24/May/1988 / 17Y,9M,27D at the time of death
**House Name** [Indri/SACRAMNTO] [INDRI/BUFFALO] [INDRI/NZP-CRC]
**Intl Stdbk#** [698/BUFFALO]
**Local ID** [100842/SACRAMNTO] [109558/NZP-CRC] [88M168/BUFFALO]
**Regional Studbook #** [698-AZA /SACRAMNTO] [698-UNKNOWN /NZP-CRC]
**Tattoo** [698/SACRAMNTO] [698 RT THIGH/NZP-CRC]
**Transponder** [00061148BF/SACRAMNTO]

## MIG12-25602096 | [NZP-CRC/112779]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Sep/1988 | Birth/Hatch | In | In | BATONROUG / M1983 | Loan Out To CLEVELAND/900308 | Out | - | 22/Mar/1990 |
| 22/Mar/1990 | Loan In From Sender: BATONROUG/M1983 Vendor: BATONROUG/1983 | In | - | CLEVELAND / 900308 | Loan Transfer To NZP-CRC/112779 | Out | - | 27/Mar/1996 |
| 16/Jan/1996 | Loan Return to Us Sender: CLEVELAND/900308 | In | - | BATONROUG / M1983 | Loan Out To NZP-CRC/112779 | Out | - | 17/Jan/1996 |
| 27/Mar/1996 | Loan In From Vendor: BATONROUG/1983 | In | - | NZP-CRC / 112779 | Death | Out | - | 07/Aug/2004 |
| - | - | - | - | BATONROUG / M1983 | Death (Ownership Only) | - | Out | 07/Aug/2004 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [GAN: MIG12-27681282 | M1661/BATONROUG]
**Sire** [GAN: 5046411 | M1660/BATONROUG]

**Birth Type** Captive Born
**Birth Location** BREC's Baton Rouge Zoo
**Birth Date/Age** 09/Sep/1988 / 15Y,10M,29D at the time of death
**House Name** [MIA/NZP-CRC] [MIA/CLEVELAND]
**Intl Stdbk#** [781/CLEVELAND]
**Local ID** [112779/NZP-CRC] [M1983/BATONROUG] [900308/CLEVELAND]
**Old Accession Number** [1983/BATONROUG]
**Regional Studbook #** [781-UNKNOWN /NZP-CRC]
**Tattoo** [781/NZP-CRC]
**Transponder** [00004D7496/BATONROUG] [00004D7496/CLEVELAND]

## MIG12-25602471 | [PROVIDNCE/951034]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 15/Jun/1988 | Birth/Hatch | In | In | NZP-CRC / 108155 | Sale CLEVELAND/880907 | Out | Out | 14/Sep/1988 |
| 14/Sep/1988 | Purchase NZP-CRC/108155 | In | In | CLEVELAND / 880907 | Loan Out To PROVIDNCE/951034 | Out | - | 25/Apr/1995 |
| 26/Apr/1995 | Loan In From Sender: CLEVELAND/880907 Vendor: CLEVELAND/880907 | In | - | PROVIDNCE / 951034 | Death | Out | - | 29/Apr/1997 |
| - | - | - | - | CLEVELAND / 880907 | Death (Ownership Only) | - | Out | 29/Apr/1997 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [103364 / NPZ] [GAN: 25350873 | 103364/NZP-CRC] [GAN: 25350873 | 103364/NZP-CRC]
**Sire** [103363 / NPZ] [GAN: 25350812 | 103363/NZP-CRC] [GAN: 25350812 | 103363/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 15/Jun/1988 / 8Y,10M,14D at the time of death
**House Name** [MATTHEW/PROVIDNCE] [MATTHEW/CLEVELAND] [MATHEW/NZP-CRC]
**Intl Stdbk#** [748/PROVIDNCE] [748/CLEVELAND]
**Local ID** [951034/PROVIDNCE] [108155/NZP-CRC] [880907/CLEVELAND]
**Regional Studbook #** [748-UNKNOWN /NZP-CRC]
**Tattoo** [748/PROVIDNCE] [748 RIGHT INNER/CLEVELAND]

## MIG12-28503933 | [TACOMA/T10M10]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Feb/2010 | Birth/Hatch | In | In | NZP-CRC / 114537 | Donation To TACOMA/ | Out | Out | 12/Jul/2010 |
| 12/Jul/2010 | Donation From NZP-CRC/114537 | In | In | TACOMA / T10M10 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [114297 / NZP-WASH] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [114296 / NZP-WASH] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 14/Feb/2010 / 7Y,1M,0D
**House Name** [Chee-Wit/TACOMA] [Chee-Wit/NZP-CRC]
**Intl Stdbk#** [1460/TACOMA] [1460/NZP-CRC]
**Local ID** [T10M10/TACOMA] [114537/NZP-CRC]
**Transponder** [4B0859A1F/TACOMA] [4B08596A1F/NZP-CRC]



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## MIG12-28552626 | [NZP-CRC/113283]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Apr/1993 | Birth/Hatch | In | In | CLEVELAND / 930429 | Loan Out To DENVER/950141 | Out | - | 02/May/1995 |
| 02/May/1995 | Loan In From Vendor: CLEVELAND/930429 | In | - | DENVER / 950141 | Loan Transfer To NZP-CRC/113283 | Out | - | 28/Jan/1998 |
| - | - | - | - | CLEVELAND / 930429 | Loan Out To (Change in Reported Holder) NZP-CRC/113283 | - | - | 28/Jan/1998 |
| 28/Jan/1998 | Loan In From Vendor: CLEVELAND/930429 | In | - | NZP-CRC / 113283 | Death | Out | - | 13/Nov/2009 |
| - | - | - | - | CLEVELAND / 930429 | Death (Ownership Only) | - | Out | 13/Nov/2009 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-28977178 | 880911/CLEVELAND] [GAN: MIG12-28977178 | 880911/CLEVELAND]
**Sire** [GAN: MIG12-29022792 | 880910/CLEVELAND] [GAN: MIG12-29022792 | 880910/CLEVELAND]

**Birth Type** Captive Born
**Birth Location** Cleveland Metroparks Zoo
**Birth Date/Age** 18/Apr/1993 / 16Y,6M,26D at the time of death
**House Name** [ZOE/NZP-CRC] [ZOE/CLEVELAND] [ZOE/DENVER]
**Intl Stdbk#** [1008/DENVER] [1008/CLEVELAND]
**Local ID** [113283/NZP-CRC] [930429/CLEVELAND] [950141/DENVER]
**Regional Studbook #** [1008-AZA /NZP-CRC]
**Tattoo** [DZ1/NZP-CRC] [DZ1/DENVER]
**Transponder** [00004F71E9/CLEVELAND] [00-004F-71E9/DENVER]

## MIG12-28552627 | [NZP-CRC/101969]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Jul/1971 | Purchase FERNDALE/ | In | In | COLO SPRG / 71M009 | Sale DENVER/00044 | Out | Out | 12/Jun/1975 |
| 11/Jun/1975 | Trade From COLO SPRG/71M009 | In | In | DENVER / 00044 | Loan Out To NZP-WASH/101969 | Out | - | 11/May/1977 |
| 11/May/1977 | Loan In From Vendor: DENVER/00044 | In | - | NZP-WASH / 101969 | Loan Transfer To NZP-CRC/101969 | Out | - | 18/Oct/1978 |
| 18/Oct/1978 | Loan In From Vendor: DENVER/00044 | In | - | NZP-CRC / 101969 | Death | Out | - | 24/Mar/1989 |
| - | - | - | - | DENVER / 00044 | Death (Ownership Only) | - | Out | 24/Mar/1989 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [Undetermined / COLO SPRG]
**Sire** [Undetermined / COLO SPRG]

**Birth Type** Undetermined
**Birth Location** Cheyenne Mtn Zoological Park
**Birth Date/Age** ~ from 01/Apr/1971 to 30/Apr/1971 / 17Y,11M,18D at the time of death
**Death Number** [39537/NZP-CRC]
**House Name** [MISHKA/NZP-WASH] [MISHKA/DENVER] [MISHKA/NZP-CRC]
**Intl Stdbk#** [200/DENVER]
**Local ID** [101969/NZP-WASH] [00044/DENVER] [71M009/COLO SPRG] [101969/NZP-CRC]
**Regional Studbook #** [200-UNKNOWN /COLO SPRG] [200-UNKNOWN /NZP-CRC]
**Studbook Name** [MISHKA/COLO SPRG]

## MIG12-28724759 | [NZP-CRC/102660]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Jan/1972 | Purchase SOUTHWICK/NONE | In | In | BROWNSVIL / 9402 | Sale SEATTLE/20216 | Out | Out | 07/Mar/1973 |
| 08/Mar/1973 | Purchase BROWNSVIL/UNK | In | In | SEATTLE / 20216 | Loan Out To NY BRONX/761289 | Out | - | 17/Nov/1976 |
| 17/Nov/1976 | Loan In From Vendor: SEATTLE/20216 | In | - | NY BRONX / 761289 | Loan Transfer To NZP-CRC/102660 | Out | - | 06/Dec/1978 |
| - | - | - | - | SEATTLE / 20216 | Loan Out To (Change in Reported Holder) NZP-CRC/102660 | - | - | 01/Oct/1978 |
| 06/Dec/1978 | Loan In From Vendor: SEATTLE/20216 | In | - | NZP-CRC / 102660 | Death | Out | - | 22/Jun/1984 |
| - | - | - | - | SEATTLE / 20216 | Death (Ownership Only) | - | Out | 21/Jun/1984 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [UNK / UNK]
**Sire** [UNK / UNK]

**Birth Type** Undetermined
**Birth Location** Unknown Location
**Birth Date/Age** Undetermined / 12Y,5M,0D at the time of death
**Death Number** [35597/NZP-CRC]
**House Name** [CLAUDE/SEATTLE] [CLAUDE/SEATTLE] [CLAUDE/NZP-CRC]
**Local ID** [761289/NY BRONX] [9402/BROWNSVIL] [102660/NZP-CRC] [20216/SEATTLE]
**Old Accession Number** [WD1/SEATTLE] [WD1/SEATTLE]
**Regional Studbook #** [135-AZA /NZP-CRC]

## MIG12-28757509 | [NZP-CRC/114642]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Apr/2009 | Birth/Hatch | In | In | BEKESBRNE / H20910 | Donation To NZP-CRC/114642 | Out | Out | 21/Nov/2010 |
| 22/Nov/2010 | Donation From BEKESBRNE/H20910 | In | In | NZP-CRC / 114642 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [GAN: MIG12-29430130 | H20724/BEKESBRNE] [GAN: MIG12-29430130 | H20724/BEKESBRNE]
**Sire** [GAN: 21650105 | H20796/BEKESBRNE] [GAN: 21650105 | H20796/BEKESBRNE]

**Birth Type** Captive Born
**Birth Location** Howletts Wild Animal Park
**Birth Date/Age** 05/Apr/2009 / 7Y,11M,9D
**House Name** [Yangon/BEKESBRNE] [Yangon/NZP-CRC]
**Intl Stdbk#** [1436/BEKESBRNE] [1436/NZP-CRC]
**Local ID** [H20910/BEKESBRNE] [114642/NZP-CRC]
**Transponder** [956 000 000 820 998/BEKESBRNE] [956-000-000-820-998/NZP-CRC]



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## MIG12-28757510 | [NZP-CRC/114643]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/May/2009 | Birth/Hatch | In | In | BEKESBRNE / H20921 | Donation To NZP-CRC/114643 | Out | Out | 21/Nov/2010 |
| 22/Nov/2010 | Donation From BEKESBRNE/H20921 | In | In | NZP-CRC / 114643 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Howletts Wild Animal Park |
| **Enclosure** | - | **Birth Date/Age** | 03/May/2009 / 7Y,10M,11D |
| **Rearing** | Parent | **House Name** | [Mong/NZP-CRC] [Mong/BEKESBRNE] |
| **Dam** | [GAN: 27139519 \| H20301/BEKESBRNE] [GAN: 27139519 \| H20301/BEKESBRNE] | **Intl Stdbk#** | [1454/NZP-CRC] [1454/BEKESBRNE] |
| | | **Local ID** | [114643/NZP-CRC] [H20921/BEKESBRNE] |
| **Sire** | [GAN: 27139518 \| H20212/BEKESBRNE] [GAN: 27139518 \| H20212/BEKESBRNE] | **Transponder** | [956-000-000-828-368/NZP-CRC] [956 000 000 828 368/BEKESBRNE] |

## MIG12-28833772 | [BEKESBRNE/H21062]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Feb/2010 | Birth/Hatch | In | In | NZP-CRC / 114538 | Loan Out To NASHV ZOO/3276 | Out | - | 09/Jul/2010 |
| 10/Jul/2010 | Donation From NZP-CRC/114538 | In | In | NASHV ZOO / 3276 | Donation To NZP-CRC/114538 | Out | Out | 17/Oct/2010 |
| 17/Oct/2010 | Loan Return to Us Sender: NASHV ZOO/3276 | In | - | NZP-CRC / 114538 | Donation To BEKESBRNE/H21062 | Out | Out | 22/Nov/2010 |
| 23/Nov/2010 | Donation From NZP-CRC/114538 | In | In | BEKESBRNE / H21062 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 14/Feb/2010 / 7Y,1M,0D |
| **Rearing** | Parent | **House Name** | [Tai-Wada/NASHV ZOO] [Tai-Wada/BEKESBRNE] [Tai-Wada/NZP-CRC] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] [GAN: MIG12-29565950 \| 114297/NZP-CRC] [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Intl Stdbk#** | [1461/NASHV ZOO] [1461/BEKESBRNE] [1461/NZP-CRC] |
| | | **Local ID** | [3276/NASHV ZOO] [114538/NZP-CRC] [H21062/BEKESBRNE] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] [GAN: MIG12-29565947 \| 114296/NZP-CRC] [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Transponder** | [4A7A6C140B/NASHV ZOO] [FDX-A 4A7 A6C 140B/BEKESBRNE] [4A7A6C140B/NZP-CRC] [1D14A7A6C140B/BEKESBRNE] |

## MIG12-29121050 | [NZP-CRC/113282]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 31/Mar/1994 | Birth/Hatch | In | In | SANFORD / 1379 | Loan Out To DENVER/950069 | Out | - | 14/Mar/1995 |
| 14/Mar/1995 | Loan In From Vendor: SANFORD/1379 | In | - | DENVER / 950069 | Loan Transfer To NZP-CRC/113282 | Out | - | 28/Jan/1998 |
| - | - | - | - | SANFORD / 1379 | Donation To (Ownership Only) NZP-CRC/113282 | - | Out | 28/Jan/1998 |
| 28/Jan/1998 | Donation From SANFORD/1379 | In | In | NZP-CRC / 113282 | Death | Out | Out | 28/Mar/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Central Florida Zoological Park |
| **Enclosure** | - | **Birth Date/Age** | 31/Mar/1994 / 16Y,11M,28D at the time of death |
| **Rearing** | Parent | **House Name** | [JUNIOR/NZP-CRC] [ZEUS/DENVER] [JUNIOR/DENVER] |
| **Dam** | [GAN: 5042553 \| 1356/SANFORD] [GAN: 5042553 \| 1356/SANFORD] | **Intl Stdbk#** | [995/DENVER] [995/SANFORD] |
| | | **Local ID** | [113282/NZP-CRC] [1379/SANFORD] [950069/DENVER] |
| **Sire** | [1355 / CLEVELAND] [GAN: 1635989 \| 1355/SANFORD] | **Regional Studbook #** | [995-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [995/NZP-CRC] [995/NZP-CRC] |

## MIG12-29344177 | [TAIPEI/1279]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/Sep/1982 | Birth/Hatch | In | In | NZP-CRC / 104923 | Sale BIRMINGHM/1273 | Out | Out | 08/Feb/1985 |
| 09/Feb/1985 | Purchase NZP-CRC/104923 | In | In | BIRMINGHM / 1273 | Trade To FERNDALE/NONE | Out | Out | 06/Oct/1986 |
| 06/Oct/1986 | Purchase BIRMINGHM/1273 | In | In | FERNDALE / B0H557 | Sale TAIPEI/1279 | Out | Out | 06/Oct/1986 |
| 05/Oct/1986 | Purchase FERNDALE/UNK | In | In | TAIPEI / 1279 | Death | Out | Out | 04/Feb/1996 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 16/Sep/1982 / 13Y,4M,19D at the time of death |
| **Rearing** | Undetermined | **House Name** | [ROMULUS/NZP-CRC] [ROMULUS/BIRMINGHM] [YUN TEH/TAIPEI] |
| **Dam** | [103364 / UNKNOWN] [GAN: 25350873 \| 103364/NZP-CRC] [GAN: 25350873 \| 103364/NZP-CRC] | **Intl Stdbk#** | [479/FERNDALE] [479/TAIPEI] |
| | | **Local ID** | [104923/NZP-CRC] [1273/BIRMINGHM] [B0H557/FERNDALE] [1279/TAIPEI] |
| **Sire** | [103363 / UNKNOWN] [GAN: 25350812 \| 103363/NZP-CRC] [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [479-UNKNOWN /NZP-CRC] [479-AZA /BIRMINGHM] |
| | | **Tag** | [2/TAIPEI] |



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### MIG12-29344178 | [FERNDALE/21524]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/1984 | Birth/Hatch | In | In | NZP-CRC / 106004 | Sale BIRMINGHM/1314 | Out | Out | 03/Apr/1985 |
| 03/Apr/1985 | Purchase NZP-CRC/106004 | In | In | BIRMINGHM / 1314 | Trade To FERNDALE/NONE | Out | Out | 06/Oct/1986 |
| 06/Oct/1986 | Purchase BIRMINGHM/1314 | In | In | FERNDALE / 21524 | Death | Out | Out | 04/Dec/1986 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [103792 / UNKNOWN] [GAN: 4942828 | 103792/NZP-CRC]
**Sire** [103791 / UNKNOWN] [GAN: 4942580 | 103791/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 27/May/1984 / 2Y,6M,7D at the time of death
**House Name** [BECKIE/BIRMINGHM] [BECKIE/NZP-CRC]
**Intl Stdbk#** [562/FERNDALE]
**Local ID** [1314/BIRMINGHM] [106004/NZP-CRC] [21524/FERNDALE]
**Regional Studbook #** [562-AZA /BIRMINGHM] [562-UNKNOWN /NZP-CRC]

### MIG12-29398059 | [NZP-CRC/112652]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 31/Jul/1992 | Birth/Hatch | In | In | BATONROUG / M2561 | Sale METROZOO/M01731 | Out | Out | 15/Feb/1994 |
| 17/Feb/1994 | Purchase BATONROUG/M2561 | In | In | METROZOO / M01731 | Loan Out To NZP-CRC/112652 | Out | - | 15/Feb/1996 |
| 15/Feb/1996 | Loan In From Vendor: METROZOO/M01731 | In | - | NZP-CRC / 112652 | Death | Out | - | 24/Feb/2009 |
| - | - | - | - | METROZOO / M01731 | Death (Ownership Only) | - | Out | 24/Feb/2009 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [GAN: MIG12-27681282 | M1661/BATONROUG] [GAN: MIG12-27681282 | M1661/BATONROUG] [GAN: MIG12-27681282 | M1661/BATONROUG]
**Sire** [GAN: 5046411 | M1660/BATONROUG] [GAN: 5046411 | M1660/BATONROUG] [GAN: 5046411 | M1660/BATONROUG]

**Birth Type** Captive Born
**Birth Location** BREC's Baton Rouge Zoo
**Birth Date/Age** 31/Jul/1992 / 16Y,6M,24D at the time of death
**Death Number** [PATH #2009-0031/METROZOO]
**House Name** [JASMINE/NZP-CRC] [JAZMINE/METROZOO]
**Intl Stdbk#** [926/METROZOO]
**Local ID** [112652/NZP-CRC] [M01731/METROZOO] [M2561/BATONROUG]
**Old Accession Number** [2561/BATONROUG]
**Regional Studbook #** [926-UNKNOWN /NZP-CRC] [926-AZA /BATONROUG]
**Tattoo** [1731 R THIGH (IN/NZP-CRC] [1731/METROZOO]

### MIG12-29535740 | [BEKESBRNE/H21063]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/May/2010 | Birth/Hatch | In | In | NASHV ZOO / 3268 | Donation To NZP-CRC/114639 | Out | Out | 17/Oct/2010 |
| 17/Oct/2010 | Donation From NASHV ZOO/3268 | In | In | NZP-CRC / 114639 | Donation To BEKESBRNE/H21063 | Out | Out | 22/Nov/2010 |
| 23/Nov/2010 | Donation From NZP-CRC/114639 | In | In | BEKESBRNE / H21063 | - | - | - | - |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29615646 | 2810/NASHV ZOO] [GAN: MIG12-29615646 | 2810/NASHV ZOO] [GAN: MIG12-29615646 | 2810/NASHV ZOO]
**Sire** [GAN: MIG12-29823526 | 2809/NASHV ZOO] [GAN: MIG12-29823526 | 2809/NASHV ZOO] [GAN: MIG12-29823526 | 2809/NASHV ZOO]

**Birth Type** Captive Born
**Birth Location** Nashville Zoo at Grassmere
**Birth Date/Age** 24/May/2010 / 6Y,9M,18D
**House Name** [Matsi/NASHV ZOO] [Matsi/BEKESBRNE] [Matsi/NZP-CRC]
**Intl Stdbk#** [1468/NASHV ZOO] [1468/BEKESBRNE] [1468/NZP-CRC]
**Local ID** [3268/NASHV ZOO] [114639/NZP-CRC] [H21063/BEKESBRNE]
**Old Accession Number** [3268/NZP-CRC]
**Transponder** [048096087/NASHV ZOO] [048096087/NZP-CRC]

### MIG12-29565947 | [NZP-CRC/114296]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 21/Feb/2008 | Donation From KHAOKHEOW/1278 | In | In | NZP-CRC / 114296 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [1221 / KHAOKHEOW]
**Sire** [1217 / KHAOKHEOW]

**Birth Type** Captive Born
**Birth Location** Khao Kheow Open Zoo
**Birth Date/Age** 30/Aug/2006 / 10Y,6M,14D
**House Name** [Hannibal/NZP-CRC]
**Local ID** [114296/NZP-CRC]
**Transponder** [900006000006325/NZP-CRC] [1278/NZP-CRC]

### MIG12-29565948 | [NZP-CRC/110904]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jan/1993 | Birth/Hatch | In | In | NZP-CRC / 110904 | Death | Out | Out | 10/Nov/2011 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [GAN: 25350813 | 105631/NZP-CRC]
**Sire** [GAN: 25351089 | 105863/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 20/Jan/1993 / 18Y,9M,21D at the time of death
**House Name** [THISTLE/NZP-CRC]
**Local ID** [110904/NZP-CRC]
**Regional Studbook #** [967-UNKNOWN /NZP-CRC]
**Tattoo** [967/NZP-CRC]



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### MIG12-29565951 | [NZP-CRC/114394]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Mar/2009 | Birth/Hatch | In | In | NZP-CRC / 114394 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 24/Mar/2009 / 7Y,11M,18D |
| **Rearing** | Hand | **House Name** | [SaMing/NZP-CRC] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Intl Stdbk#** | [1434/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Local ID** | [114394/NZP-CRC] |
| | | **Transponder** | [4A0 660 737D Home Again/NZP-CRC] |

### MIG12-29565971 | [NZP-CRC/114393]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Mar/2009 | Birth/Hatch | In | In | NZP-CRC / 114393 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 24/Mar/2009 / 7Y,11M,18D |
| **Rearing** | Hand | **House Name** | [Ta Moon/NZP-CRC] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Intl Stdbk#** | [1433/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Local ID** | [114393/NZP-CRC] |
| | | **Transponder** | [4A0 61F 1438 Home Again/NZP-CRC] |

### MIG12-29566005 | [LOWRY/102947]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Mar/2011 | Birth/Hatch | In | In | NZP-CRC / 114659 | Donation To NASHV ZOO/3599 | Out | Out | 09/Sep/2011 |
| 09/Sep/2011 | Donation From NZP-CRC/114659 | In | In | NASHV ZOO / 3599 | Donation To LOWRY/UNKNOWN | Out | Out | 27/Sep/2011 |
| 27/Sep/2011 | Donation From NASHV ZOO/3599 | In | In | LOWRY / 102947 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Mar/2011 / 5Y,11M,14D |
| **Rearing** | Hand | **House Name** | [Malee/LOWRY] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1478/NZP-CRC] [1478/LOWRY] |
| | | **Local ID** | [114659/NZP-CRC] [3599/NASHV ZOO] [102947/LOWRY] |
| | | **Transponder** | [4B01751F00/NZP-CRC] [4B01751F00/NASHV ZOO] [#4B01751F00/LOWRY] [AVID*072*596*873/LOWRY] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] | | |

### MIG12-29613016 | [PITTSBORO/0043]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Mar/1987 | Birth/Hatch | In | In | NZP-CRC / 107576 | Sale BUFFALO/87M400 | Out | Out | 20/Aug/1987 |
| 20/Aug/1987 | Purchase NZP-CRC/107576 | In | In | BUFFALO / 87M400 | Donation To PITTSBORO/0043 | Out | Out | 19/Nov/1996 |
| 19/Nov/1996 | Donation From UNKNOWN/ | In | In | PITTSBORO / 0043 | Undetermined OFF ZIMS/ | Out | Out | 24/Apr/2003 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1987 / 16Y,1M,20D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [SIROB/BUFFALO] [SIROB/PITTSBORO] |
| **Dam** | [GAN: 25350813 \| 105631/NZP-CRC] [GAN: 25350813 \| 105631/NZP-CRC] | **Intl Stdbk#** | [681/BUFFALO] |
| | | **Local ID** | [87M400/BUFFALO] [0043/PITTSBORO] [107576/NZP-CRC] |
| **Sire** | [GAN: 25351089 \| 105863/NZP-CRC] [GAN: 25351089 \| 105863/NZP-CRC] | **Regional Studbook #** | [681-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [7576 LR LEG/NZP-CRC] |



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## MIG12-29730207 | [NZP-CRC/113879]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jun/2000 | Birth/Hatch | - | In | SANFORD / 1506 | - | - | - | - |
| 20/Jun/2000 | Birth/Hatch Owner: SANFORD/1506 | In | - | OAKHILL / 202019 | Loan Transfer To COLUMBUS/200055 | Out | - | 11/Jul/2000 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) COLUMBUS/200055 | - | - | 11/Jul/2000 |
| 11/Jul/2000 | Loan In From Sender: OAKHILL/202019 Vendor: OAKHILL/202019 | In | - | COLUMBUS / 200055 | Loan Return To Owner OAKHILL/202019 | Out | - | 19/Aug/2001 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) COLUMBUS/200055 | - | - | 18/Aug/2001 |
| 19/Aug/2001 | Loan In From Vendor: SANFORD/1506 | In | - | COLUMBUS / 200055 | Loan Transfer To MINNESOTA/10460 | Out | - | 08/Nov/2001 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) MINNESOTA/10460 | - | - | 08/Nov/2001 |
| 08/Nov/2001 | Loan In From Sender: COLUMBUS/200055 Vendor: SANFORD/1506 | In | - | MINNESOTA / 10460 | Loan Transfer To NZP-WASH/113879 | Out | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) NZP-CRC/113879 | - | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1506 | Donation To (Ownership Only) NZP-CRC/113879 | - | Out | 31/Mar/2004 |
| 31/Mar/2004 | Donation From SANFORD/1506 | In | In | NZP-CRC / 113879 | Death | Out | Out | 10/Dec/2015 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 20/Jun/2000 / 15Y,5M,20D at the time of death |
| **Rearing** | Hand | **House Name** | [Nattie/COLUMBUS] [NATTIE/NZP-CRC] [NATTIE/MINNESOTA] |
| **Dam** | [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] | **Intl Stdbk#** | [1124/OAKHILL] [1124/NZP-CRC] [1124/SANFORD] |
| | | **Local ID** | [202019/OAKHILL] [200055/COLUMBUS] [1506/SANFORD] [113879/NZP-CRC] [10460/MINNESOTA] |
| | | **Regional Studbook #** | [1124-AZA /COLUMBUS] [1124-AZA /MINNESOTA] |
| **Sire** | [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] | **Tattoo** | [1124/MINNESOTA] [1124/NZP-CRC] |
| | | **Transponder** | [00-05FC-4606/COLUMBUS] [00-05FC-4606/MINNESOTA] |

## MIG12-29764535 | [TAIPEI/1278]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Feb/1982 | Birth/Hatch | In | In | NZP-CRC / 104496 | Trade To MINNESOTA/3140 | Out | Out | 19/Aug/1982 |
| 19/Aug/1982 | Trade From NZP-CRC/104496 | In | In | MINNESOTA / 3140 | Sale FERNDALE/ | Out | Out | 25/Sep/1986 |
| 05/Oct/1986 | Purchase FERNDALE/UNK | In | In | TAIPEI / 1278 | Death | Out | Out | 07/Mar/1997 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 24/Feb/1982 / 15Y,0M,11D at the time of death |
| **Rearing** | Parent | **House Name** | [YUN PEI/TAIPEI] [CHELSEY/NZP-CRC] |
| **Dam** | [GAN: 25350873 \| 103364/NZP-CRC] [GAN: 25350873 \| 103364/NZP-CRC] | **Intl Stdbk#** | [465/TAIPEI] |
| | | **Local ID** | [1278/TAIPEI] [3140/MINNESOTA] [104496/NZP-CRC] |
| **Sire** | [GAN: 25350812 \| 103363/NZP-CRC] [GAN: 25350812 \| 103363/NZP-CRC] | **Regional Studbook #** | [465-UNKNOWN /NZP-CRC] [465-AZA /MINNESOTA] |
| | | **Tag** | [3/TAIPEI] |

## MIG12-29767641 | [NZP-CRC/113878]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jun/2000 | Birth/Hatch | In | In | OAKHILL / 202018 | Loan Out To COLUMBUS/200054 | Out | - | 11/Jul/2000 |
| 11/Jul/2000 | Loan In From Sender: OAKHILL/202018 Vendor: OAKHILL/202018 | In | - | COLUMBUS / 200054 | Loan Return To Owner OAKHILL/202018 | Out | - | 18/Aug/2001 |
| - | - | - | - | OAKHILL / 202018 | Trade To (Ownership Only) SANFORD/1514 | - | Out | 18/Aug/2001 |
| 18/Aug/2001 | Trade From Vendor: OAKHILL/202018 | - | In | SANFORD / 1514 | - | - | - | - |
| 19/Aug/2001 | Loan In From Vendor: SANFORD/1514 | In | - | COLUMBUS / 200054 | Loan Transfer To MINNESOTA/10459 | Out | - | 08/Nov/2001 |
| - | - | - | - | SANFORD / 1514 | Loan Out To (Change in Reported Holder) MINNESOTA/10459 | - | - | 08/Nov/2001 |
| 08/Nov/2001 | Loan In From Sender: COLUMBUS/200054 Vendor: SANFORD/1514 | In | - | MINNESOTA / 10459 | Loan Transfer To NZP-WASH/113878 | Out | - | 31/Mar/2004 |
| 31/Mar/2004 | Donation From SANFORD/1514 | In | In | NZP-CRC / 113878 | - | - | - | - |
| - | - | - | - | SANFORD / 1514 | Loan Out To (Change in Reported Holder) NZP-CRC/113878 | - | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1514 | Donation To (Ownership Only) NZP-CRC/113878 | - | Out | 31/Mar/2004 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 20/Jun/2000 / 16Y,8M,22D |
| **Rearing** | Hand | **House Name** | [Nellie/COLUMBUS] [NELLIE/MINNESOTA] [NELLIE/NZP-CRC] |
| **Dam** | [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] | **Intl Stdbk#** | [1123/OAKHILL] [1123/NZP-CRC] [1123/SANFORD] |
| | | **Local ID** | [200054/COLUMBUS] [202018/OAKHILL] [10459/MINNESOTA] [1514/SANFORD] [113878/NZP-CRC] |
| | | **Regional Studbook #** | [1123-AZA /COLUMBUS] [1123-AZA /MINNESOTA] |
| **Sire** | [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] | **Tattoo** | [1123/MINNESOTA] |
| | | **Transponder** | [00-05FC-5C01/COLUMBUS] [00-05FC-5C01/MINNESOTA] [00-05FC-501/NZP-CRC] [00-05FC-501/SANFORD] |



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## MIG12-29823486 | [METROZOO/11M110]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/May/2011 | Birth/Hatch | In | In | NZP-CRC / 114677 | Donation To NASHV ZOO/UNK | Out | Out | 09/Sep/2011 |
| 09/Sep/2011 | Donation From NZP-CRC/114677 | In | In | NASHV ZOO / 3600 | Donation To METROZOO/11M110 | Out | Out | 13/Nov/2011 |
| 12/Nov/2011 | Donation From NASHV ZOO/3600 | In | In | METROZOO / 11M110 | - | - | - | - |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 13/May/2011 / 5Y,10M,1D
**House Name** [Serai/METROZOO]
**Intl Stdbk#** [1504/METROZOO] [1504/NASHV ZOO]
**Local ID** [11M110/METROZOO] [3600/NASHV ZOO] [114677/NZP-CRC]

## MIG12-29823530 | [NASHV ZOO/3172]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Jul/2009 | Birth/Hatch | In | In | NZP-CRC / 114452 | Donation To NASHVILLE/3172 | Out | Out | 14/Aug/2009 |
| 14/Aug/2009 | Donation From NZP-CRC/114452 | In | In | NASHV ZOO / 3172 | Loan Out To COLUMBUS/209147 | Out | - | 14/Aug/2009 |
| 14/Aug/2009 | Loan In From Sender: NASHV ZOO/3172 Vendor: NASHV ZOO/3172 | In | - | COLUMBUS / 209147 | Loan Return To Owner NASHV ZOO/3172 | Out | - | 04/Jan/2010 |
| 04/Jan/2010 | Loan Return to Us Sender: COLUMBUS/209147 | In | - | NASHV ZOO / 3172 | Loan Out To GREENWICH/UNDETERM+ | Out | - | 21/Dec/2014 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 09/Jul/2009 / 7Y,8M,5D
**House Name** [Baylie/COLUMBUS] [Baylie/NASHV ZOO] [Baylie/NZP-CRC]
**Intl Stdbk#** [1449/NASHV ZOO]
**Local ID** [209147/COLUMBUS] [114452/NZP-CRC] [3172/NASHV ZOO]
**Regional Studbook #** [1449-AZA /COLUMBUS] [1449-AZA /NZP-CRC]
**Transponder** [048*098*577/NASHV ZOO]

## MIG12-29908024 | [SANFORD/11C171]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Mar/2011 | Birth/Hatch | In | In | NZP-CRC / 114658 | Donation To TACOMA/T11M21 | - | Out | 09/Sep/2011 |
| - | - | - | - | NZP-CRC / 114658 | Loan Transfer To (Physical Only) NASHV ZOO/3598 | Out | - | 09/Sep/2011 |
| 09/Sep/2011 | Loan In From Vendor: TACOMA/T11M21 | In | - | NASHV ZOO / 3598 | Loan Transfer To TACOMA/T11M21 | Out | - | 22/Sep/2011 |
| 22/Sep/2011 | Donation From NZP-WASH/114658 | In | In | TACOMA / T11M21 | Donation To SANFORD/11C171 | Out | Out | 26/Jan/2012 |
| 27/Jan/2012 | Donation From TACOMA/T11M21 | In | In | SANFORD / 11C171 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [114487 / SMITHSON] [GAN: 26979184 | 114487/NZP-CRC]
**Sire** [114393 / SMITHSON] [GAN: MIG12-29565971 | 114393/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 28/Mar/2011 / 5Y,11M,14D
**House Name** [SABAH/SANFORD] [Sabah/TACOMA]
**Intl Stdbk#** [1477/SANFORD] [1477/TACOMA]
**Local ID** [3598/NASHV ZOO] [11C171/SANFORD] [114658/NZP-CRC] [T11M21/TACOMA]
**Old Accession Number** [1641/SANFORD] [FCH13-00203/SPECIE360]
**Transponder** [4B1B242911/NASHV ZOO] [4B1B242911/TACOMA] [4B1B242911/SANFORD] [4B1B242911/NZP-CRC]



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## MIG12-30090037 | [LITTLEROC/7282]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | - | In | CLEVELAND / M30413 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 03/Apr/2003 | Birth/Hatch Owner: CLEVELAND/M30413 | In | - | TACOMA / T03M03 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 17/Feb/2005 | Loan Transfer From Sender: TACOMA/T03M03 Vendor: CLEVELAND/M30413 | In | - | NASHV ZOO / 2318 | Loan Transfer To NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | TACOMA / T03M03 | Loan Transfer To (Physical Only) NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) NZP-CRC/113958 | - | - | 24/Feb/2005 |
| 24/Feb/2005 | Loan In From Vendor: CLEVELAND/M30413 | In | - | NZP-CRC / 113958 | Loan Transfer To HOUSTON/22865 | Out | - | 20/Feb/2007 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 22/Feb/2007 | Loan In From Sender: NZP-CRC/113958 Vendor: CLEVELAND/M30413 | In | - | HOUSTON / 22865 | Loan Transfer To LITTLEROC/7282 | Out | - | 01/Oct/2012 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 01/Oct/2012 | Loan In From Sender: HOUSTON/22865 Vendor: CLEVELAND/M30413 | In | - | LITTLEROC / 7282 | - | - | - | - |
| - | - | - | - | CLEVELAND / M30413 | Donation To (Ownership Only) LITTLEROC/7282 | - | Out | 01/Oct/2012 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [98MO18 / TACOMA] [GAN: 2425883 | 980716/CLEVELAND] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA]
**Sire** [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA]

**Birth Type** Captive Born
**Birth Location** Point Defiance Zoo & Aquarium
**Birth Date/Age** 03/Apr/2003 / 13Y,11M,11D
**House Name** [RAMA/TACOMA] [Rama/LITTLEROC] [RAMA/NZP-CRC] [Rama/NASHV ZOO] [Rama/CLEVELAND] [Rama/HOUSTON]
**Intl Stdbk#** [1211/LITTLEROC] [1211/CLEVELAND] [1211/HOUSTON] [1211/NZP-CRC] [1211/NASHV ZOO]
**Local ID** [T03M03/TACOMA] [7282/LITTLEROC] [113958/NZP-CRC] [2318/NASHV ZOO] [M30413/CLEVELAND] [22865/HOUSTON]
**Old Accession Number** [2318 at Nashville Zoo/NZP-CRC] [M30413 at Cleveland/NZP-CRC]
**Regional Studbook #** [1211-AZA /TACOMA]
**Tattoo** [1211/LITTLEROC] [1211/NZP-CRC] [1211/HOUSTON]
**Transponder** [00-0630-DEA1/TACOMA] [00-0630-DEA1 Trovan/LITTLEROC] [00-0630-DEA1/NZP-CRC] [00-0630-DEA1/NASHV ZOO] [00-0630-DEA1/HOUSTON]

## MIG12-6333740 | [NZP-CRC/102661]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Mar/1972 | Purchase BRADENTON/NONE | In | In | NY BRONX / 720363 | Loan Out To NZP-CRC/102661 | Out | - | 06/Dec/1978 |
| 06/Dec/1978 | Loan In From Vendor: NY BRONX/720363 | In | - | NZP-CRC / 102661 | Death | Out | - | 25/Apr/1986 |
| - | - | - | - | NY BRONX / 720363 | Death (Ownership Only) | - | Out | 25/Apr/1986 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Wild Born
**Birth Location** Lao People's Democratic Republic / Vientiane (lo) (province) (LA)
**Birth Date/Age** ~ from 01/Jan/1969 to 31/Dec/1969 / 17Y,1M,23D at the time of death
**Death Number** [37117/NZP-CRC]
**House Name** [PFEFFA/NZP-CRC]
**Local ID** [102661/NZP-CRC] [720363/NY BRONX]
**Regional Studbook #** [167-UNKNOWN /NZP-CRC] [167-AZA /NY BRONX]

## MIG12-6359791 | [NZP-CRC/102662]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Apr/1968 | Purchase EBERSWALD/NONE | In | In | NY BRONX / 680362 | Loan Out To NZP-CRC/102662 | Out | - | 06/Dec/1978 |
| 06/Dec/1978 | Loan In From Vendor: NY BRONX/680762 | In | - | NZP-CRC / 102662 | Death | Out | - | 21/Feb/1979 |
| - | - | - | - | NY BRONX / 680362 | Death (Ownership Only) | - | Out | 11/Feb/1979 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Captive Born
**Birth Location** Tierpark Eberswalde
**Birth Date/Age** 19/Jul/1967 / 11Y,7M,2D at the time of death
**Death Number** [31613/NZP-CRC]
**Local ID** [680362/NY BRONX] [102662/NZP-CRC]
**Regional Studbook #** [100-UNKNOWN /NZP-CRC]

## MIG12-6359803 | [NZP-CRC/102663]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Jan/1975 | Purchase SOUTHWICK/UNK | In | In | NY BRONX / 751514 | Loan Out To NZP-CRC/102663 | Out | - | 06/Dec/1978 |
| 06/Dec/1978 | Loan In From Vendor: NY BRONX/751514 | In | - | NZP-CRC / 102663 | Death | Out | - | 17/Feb/1979 |
| - | - | - | - | NY BRONX / 751514 | Death (Ownership Only) | - | Out | 17/Feb/1979 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Wild Born
**Birth Location** -
**Birth Date/Age** ~ from 01/Jan/1973 to 31/Dec/1973 / 6Y,0M,19D at the time of death
**Death Number** [31603/NZP-CRC]
**Local ID** [102663/NZP-CRC] [751514/NY BRONX]
**Regional Studbook #** [177-UNKNOWN /NZP-CRC]



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## TYY12-00064 | [NASHV ZOO/3714]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/2012 | Birth/Hatch | In | In | NZP-CRC / 114756 | Donation To NASHV ZOO/3714 | Out | Out | 29/Mar/2012 |
| 30/Mar/2012 | Donation From NZP-CRC/114756 | In | In | NASHV ZOO / 3714 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 07/Mar/2012 / 5Y,0M,7D |
| **Rearing** | Hand | **House Name** | [Nuri/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Intl Stdbk#** | [1593/NASHV ZOO] |
| | | **Local ID** | [3714/NASHV ZOO] [114756/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Regional Studbook #** | [1593-AZA /NZP-CRC] |
| | | **Transponder** | [084 379 016/NASHV ZOO] |

## TYY13-00736 | [TORONTO/47589]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Apr/2013 | Birth/Hatch | In | In | NASHV ZOO / 4042 | Loan Out To NZP-CRC/UNDETERM+ | Out | - | 27/Feb/2014 |
| 27/Feb/2014 | Loan In From Vendor: NASHV ZOO/4042 | In | - | NZP-CRC / 115032 | Loan Transfer To TORONTO/47589 | Out | - | 30/Jul/2014 |
| 30/Jul/2014 | Donation From Sender: NZP-CRC/115032 Vendor: NASHV ZOO/4042 | In | In | TORONTO / 47589 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 4042 | Donation To (Ownership Only) TORONTO/UNDETERM+ | - | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 30/Apr/2013 / 3Y,10M,14D |
| **Rearing** | Hand | **House Name** | [PAVARTI/TORONTO] [Pavarti/NZP-CRC] [Pavarti/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823528 \| 520048/KHAOKHEOW] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1621/TORONTO] [1621/NZP-CRC] [1621/NASHV ZOO] |
| | | **Local ID** | [47589/TORONTO] [4042/NASHV ZOO] [115032/NZP-CRC] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Transponder** | [009-045-871/TORONTO] [009-045-871/NZP-CRC] [009-045-871/NASHV ZOO] |



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# Appendix H-Historical Taxon Report-National Zoo-Washington

## 18014743 | [NZP-WASH/16118]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa macrosceloides**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Sep/1937 | Collected From The Wild | In | In | NZP-WASH / 16118 | Death | Out | Out | 16/Jun/1946 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Wild Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Thailand |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 8Y,8M,19D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [10348/NZP-WASH] |
| | | **Local ID** | [16118/NZP-WASH] |

## 18011019 | [NZP-WASH/28711A]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Aug/1961 | Purchase ZEEHANDLR/ | In | In | NZP-WASH / 28711A | Death | Out | Out | 22/Nov/1967 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 6Y,3M,14D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [23449/NZP-WASH] |
| | | **Local ID** | [28711A/NZP-WASH] |

## 18011020 | [NZP-WASH/28711B]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Aug/1961 | Purchase ZEEHANDLR/ | In | In | NZP-WASH / 28711B | Death | Out | Out | 24/Aug/1961 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 0Y,0M,16D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [18910/NZP-WASH] |
| | | **Local ID** | [28711B/NZP-WASH] |

## 18012148 | [NZP-WASH/29113]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Jul/1962 | Trade From CINCINNAT/UNK | In | In | NZP-WASH / 29113 | Death | Out | Out | 31/Dec/1962 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 0Y,5M,9D at the time of death |
| **Rearing** | Undetermined | **Local ID** | [29113/NZP-WASH] |

## 18014612 | [NZP-WASH/28449]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Mar/1961 | Purchase ZEEHANDLR/ | In | In | NZP-WASH / 28449 | Death | Out | Out | 31/Dec/1961 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 0Y,9M,23D at the time of death |
| **Rearing** | Undetermined | **Local ID** | [28449/NZP-WASH] |

## 18014995 | [NZP-WASH/10923]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 06/Jul/1922 | Trade From L RUHE/ | In | In | NZP-WASH / 10923 | Death | Out | Out | 28/Jan/1930 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Undetermined / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | Undetermined / 7Y,6M,22D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [3575 or 3595/NZP-WASH] |
| | | **Local ID** | [10923/NZP-WASH] |



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## 18015145 | [NZP-WASH/7755]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/May/1910 | Purchase BARTELS H/ | In | In | NZP-WASH / 7755 | Death | Out | Out | 28/Jul/1910 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | ~ from 16/Nov/1909 to 16/Nov/1909 / 0Y,8M,12D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [1808/NZP-WASH] |
| | | **Local ID** | [7755/NZP-WASH] |

## 18015146 | [NZP-WASH/7756]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/May/1910 | Purchase BARTELS H/ | In | In | NZP-WASH / 7756 | Death | Out | Out | 27/Jul/1910 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Undetermined |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Unknown Location |
| **Enclosure** | - | **Birth Date/Age** | ~ from 16/Nov/1909 to 16/Nov/1909 / 0Y,8M,11D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [1807/NZP-WASH] |
| | | **Local ID** | [7756/NZP-WASH] |

## 2084600 | [MINNESOTA/562]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 21/May/1976 | Loan In From Vendor: CENTERHIL/UNK | In | - | NZP-WASH / 101604 | Loan Transfer To MINNESOTA/562 | Out | - | 09/May/1978 |
| 09/May/1978 | Purchase CENTERHIL/UNK | In | In | MINNESOTA / 562 | Sale DRESDEN Z/ | Out | Out | 17/Nov/1981 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1976 / 5Y,8M,13D at the time of last unconfirmed disposition |
| **Rearing** | Undetermined | **Local ID** | [101604/NZP-WASH] [562/MINNESOTA] |
| | | **Regional Studbook #** | [346-AZA /MINNESOTA] |

## 27069057 | [NZP-CRC/114798]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jun/2002 | Birth/Hatch | In | In | OAKHILL / 222217 | Donation To NASHV ZOO/1822 | Out | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From OAKHILL/222217 | In | In | NASHV ZOO / 1822 | Loan Out To CINCINNAT/105034 | Out | - | 10/Jun/2005 |
| 10/Jun/2005 | Loan In From Sender: NASHV ZOO/1822 Vendor: NASHV ZOO/1822 | In | - | CINCINNAT / 105034 | Loan Transfer To NZP-CRC/UNK | Out | - | 22/May/2012 |
| - | - | - | - | NASHV ZOO / 1822 | Loan Out To (Change in Reported Holder) NZP-CRC/114798 | - | - | 22/May/2012 |
| 22/May/2012 | Loan In From Vendor: NASHV ZOO/1822 | In | - | NZP-CRC / 114798 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 1822 | Donation To (Ownership Only) NZP-WASH/114798 | - | Out | 06/Jun/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Jun/2002 / 14Y,9M,2D |
| **Rearing** | Hand | **House Name** | [Kiri/NASHV ZOO] [Kiri/CINCINNAT] [Kiri/NZP-CRC] |
| **Dam** | [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] | **ID Elsewhere** | [105034/NZP-CRC] |
| | | **Intl Stdbk#** | [1181/NZP-CRC] [1181/CINCINNAT] [1181/NASHV ZOO] [1181/OAKHILL] |
| | | **Local ID** | [114798/NZP-CRC] [105034/CINCINNAT] [222217/OAKHILL] [1822/NASHV ZOO] |
| **Sire** | [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] | **Transponder** | [061-827-568/NZP-CRC] [061-827-568/NASHV ZOO] [061*827*568/CINCINNAT] |

## 3588668 | [NZP-CRC/101600]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/May/1976 | Donation From CENTERHIL/UNK | In | In | NZP-WASH / 101600 | Donation To NZP-CRC/101600 | Out | Out | 25/Aug/1980 |
| 25/Aug/1980 | Donation From NZP-WASH/101600 | In | In | NZP-CRC / 101600 | Death | Out | Out | 09/Nov/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | 04/Mar/1976 / 17Y,8M,5D at the time of death |
| **Rearing** | Undetermined | **House Name** | [TUT/NZP-CRC] [TUT/NZP-WASH] |
| | | **Local ID** | [101600/NZP-CRC] [101600/NZP-WASH] |
| | | **Regional Studbook #** | [347-UNKNOWN /NZP-CRC] |
| | | **Tattoo** | [347 R THIGH/NZP-CRC] |



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## MIG12-25350237 | [NZP-CRC/101968]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Aug/1972 | Purchase FERNDALE/UNK | In | In | DENVER / 00363 | Loan Out To NZP-WASH/101968 | Out | - | 11/May/1977 |
| 11/May/1977 | Loan In From Vendor: DENVER/00363 | In | - | NZP-WASH / 101968 | Loan Transfer To NZP-CRC/101968 | Out | - | 18/Oct/1978 |
| 18/Oct/1978 | Loan In From Vendor: DENVER/00363 | In | - | NZP-CRC / 101968 | Death | Out | - | 07/Apr/1986 |
| - | - | - | - | DENVER / 00363 | Death (Ownership Only) | - | Out | 07/Apr/1986 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Wild Born
**Birth Location** -
**Birth Date/Age** ~ from 31/May/1971 to 02/Jun/1971 / 14Y,10M,6D at the time of death
**Death Number** [37070/NZP-CRC]
**House Name** [CHANTAR/NZP-WASH] [CHANTAR/NZP-CRC] [CHANTAR/DENVER]
**Intl Stdbk#** [223/DENVER]
**Local ID** [101968/NZP-WASH] [101968/NZP-CRC] [00363/DENVER]
**Regional Studbook #** [223-UNKNOWN /NZP-CRC]

## MIG12-28552627 | [NZP-CRC/101969]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Jul/1971 | Purchase FERNDALE/ | In | In | COLO SPRG / 71M009 | Sale DENVER/00044 | Out | Out | 12/Jun/1975 |
| 11/Jun/1975 | Trade From COLO SPRG/71M009 | In | In | DENVER / 00044 | Loan Out To NZP-WASH/101969 | Out | - | 11/May/1977 |
| 11/May/1977 | Loan In From Vendor: DENVER/00044 | In | - | NZP-WASH / 101969 | Loan Transfer To NZP-CRC/101969 | Out | - | 18/Oct/1978 |
| 18/Oct/1978 | Loan In From Vendor: DENVER/00044 | In | - | NZP-CRC / 101969 | Death | Out | - | 24/Mar/1989 |
| - | - | - | - | DENVER / 00044 | Death (Ownership Only) | - | Out | 24/Mar/1989 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [Undetermined / COLO SPRG]
**Sire** [Undetermined / COLO SPRG]

**Birth Type** Undetermined
**Birth Location** Cheyenne Mtn Zoological Park
**Birth Date/Age** ~ from 01/Apr/1971 to 30/Apr/1971 / 17Y,11M,18D at the time of death
**Death Number** [39537/NZP-CRC]
**House Name** [MISHKA/NZP-WASH] [MISHKA/DENVER] [MISHKA/NZP-CRC]
**Intl Stdbk#** [200/DENVER]
**Local ID** [101969/NZP-WASH] [00044/DENVER] [71M009/COLO SPRG] [101969/NZP-CRC]
**Regional Studbook #** [200-UNKNOWN /COLO SPRG] [200-UNKNOWN /NZP-CRC]
**Studbook Name** [MISHKA/COLO SPRG]

## MIG12-29730207 | [NZP-CRC/113879]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jun/2000 | Birth/Hatch | - | In | SANFORD / 1506 | - | - | - | - |
| 20/Jun/2000 | Birth/Hatch Owner: SANFORD/1506 | In | - | OAKHILL / 202019 | Loan Transfer To COLUMBUS/200055 | Out | - | 11/Jul/2000 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) COLUMBUS/200055 | - | - | 11/Jul/2000 |
| 11/Jul/2000 | Loan In From Sender: OAKHILL/202019 Vendor: OAKHILL/202019 | In | - | COLUMBUS / 200055 | Loan Return To Owner OAKHILL/202019 | Out | - | 19/Aug/2001 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) COLUMBUS/200055 | - | - | 18/Aug/2001 |
| 19/Aug/2001 | Loan In From Vendor: SANFORD/1506 | In | - | COLUMBUS / 200055 | Loan Transfer To MINNESOTA/10460 | Out | - | 08/Nov/2001 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) MINNESOTA/10460 | - | - | 08/Nov/2001 |
| 08/Nov/2001 | Loan In From Sender: COLUMBUS/200055 Vendor: SANFORD/1506 | In | - | MINNESOTA / 10460 | Loan Transfer To NZP-WASH/113879 | Out | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1506 | Loan Out To (Change in Reported Holder) NZP-CRC/113879 | - | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1506 | Donation To (Ownership Only) NZP-CRC/113879 | - | Out | 31/Mar/2004 |
| 31/Mar/2004 | Donation From SANFORD/1506 | In | In | NZP-CRC / 113879 | Death | Out | Out | 10/Dec/2015 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: 24467672 | 969105/OAKHILL] [GAN: 24467672 | 969105/OAKHILL] [GAN: 24467672 | 969105/OAKHILL] [GAN: 24467672 | 969105/OAKHILL] [GAN: 24467672 | 969105/OAKHILL]
**Sire** [GAN: MIG12-27681261 | 979711/OAKHILL] [GAN: MIG12-27681261 | 979711/OAKHILL] [GAN: MIG12-27681261 | 979711/OAKHILL] [GAN: MIG12-27681261 | 979711/OAKHILL] [GAN: MIG12-27681261 | 979711/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 20/Jun/2000 / 15Y,5M,20D at the time of death
**House Name** [Nattie/COLUMBUS] [NATTIE/NZP-CRC] [NATTIE/MINNESOTA]
**Intl Stdbk#** [1124/OAKHILL] [1124/NZP-CRC] [1124/SANFORD]
**Local ID** [202019/OAKHILL] [200055/COLUMBUS] [1506/SANFORD] [113879/NZP-CRC] [10460/MINNESOTA]
**Regional Studbook #** [1124-AZA /COLUMBUS] [1124-AZA /MINNESOTA]
**Tattoo** [1124/MINNESOTA] [1124/NZP-CRC]
**Transponder** [00-05FC-4606/COLUMBUS] [00-05FC-4606/MINNESOTA]



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## MIG12-29767641 | [NZP-CRC/113878]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 20/Jun/2000 | Birth/Hatch | In | In | OAKHILL / 202018 | Loan Out To COLUMBUS/200054 | Out | - | 11/Jul/2000 |
| 11/Jul/2000 | Loan In From Sender: OAKHILL/202018 Vendor: OAKHILL/202018 | In | - | COLUMBUS / 200054 | Loan Return To Owner OAKHILL/202018 | Out | - | 18/Aug/2001 |
| - | - | - | - | OAKHILL / 202018 | Trade To (Ownership Only) SANFORD/1514 | - | Out | 18/Aug/2001 |
| 18/Aug/2001 | Trade From Vendor: OAKHILL/202018 | - | In | SANFORD / 1514 | - | - | - | - |
| 19/Aug/2001 | Loan In From Vendor: SANFORD/1514 | In | - | COLUMBUS / 200054 | Loan Transfer To MINNESOTA/10459 | Out | - | 08/Nov/2001 |
| - | - | - | - | SANFORD / 1514 | Loan Out To (Change in Reported Holder) MINNESOTA/10459 | - | - | 08/Nov/2001 |
| 08/Nov/2001 | Loan In From Sender: COLUMBUS/200054 Vendor: SANFORD/1514 | In | - | MINNESOTA / 10459 | Loan Transfer To NZP-WASH/113878 | Out | - | 31/Mar/2004 |
| 31/Mar/2004 | Donation From SANFORD/1514 | In | In | NZP-CRC / 113878 | - | - | - | - |
| - | - | - | - | SANFORD / 1514 | Loan Out To (Change in Reported Holder) NZP-CRC/113878 | - | - | 31/Mar/2004 |
| - | - | - | - | SANFORD / 1514 | Donation To (Ownership Only) NZP-CRC/113878 | - | Out | 31/Mar/2004 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 20/Jun/2000 / 16Y,8M,22D |
| **Rearing** | Hand | **House Name** | [Nellie/COLUMBUS] [NELLIE/MINNESOTA] [NELLIE/NZP-CRC] |
| **Dam** | [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] | **Intl Stdbk#** | [1123/OAKHILL] [1123/NZP-CRC] [1123/SANFORD] |
| | | **Local ID** | [200054/COLUMBUS] [202018/OAKHILL] [10459/MINNESOTA] [1514/SANFORD] [113878/NZP-CRC] |
| | | **Regional Studbook #** | [1123-AZA /COLUMBUS] [1123-AZA /MINNESOTA] |
| **Sire** | [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] | **Tattoo** | [1123/MINNESOTA] |
| | | **Transponder** | [00-05FC-5C01/COLUMBUS] [00-05FC-5C01/MINNESOTA] [00-05FC-501/NZP-CRC] [00-05FC-501/SANFORD] |

## MIG12-29899816 | [NZP-WASH/114146]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jun/2002 | Birth/Hatch | In | In | OAKHILL / 222216 | Donation To NASHV ZOO/1821 | Out | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From OAKHILL/222216 | In | In | NASHV ZOO / 1821 | Loan Out To COLUMBUS/203009 | Out | - | 18/Mar/2003 |
| 18/Mar/2003 | Loan In From Sender: NASHV ZOO/1821 Vendor: NASHV ZOO/1821 | In | - | COLUMBUS / 203009 | Loan Transfer To NZP-WASH/114146 | Out | - | 11/Aug/2006 |
| - | - | - | - | NASHV ZOO / 1821 | Loan Out To (Change in Reported Holder) NZP-WASH/114146 | - | - | 11/Aug/2006 |
| 11/Aug/2006 | Loan In From Vendor: NASHV ZOO/1821 | In | - | NZP-WASH / 114146 | Death | Out | - | 24/Nov/2015 |
| - | - | - | - | NASHV ZOO / 1821 | Death (Ownership Only) | - | Out | 24/Nov/2015 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Jun/2002 / 13Y,5M,12D at the time of death |
| **Rearing** | Hand | **House Name** | [Tai/NZP-WASH] [Tai/NASHV ZOO] [Tai/COLUMBUS] |
| **Dam** | [1081 / OAKHILL] [1081 / OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] | **Intl Stdbk#** | [1180/OAKHILL] [1180/NASHV ZOO] |
| | | **Local ID** | [114146/NZP-WASH] [222216/OAKHILL] [1821/NASHV ZOO] [203009/COLUMBUS] |
| **Sire** | [1093 / OAKHILL] [1093 / OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] | **Regional Studbook #** | [1180-AZA /NZP-WASH] [1180-AZA /COLUMBUS] |
| | | **Transponder** | [00-0639-102C/NZP-WASH] [0639-1D2C/COLUMBUS] |

## MIG12-29899817 | [NZP-WASH/114147]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Feb/2002 | Birth/Hatch | In | In | OAKHILL / 222204 | Loan Out To COLUMBUS/202012 | Out | - | 13/Mar/2002 |
| 13/Mar/2002 | Loan In From Sender: OAKHILL/222204 Vendor: OAKHILL/222204 | In | - | COLUMBUS / 202012 | - | - | - | - |
| 15/Apr/2006 | Ownership Transfer for Animal in on Loan | - | - | COLUMBUS / 202012 | Loan Transfer To NZP-WASH/114147 | Out | - | 11/Aug/2006 |
| 11/Aug/2006 | Purchase FOUTS J/UNK | In | In | NZP-WASH / 114147 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 22/Feb/2002 / 15Y,0M,20D |
| **Rearing** | Hand | **House Name** | [Mook/COLUMBUS] [Mook/NZP-WASH] |
| **Dam** | [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] [GAN: 24467672 \| 969105/OAKHILL] | **ID Elsewhere** | [202012/NZP-WASH] |
| | | **Intl Stdbk#** | [1179/OAKHILL] |
| **Sire** | [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] [GAN: MIG12-27681261 \| 979711/OAKHILL] | **Local ID** | [202012/COLUMBUS] [222204/OAKHILL] [114147/NZP-WASH] |
| | | **Regional Studbook #** | [1179-AZA /COLUMBUS] [1179-AZA /NZP-WASH] |
| | | **Transponder** | [5FD-9C0E/COLUMBUS] [00-05FD-9C0E/NZP-WASH] |



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# Appendix H-Historical Taxon Report-Nashville Zoo

## 27134825 | [KHAOKHEOW/460049]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 23/Apr/2003 | Birth/Hatch | In | In | KHAOKHEOW / 460049 | Trade To NASHV ZOO/2314 | Out | Out | 25/Jan/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 23/Apr/2003 / 1Y,9M,2D at the time of lost ISIS tracking |
| **Rearing** | Parent | **House Name** | [JoGayle/KHAOKHEOW] |
| **Dam** | [GAN: 27179339 \| 410028/KHAOKHEOW] | **Intl Stdbk#** | [1214/KHAOKHEOW] |
| **Sire** | [GAN: 27179338 \| 380038/KHAOKHEOW] | **Local ID** | [460049/KHAOKHEOW] |
| | | **Transponder** | [115324716A/KHAOKHEOW] |

## 27134826 | [NZP-CRC/114246]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/Feb/2004 | Birth/Hatch | In | In | KHAOKHEOW / 470006 | Trade To NASHV ZOO/UNK | Out | Out | 25/Jan/2005 |
| 26/Jan/2005 | Donation From KHAOKHEOW/NONE | In | In | NASHV ZOO / 2313 | Loan Out To NZP-CRC/114246 | Out | - | 16/Sep/2007 |
| 17/Sep/2007 | Loan In From Vendor: NASHV ZOO/2313 | In | - | NZP-CRC / 114246 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 25/Feb/2004 / 13Y,0M,17D |
| **Rearing** | Hand | **House Name** | [dao/KHAOKHEOW] [Dao/NASHV ZOO] [Dao/NZP-CRC] |
| **Dam** | [1188 / KHAOKHEOW] [NONE / KHAOKHEOW] [GAN: 27134835 \| 450066/KHAOKHEOW] | **Intl Stdbk#** | [1218/KHAOKHEOW] [1218/NASHV ZOO] |
| | | **Local ID** | [470006/KHAOKHEOW] [114246/NZP-CRC] [2313/NASHV ZOO] |
| **Sire** | [1186 / KHAOKHEOW] [NONE / KHAOKHEOW] [GAN: 27134834 \| 450105/KHAOKHEOW] | **Old Accession Number** | [2313/NZP-CRC] |
| | | **Transponder** | [122919677/KHAOKHEOW] [122-919-677A/NZP-CRC] [122919677A/NASHV ZOO] |

## MIG12-15188763 | [NASHV ZOO/940003]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/1987 | Birth/Hatch | In | In | SANDIEGOZ / 587029 | Loan Out To CROWN/NONE | Out | - | 08/Oct/1987 |
| - | - | - | - | SANDIEGOZ / 587029 | Loan Out To (Change in Reported Holder) NASHV ZOO/940003 | - | - | 20/Nov/1987 |
| 17/Jan/1992 | Loan In From Vendor: SANDIEGOZ/587029 | In | - | NASHV ZOO / 940003 | - | - | - | - |
| - | - | - | - | SANDIEGOZ / 587029 | Donation To (Ownership Only) NASHV ZOO/940003 | - | Out | 15/Jun/2001 |
| 15/Jun/2001 | Donation From Vendor: SANDIEGOZ/587209 | - | In | NASHV ZOO / 940003 | Death | Out | Out | 13/Jan/2003 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Diego Zoo |
| **Enclosure** | - | **Birth Date/Age** | 07/Mar/1987 / 15Y,10M,6D at the time of death |
| **Rearing** | Parent | **Breeder Number** | [SD 11/SANDIEGOZ] |
| **Dam** | [29175 / SANDIEGOZ] [GAN: 14486221 \| 029175/SANDIEGOZ] | **House Name** | [PU-YING/NASHV ZOO] [PU-YING/SANDIEGOZ] |
| | | **Intl Stdbk#** | [691/NASHV ZOO] [691/SANDIEGOZ] |
| **Sire** | [27999 / SANDIEGOZ] [GAN: 25212848 \| 027999/SANDIEGOZ] | **Local ID** | [940003/NASHV ZOO] [587029/SANDIEGOZ] |
| | | **Studbook Name** | [PU-YING (SD-11)/NASHV ZOO] |
| | | **Tattoo** | [BK-12/NASHV ZOO] [BK12/[Thigh/Inner,Left]/SANDIEGOZ] |

## MIG12-20022497 | [NASHV ZOO/940011]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/1987 | Birth/Hatch | In | In | SANDIEGOZ / 587028 | Loan Out To CROWN/NONE | Out | - | 08/Oct/1987 |
| - | - | - | - | SANDIEGOZ / 587028 | Loan Out To (Change in Reported Holder) NASHV ZOO/940011 | - | - | 20/Nov/1987 |
| 17/Jan/1992 | Loan In From Vendor: SANDIEGOZ/587028 | In | - | NASHV ZOO / 940011 | Death | Out | - | 04/Feb/1994 |
| - | - | - | - | SANDIEGOZ / 587028 | Death (Ownership Only) | - | Out | 04/Feb/1994 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Diego Zoo |
| **Enclosure** | - | **Birth Date/Age** | 07/Mar/1987 / 6Y,10M,28D at the time of death |
| **Rearing** | Undetermined | **Breeder Number** | [SD 10/SANDIEGOZ] |
| **Dam** | [587 / SANDIEGOZ] [GAN: 14486221 \| 029175/SANDIEGOZ] | **House Name** | [PU-CHAI/SANDIEGOZ] [PUYANG/NASHV ZOO] |
| | | **Intl Stdbk#** | [690/SANDIEGOZ] |
| **Sire** | [585 / SANDIEGOZ] [GAN: 25212848 \| 027999/SANDIEGOZ] | **Local ID** | [587028/SANDIEGOZ] [940011/NASHV ZOO] |
| | | **Regional Studbook #** | [690-UNKNOWN /NASHV ZOO] |
| | | **Studbook Name** | [PUYANG/NASHV ZOO] |
| | | **Tattoo** | [BK11/[Thigh/Inner,Left]/SANDIEGOZ] |



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## MIG12-29615646 | [NASHV ZOO/2810]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 01/May/2006 | Birth/Hatch | In | In | KHAOKHEOW / 500007 | Trade To NASHV ZOO/2810 | Out | Out | 19/Feb/2008 |
| 20/Feb/2008 | Donation From KHAOKHEOW/NONE | In | In | NASHV ZOO / 2810 | Donation To TANGAN WP/UNDETERM+ | Out | Out | 01/Nov/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 01/May/2006 / 8Y,6M,0D at the time of last unconfirmed disposition |
| **Rearing** | Hand | **House Name** | [Jing Jai/KHAOKHEOW] [Jing Jai/NASHV ZOO] |
| **Dam** | [MINI / KHAOKHEOW] [GAN: MIG12-28713286 \| 470011/KHAOKHEOW] | **Intl Stdbk#** | [1273/KHAOKHEOW] [1273/NASHV ZOO] |
| | | **Local ID** | [500007/KHAOKHEOW] [2810/NASHV ZOO] |
| **Sire** | [WANCHAI / KHAOKHEOW] [GAN: MIG12-28430022 \| 470005/KHAOKHEOW] | **Transponder** | [900006000006721/KHAOKHEOW] [900006000006721/NASHV ZOO] [096-857-844/NASHV ZOO] |

## MIG12-29615900 | [NASHV ZOO/940326]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/Aug/1993 | Birth/Hatch Owner: SANDIEGOZ/593442 | In | - | CINCINNAT / 193180 | - | - | - | - |
| 27/Aug/1993 | Birth/Hatch | - | In | SANDIEGOZ / 593442 | Donation To CINCINNAT/193180 | - | Out | 04/May/1994 |
| 04/May/1994 | Donation From Vendor: SANDIEGOZ/593442 | - | In | CINCINNAT / 193180 | Donation To NASHV ZOO/940326 | Out | Out | 23/Mar/1995 |
| 23/Mar/1995 | Donation From CINCINNAT/193180 | In | In | NASHV ZOO / 940326 | Loan Out To AUDUB SSC/076 | Out | - | 20/Nov/1998 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940326 | In | - | AUDUB SSC / 076 | Undetermined NASHV ZOO/UNK | Out | - | 10/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940326 | Donation To (Ownership Only) AUDUB SSC/076 | - | Out | 08/Jun/2004 |
| 11/Oct/2005 | Donation From AUDUB SSC/076 | In | In | NASHV ZOO / 940326 | Loan Out To BERENS J/NONE | Out | - | 11/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940326 | Death (Ownership Only) | - | Out | 22/Feb/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Cincinnati Zoo & Botanical Garden |
| **Enclosure** | - | **Birth Date/Age** | 27/Aug/1993 / 17Y,5M,26D at the time of death |
| **Rearing** | Hand | **House Name** | [PAYAK/NASHV ZOO] [Payak/AUDUB SSC] |
| **Dam** | [UNK / UNKNOWN] [GAN: 5043392 \| 190216/CINCINNAT] [GAN: 5043392 \| 190216/CINCINNAT] [GAN: 5043392 \| 90M26/BUFFALO] | **Intl Stdbk#** | [989/NASHV ZOO] [989/CINCINNAT] [989/AUDUB SSC] [989/SANDIEGOZ] |
| | | **Local ID** | [940326/NASHV ZOO] [193180/CINCINNAT] [076/AUDUB SSC] [593442/SANDIEGOZ] |
| | | **Transponder** | [028-571-841/NASHV ZOO] [00-01D3-7ADD/CINCINNAT] [00-01D3-7ADD/NASHV ZOO] [028571841/AUDUB SSC] |
| **Sire** | [UNK / UNKNOWN] [GAN: 26306891 \| 591364/SANDIEGOZ] [GAN: 26306891 \| 191094/CINCINNAT] [GAN: 26306891 \| 191094/CINCINNAT] | | |

## MIG12-29823526 | [NASHV ZOO/2809]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/Nov/2006 | Birth/Hatch | In | In | KHAOKHEOW / 500014 | Trade To NASHV ZOO/2809 | Out | Out | 19/Feb/2008 |
| 20/Feb/2008 | Donation From KHAOKHEOW/NONE | In | In | NASHV ZOO / 2809 | Donation To TANGAN WP/UNDETERM+ | Out | Out | 01/Nov/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 24/Nov/2006 / 7Y,11M,8D at the time of last unconfirmed disposition |
| **Rearing** | Hand | **House Name** | [Arun/NASHV ZOO] [Tum Yam / Arun/KHAOKHEOW] |
| **Dam** | [NUMFUN / KHAOKHEOW] [GAN: MIG12-28430016 \| 420028/KHAOKHEOW] | **Intl Stdbk#** | [1279/KHAOKHEOW] [1279/NASHV ZOO] |
| | | **Local ID** | [2809/NASHV ZOO] [500014/KHAOKHEOW] |
| **Sire** | [SONGKHLA / KHAOKHEOW] [GAN: MIG12-28430043 \| 470008/KHAOKHEOW] | **Transponder** | [048*522*537/NASHV ZOO] [900006000006680/NASHV ZOO] [900006000006680/KHAOKHEOW] |

## MIG12-29823528 | [NASHV ZOO/3247]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/2009 | Birth/Hatch | In | In | KHAOKHEOW / 520048 | Trade To NASHV ZOO/3247 | Out | Out | ~ from 24/Feb/2010 to 24/Apr/2010 |
| 01/Apr/2010 | Donation From KHAOKHEOW/UNKNOWN | In | In | NASHV ZOO / 3247 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Khao Kheow Open Zoo |
| **Enclosure** | - | **Birth Date/Age** | 27/May/2009 / 7Y,9M,15D |
| **Rearing** | Hand | **House Name** | [Lom Choy/KHAOKHEOW] [Lom Choy/NASHV ZOO] |
| **Dam** | [UNKNOWN / KHAOKHEOW] [GAN: MIG12-28713525 \| 500075/KHAOKHEOW] | **Intl Stdbk#** | [1441/KHAOKHEOW] [1441/NASHV ZOO] |
| | | **Local ID** | [520048/KHAOKHEOW] [3247/NASHV ZOO] |
| **Sire** | [UNKNOWN / KHAOKHEOW] [GAN: MIG12-28430031 \| 500013/KHAOKHEOW] | **Transponder** | [900012000576950/KHAOKHEOW] [048*124*832/NASHV ZOO] |



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## 1130951 | [CLEVELAND/950810]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/Aug/1995 | Birth/Hatch | In | In | CLEVELAND / 950810 | Loan Out To NASHV ZOO/1797 | Out | - | 18/Feb/2002 |
| 18/Feb/2002 | Loan In From Sender: CLEVELAND/950810 Vendor: CLEVELAND/950810 | In | - | NASHV ZOO / 1797 | Loan Return To Owner CLEVELAND/950810 | Out | - | 04/Apr/2002 |
| 04/Apr/2002 | Loan Return to Us Sender: NASHV ZOO/1797 | In | - | CLEVELAND / 950810 | Death | Out | Out | 18/Apr/2002 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-28977178 | 880911/CLEVELAND] [GAN: MIG12-28977178 | 880911/CLEVELAND]
**Sire** [GAN: MIG12-29022792 | 880910/CLEVELAND] [GAN: MIG12-29022792 | 880910/CLEVELAND]

**Birth Type** Captive Born
**Birth Location** Cleveland Metroparks Zoo
**Birth Date/Age** 16/Aug/1995 / 6Y,8M,2D at the time of death
**House Name** [SHANGDI/CLEVELAND] [SHANGDI/NASHV ZOO]
**Intl Stdbk#** [1053/CLEVELAND] [1053/NASHV ZOO]
**Local ID** [950810/CLEVELAND] [1797/NASHV ZOO]
**Transponder** [00001716CA/CLEVELAND] [00001716CA/NASHV ZOO]

## 12104325 | [NASHV ZOO/940007]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1992 | Birth/Hatch | In | In | NASHV ZOO / 940007 | Loan Out To FOUTS J/NONE | Out | - | 12/Jan/2004 |
| 19/Jul/2005 | Loan In From Vendor: NASHV ZOO/940007 | In | - | TULSA / 15063 | Loan Return To Owner NASHV ZOO/940007 | Out | - | 10/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940007 | Loan Out To (Change in Reported Holder) BERENS J/NONE | - | - | 11/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940007 | Death (Ownership Only) | - | Out | 04/Sep/2012 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-6262463 | 940009/NASHV ZOO] [GAN: MIG12-6262463 | 940009/NASHV ZOO]
**Sire** [GAN: 20022635 | 940012/NASHV ZOO] [GAN: 20022635 | 940012/NASHV ZOO]

**Birth Type** Captive Born
**Birth Location** Nashville Zoo at Grassmere
**Birth Date/Age** 28/Feb/1992 / 20Y,6M,7D at the time of death
**House Name** [MATTIE/NASHV ZOO] [Mattie/TULSA]
**Intl Stdbk#** [938/NASHV ZOO] [938/TULSA]
**Local ID** [940007/NASHV ZOO] [15063/TULSA]
**Old Accession Number** [HVH14-04539-IC/TULSA]
**Studbook Name** [MATTIE/NASHV ZOO]
**Undetermined** [ISIS# 15063/TULSA]

## 12373803 | [NZP-CRC/113959]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Jan/2005 | Trade From KHAOKHEOW/460049 | In | In | NASHV ZOO / 2314 | Donation To NZP-CRC/113959 | Out | Out | 24/Feb/2005 |
| 24/Feb/2005 | Donation From NASHV ZOO/2314 | In | In | NZP-CRC / 113959 | Donation To NASHV ZOO/2314 | Out | Out | 20/Sep/2006 |
| 20/Sep/2006 | Donation From NZP-CRC/113959 | In | In | NASHV ZOO / 2314 | Loan Out To NZP-CRC/113959 | Out | - | 16/Sep/2007 |
| 17/Sep/2007 | Loan In From Vendor: NASHV ZOO/2314 | In | - | NZP-CRC / 113959 | - | - | - | - |

**Sex/Contraception** Female / Medical method- surgical(Active)
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [1148 / KHAOKHEOW] [1148 / KHAOKHEOW]
**Sire** [1147 / KHAOKHEOW] [1147 / KHAOKHEOW]

**Birth Type** Captive Born
**Birth Location** Khao Kheow Open Zoo
**Birth Date/Age** 23/Feb/2003 / 14Y,0M,19D
**House Name** [Jo Gayle/NASHV ZOO] [Jo Gayle/NZP-CRC]
**Intl Stdbk#** [1214/NASHV ZOO] [1214/NZP-CRC]
**Local ID** [2314/NASHV ZOO] [113959/NZP-CRC]
**Old Accession Number** [2314 at Nashville Zoo/NZP-CRC]
**Tattoo** [1214/NZP-CRC]
**Transponder** [115324716A/NASHV ZOO] [115-324-716A/NZP-CRC]

## 20021422 | [NASHV ZOO/940014]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/1991 | Donation From SCHWARTZ/ | In | In | NASHV ZOO / 940014 | Donation To FOUTS J/UNK | Out | Out | 05/Sep/1992 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 02/Mar/1990 / 2Y,6M,3D at the time of lost ISIS tracking
**House Name** [NIMBUS/NASHV ZOO]
**Local ID** [940014/NASHV ZOO]
**Regional Studbook #** [906-UNKNOWN /NASHV ZOO]
**Studbook Name** [TORY/NASHV ZOO]

## 20021423 | [NASHV ZOO/940016]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Sep/1991 | Loan In From Vendor: SCHWARTZ/ | In | - | NASHV ZOO / 940016 | Death | Out | - | 16/Aug/1992 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 02/Aug/1991 / 1Y,0M,14D at the time of death
**House Name** [SHAWNI/NASHV ZOO]
**Local ID** [940016/NASHV ZOO]
**Regional Studbook #** [911-UNKNOWN /NASHV ZOO]
**Studbook Name** [SHAWNI/NASHV ZOO]



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### 20021425 | [NASHV ZOO/940025]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Oct/1992 | Birth/Hatch | In | In | NASHV ZOO / 940025 | Death | Out | Out | 03/Oct/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 03/Oct/1992 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [6/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940025/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |

### 20021426 | [NASHV ZOO/940026]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Oct/1992 | Birth/Hatch | In | In | NASHV ZOO / 940026 | Death | Out | Out | 03/Oct/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 03/Oct/1992 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [7/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940026/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |

### 20021427 | [NASHV ZOO/940027]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Feb/1993 | Birth/Hatch | In | In | NASHV ZOO / 940027 | Death | Out | Out | 18/Feb/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 18/Feb/1993 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [8/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940027/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |

### 20021428 | [NASHV ZOO/940028]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Feb/1993 | Birth/Hatch | In | In | NASHV ZOO / 940028 | Death | Out | Out | 18/Feb/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 18/Feb/1993 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [9/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940028/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |

### 20021429 | [NASHV ZOO/940029]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Feb/1993 | Birth/Hatch | In | In | NASHV ZOO / 940029 | Death | Out | Out | 18/Feb/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 18/Feb/1993 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [10/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940029/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |

### 20021430 | [NASHV ZOO/940030]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Feb/1993 | Birth/Hatch | In | In | NASHV ZOO / 940030 | Death | Out | Out | 18/Feb/1993 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 18/Feb/1993 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [11/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940030/NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | | |



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### 20021431 | [NASHV ZOO/940031]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/May/1993 | Donation From CENTERHIL/ | In | In | NASHV ZOO / 940031 | Donation To CFEC/NONE | Out | Out | 12/Jul/1994 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | ~ from 01/Jan/1989 to 31/Dec/1989 / 5Y,1M,19D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [BURMA/NASHV ZOO] |
| | | **Local ID** | [940031/NASHV ZOO] |

### 20021432 | [NASHV ZOO/940032]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/May/1993 | Loan In From Vendor: CENTERHIL/ | In | - | NASHV ZOO / 940032 | Loan Transfer To PUBLIC/NONE | Out | - | 13/Apr/1994 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Rare Feline Breeding Compound |
| **Enclosure** | - | **Birth Date/Age** | ~ from 01/Jan/1988 to 31/Dec/1988 / 5Y,10M,21D at the time of lost ISIS tracking |
| **Rearing** | Undetermined | **House Name** | [LANKA/NASHV ZOO] |
| | | **Local ID** | [940032/NASHV ZOO] |

### 20021682 | [NASHV ZOO/940015]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/1992 | Birth/Hatch | In | In | NASHV ZOO / 940015 | Death | Out | Out | 26/Jan/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 27/May/1992 / 8Y,7M,30D at the time of death |
| **Rearing** | Hand | **House Name** | [SHANOBI/NASHV ZOO] |
| **Dam** | [GAN: MIG12-15188763 \| 940003/NASHV ZOO] | **Intl Stdbk#** | [937/NASHV ZOO] |
| **Sire** | [GAN: MIG12-27296538 \| 940017/NASHV ZOO] | **Local ID** | [940015/NASHV ZOO] |
| | | **Studbook Name** | [SHANOBI/NASHV ZOO] |

### 20021683 | [NASHV ZOO/940018]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/1992 | Birth/Hatch | In | In | NASHV ZOO / 940018 | Donation To HEXAGON/UNK | Out | Out | 17/Nov/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 27/May/1992 / 0Y,5M,21D at the time of lost ISIS tracking |
| **Rearing** | Hand | **Local ID** | [940018/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Regional Studbook #** | [913-UNKNOWN /NASHV ZOO] |
| **Sire** | [GAN: 20022635 \| 940012/NASHV ZOO] | **Studbook Name** | [UNK/NASHV ZOO] |

### 20021684 | [NASHV ZOO/940019]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/May/1992 | Birth/Hatch | In | In | NASHV ZOO / 940019 | Donation To HEXAGON/UNK | Out | Out | 17/Nov/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 27/May/1992 / 0Y,5M,21D at the time of lost ISIS tracking |
| **Rearing** | Hand | **Local ID** | [940019/NASHV ZOO] |
| **Dam** | [GAN: MIG12-15188763 \| 940003/NASHV ZOO] | **Regional Studbook #** | [914-UNKNOWN /NASHV ZOO] |
| **Sire** | [GAN: MIG12-27296538 \| 940017/NASHV ZOO] | **Studbook Name** | [UNK/NASHV ZOO] |

### 20021685 | [NASHV ZOO/940021]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/May/1990 | Birth/Hatch | In | In | NASHV ZOO / 940021 | Death | Out | Out | 16/May/1990 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 16/May/1990 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940021/NASHV ZOO] |
| **Sire** | [GAN: 20022316 \| 940023/NASHV ZOO] | **Regional Studbook #** | [907-UNKNOWN /NASHV ZOO] |



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## 20021686 | [NASHV ZOO/940022]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 16/May/1990 | Birth/Hatch | In | In | NASHV ZOO / 940022 | Death | Out | Out | 16/May/1990 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 16/May/1990 / 0Y,0M,0D at the time of death |
| **Rearing** | Parent | **Death Number** | [2/NASHV ZOO] |
| **Dam** | [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Local ID** | [940022/NASHV ZOO] |
| **Sire** | [GAN: 20022316 \| 940023/NASHV ZOO] | **Regional Studbook #** | [908-UNKNOWN /NASHV ZOO] |

## 20021687 | [NASHV ZOO/940024]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 02/Aug/1991 | Birth/Hatch | In | In | NASHV ZOO / 940024 | Death | Out | Out | 16/Aug/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 02/Aug/1991 / 1Y,0M,14D at the time of death |
| **Rearing** | Hand | **Death Number** | [5/NASHV ZOO] |
| **Dam** | [GAN: MIG12-15188763 \| 940003/NASHV ZOO] | **House Name** | [JAKE/NASHV ZOO] |
| **Sire** | [GAN: 20022957 \| 940020/NASHV ZOO] | **Local ID** | [940024/NASHV ZOO] |
| | | **Regional Studbook #** | [912-UNKNOWN /NASHV ZOO] |
| | | **Studbook Name** | [UNK/NASHV ZOO] |

## 20022316 | [NASHV ZOO/940023]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 17/Jan/1992 | Loan In From Vendor: SCHWARTZ/ | In | - | NASHV ZOO / 940023 | Death | Out | - | 07/Jul/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Diego Zoo |
| **Enclosure** | - | **Birth Date/Age** | 20/Jun/1988 / 4Y,0M,17D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [4/NASHV ZOO] |
| **Dam** | [587 / SANDIEGOZ] [GAN: 14486221 \| 029175/SANDIEGOZ] | **House Name** | [BOY/NASHV ZOO] |
| | | **Local ID** | [940023/NASHV ZOO] |
| **Sire** | [586 / SANDIEGOZ] [GAN: 23048186 \| 028000/SANDIEGOZ] | **Regional Studbook #** | [788-UNKNOWN /NASHV ZOO] |
| | | **Studbook Name** | [TJORN/NASHV ZOO] [UNK/NASHV ZOO] |

## 20022635 | [NASHV ZOO/940012]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/1991 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940012 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940012 | Loan Out To TIGER HAV/NONE | Out | - | 18/Sep/2002 |
| - | - | - | - | NASHV ZOO / 940012 | Death (Ownership Only) | - | Out | 14/Dec/2005 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Jamaica / Hanover (en) (parish) (JM) |
| **Enclosure** | - | **Birth Date/Age** | 02/Mar/1990 / 15Y,9M,12D at the time of death |
| **Rearing** | Hand | **House Name** | [Stratos/NASHV ZOO] [TAI/NASHV ZOO] |
| | | **Intl Stdbk#** | [904/NASHV ZOO] |
| | | **Local ID** | [940012/NASHV ZOO] |
| | | **Studbook Name** | [KAI/NASHV ZOO] |

## 20022640 | [NASHV ZOO/940006]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 17/Jan/1992 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940006 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940006 | Death | Out | Out | 10/Feb/2003 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Jamaica / Hanover (en) (parish) (JM) |
| **Enclosure** | - | **Birth Date/Age** | 14/Aug/1990 / 12Y,5M,27D at the time of death |
| **Rearing** | Hand | **House Name** | [CHLOE/NASHV ZOO] |
| | | **Intl Stdbk#** | [909/NASHV ZOO] |
| | | **Local ID** | [940006/NASHV ZOO] |
| | | **Studbook Name** | [CHLOE/NASHV ZOO] |



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## 20022957 | [NASHV ZOO/940020]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 17/Jan/1992 | Loan In From Vendor: SCHWARTZ/ | In | - | NASHV ZOO / 940020 | Death | Out | - | 31/Jul/1992 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | San Antonio Zoological Gardens & Aquar |
| **Enclosure** | - | **Birth Date/Age** | 02/Aug/1987 / 4Y,11M,29D at the time of death |
| **Rearing** | Undetermined | **Death Number** | [3/NASHV ZOO] |
| | | **House Name** | [DUTCH/NASHV ZOO] |
| | | **Local ID** | [940020/NASHV ZOO] |
| | | **Regional Studbook #** | [671-UNKNOWN /NASHV ZOO] |
| | | **Studbook Name** | [UNK/NASHV ZOO] |

## 26037282 | [NASHV ZOO/1677]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Jul/1999 | Birth/Hatch | In | In | OAKHILL / 999912 | Loan Out To COLUMBUS/992041 | Out | - | 30/Jul/1999 |
| 30/Jul/1999 | Loan In From Sender: OAKHILL/999912 Vendor: OAKHILL/999912 | In | - | COLUMBUS / 992041 | Loan Transfer To NASHVILLE/1677 | Out | - | 25/Mar/2001 |
| - | - | - | - | OAKHILL / 999912 | Loan Out To (Change in Reported Holder) NASHV ZOO/1677 | - | - | 25/Mar/2001 |
| 25/Mar/2001 | Loan In From Vendor: OAKHILL/999912 | In | - | NASHV ZOO / 1677 | Loan Transfer To KAMI GUN/NN003 | Out | - | 18/Jan/2003 |
| - | - | - | - | OAKHILL / 999912 | Sale (Ownership Only) KAMI GUN/NN003 | - | Out | 18/Jan/2003 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 07/Jul/1999 / 3Y,6M,11D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Shoo Shoo/NASHV ZOO] [Shoo Shoo/COLUMBUS] |
| **Dam** | [1033 / OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] | **Intl Stdbk#** | [1104/NASHV ZOO] [1104/OAKHILL] [1104/COLUMBUS] |
| | | **Local ID** | [1677/NASHV ZOO] [999912/OAKHILL] [992041/COLUMBUS] |
| | | **Transponder** | [00-01C5-D3DC/NASHV ZOO] [00-01C5-D3DC/COLUMBUS] |
| **Sire** | [1034 / OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] | | |

## 26306891 | [NASHV ZOO/701]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Jul/1990 | Birth/Hatch | In | In | OMAHA / 5725 | Trade To SANDIEGOZ/591364 | Out | Out | 17/Apr/1991 |
| 17/Apr/1991 | Loan In From Vendor: OMAHA/5725 | In | - | CINCINNAT / 191094 | Loan Transfer To SANDIEGOZ/591364 | Out | - | 22/May/1991 |
| 22/May/1991 | Loan In From Sender: SANDIEGOZ/591364 Vendor: SANDIEGOZ/591364 | In | - | CINCINNAT / 191094 | Loan Transfer To NASHV ZOO/701 | Out | - | 20/Aug/1998 |
| 22/May/1991 | Trade From OMAHA/5725 | In | In | SANDIEGOZ / 591364 | Loan Out To CINCINNAT/191094 | Out | - | 22/May/1991 |
| - | - | - | - | SANDIEGOZ / 591364 | Trade To (Ownership Only) NASHV ZOO/701 | - | Out | 20/Aug/1998 |
| 21/Aug/1998 | Loan In From Sender: CINCINNAT/191094 Vendor: SANDIEGOZ/591364 | In | - | NASHV ZOO / 701 | Death | Out | - | 02/Nov/1998 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Omaha's Henry Doorly Zoo |
| **Enclosure** | - | **Birth Date/Age** | 18/Jul/1990 / 8Y,3M,15D at the time of death |
| **Rearing** | Undetermined | **House Name** | [OMAHA/NASHV ZOO] |
| **Dam** | [UNK / UNKNOWN] [GAN: 6080917 \| 5129/OMAHA] [GAN: 6080917 \| 5129/OMAHA] [GAN: 6080917 \| 5129/OMAHA] | **Intl Stdbk#** | [839/SANDIEGOZ] [839/NASHV ZOO] [839/CINCINNAT] |
| | | **Local ID** | [591364/SANDIEGOZ] [701/NASHV ZOO] [191094/CINCINNAT] [5725/OMAHA] |
| | | **Old Accession Number** | [191094/NASHV ZOO] [5725/NASHV ZOO] |
| **Sire** | [UNK / UNKNOWN] [GAN: 6257631 \| 5128/OMAHA] [GAN: 6257631 \| 5128/OMAHA] [GAN: 6257631 \| 5128/OMAHA] | **Regional Studbook #** | [839-UNKNOWN /OMAHA] |
| | | **Transponder** | [00-012b-271e/NASHV ZOO] [00-012B-271E/CINCINNAT] |

## 26979184 | [NZP-CRC/114487]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/2009 | Birth/Hatch | In | In | NASHV ZOO / 3147 | Donation To NZP-CRC/UNK | Out | Out | 28/Oct/2009 |
| 30/Oct/2009 | Donation From NASHV ZOO/3147 | In | In | NZP-CRC / 114487 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 30/May/2009 / 7Y,9M,14D |
| **Rearing** | Hand | **House Name** | [Sita/NASHV ZOO] [Sita/NZP-CRC] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1444/NASHV ZOO] [1444/NZP-CRC] |
| | | **Local ID** | [3147/NASHV ZOO] [114487/NZP-CRC] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | | |



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## 27069057 | [NZP-CRC/114798]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jun/2002 | Birth/Hatch | In | In | OAKHILL / 222217 | Donation To NASHV ZOO/1822 | Out | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From OAKHILL/222217 | In | In | NASHV ZOO / 1822 | Loan Out To CINCINNAT/105034 | Out | - | 10/Jun/2005 |
| 10/Jun/2005 | Loan In From Sender: NASHV ZOO/1822 Vendor: NASHV ZOO/1822 | In | - | CINCINNAT / 105034 | Loan Transfer To NZP-CRC/UNK | Out | - | 22/May/2012 |
| - | - | - | - | NASHV ZOO / 1822 | Loan Out To (Change in Reported Holder) NZP-CRC/114798 | - | - | 22/May/2012 |
| 22/May/2012 | Loan In From Vendor: NASHV ZOO/1822 | In | - | NZP-CRC / 114798 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 1822 | Donation To (Ownership Only) NZP-WASH/114798 | - | Out | 06/Jun/2012 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 989813/OAKHILL]
**Sire** [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 999918/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 12/Jun/2002 / 14Y,9M,2D
**House Name** [Kiri/NASHV ZOO] [Kiri/CINCINNAT] [Kiri/NZP-CRC]
**ID Elsewhere** [105034/NZP-CRC]
**Intl Stdbk#** [1181/NZP-CRC] [1181/CINCINNAT] [1181/NASHV ZOO] [1181/OAKHILL]
**Local ID** [114798/NZP-CRC] [105034/CINCINNAT] [222217/OAKHILL] [1822/NASHV ZOO]
**Transponder** [061-827-568/NZP-CRC] [061-827-568/NASHV ZOO] [061*827*568/CINCINNAT]

## 3140326 | [AUDUB SSC/075]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 06/May/1991 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940005 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940005 | Loan Out To AUDUB SSC/075 | Out | - | 20/Nov/1998 |
| - | - | - | - | NASHV ZOO / 940005 | Donation To (Ownership Only) AUDUB SSC/075 | - | Out | 08/Jun/2004 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940005 | In | - | AUDUB SSC / 075 | Death | Out | - | 24/Oct/2004 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [UNK / UNKNOWN]
**Sire** [UNK / UNKNOWN]

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 21/Mar/1989 / 15Y,7M,3D at the time of death
**House Name** [Tajha/AUDUB SSC] [TAJHA/NASHV ZOO]
**Intl Stdbk#** [903/AUDUB SSC] [903/NASHV ZOO]
**Local ID** [940005/NASHV ZOO] [075/AUDUB SSC]
**Studbook Name** [TAJHA/NASHV ZOO]
**Tattoo** [JC8/AUDUB SSC]
**Transponder** [028055018/AUDUB SSC] [00-0611-2931/AUDUB SSC] [028-055-018/NASHV ZOO]

## 5749978 | [AUDUB SSC/074]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 06/May/1991 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940004 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940004 | Loan Out To AUDUB SSC/074 | Out | - | 20/Nov/1998 |
| - | - | - | - | NASHV ZOO / 940004 | Donation To (Ownership Only) AUDUB SSC/074 | - | Out | 08/Jun/2004 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940004 | In | - | AUDUB SSC / 074 | Death | Out | - | 19/Sep/2002 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [691 / STUDBOOK] [UNK / UNKNOWN]
**Sire** [671: / STUDBOOK] [UNK / UNKNOWN]

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 21/Mar/1989 / 15Y,2M,18D at the time of death
**House Name** [Mitra/AUDUB SSC] [MITRA/NASHV ZOO]
**Intl Stdbk#** [902/AUDUB SSC] [902/NASHV ZOO]
**Local ID** [940004/NASHV ZOO] [074/AUDUB SSC]
**Studbook Name** [MITRA/NASHV ZOO]
**Tattoo** [JC6/AUDUB SSC]
**Transponder** [028036051/AUDUB SSC] [028-036-051/NASHV ZOO]

## 5749980 | [AUDUB SSC/079]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Sep/1991 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940010 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940010 | Loan Out To AUDUB SSC/079 | Out | - | 20/Nov/1998 |
| - | - | - | - | NASHV ZOO / 940010 | Donation To (Ownership Only) AUDUB SSC/079 | - | Out | 08/Jun/2004 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940010 | In | - | AUDUB SSC / 079 | Death | Out | - | 15/Mar/2005 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [UNK / UNKNOWN]
**Sire** [UNK / UNKNOWN]

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 02/Aug/1991 / 13Y,7M,13D at the time of death
**House Name** [Cincy/AUDUB SSC] [CINCY/NASHV ZOO]
**Intl Stdbk#** [910/AUDUB SSC] [910/NASHV ZOO]
**Local ID** [079/AUDUB SSC] [940010/NASHV ZOO]
**Studbook Name** [CINCY/NASHV ZOO]
**Transponder** [028047025/AUDUB SSC] [028-047-025/NASHV ZOO]



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## 7961493 | [NASHV ZOO/2001]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Feb/2003 | Birth/Hatch Owner: CLEVELAND/UNK | In | - | OAKHILL / 232301 | Loan Transfer To NASHV ZOO/2001 | Out | - | 24/Feb/2003 |
| 24/Feb/2003 | Loan In From Sender: OAKHILL/232301 Vendor: CLEVELAND/M30228 | In | - | NASHV ZOO / 2001 | - | - | - | - |
| 26/Oct/2012 | Donation From Vendor: CLEVELAND/M30228 | - | In | NASHV ZOO / 2001 | Donation To BERENS J/UNDETERM+ | Out | Out | 24/Nov/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Feb/2003 / 9Y,9M,12D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Ming/NASHV ZOO] |
| **Dam** | [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] | **Intl Stdbk#** | [1208/OAKHILL] [1208/NASHV ZOO] |
| | | **Local ID** | [232301/OAKHILL] [2001/NASHV ZOO] |
| **Sire** | [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] | **Transponder** | [062-004-375/NASHV ZOO] |

## 7961494 | [NASHV ZOO/2002]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Feb/2003 | Birth/Hatch | - | In | CLEVELAND / M30229 | - | - | - | - |
| 12/Feb/2003 | Birth/Hatch Owner: CLEVELAND/UNK | In | - | OAKHILL / 232302 | Loan Transfer To NASHV ZOO/2002 | Out | - | 24/Feb/2003 |
| - | - | - | - | CLEVELAND / M30229 | Loan Out To (Change in Reported Holder) NASHV ZOO/2002 | - | - | 24/Feb/2003 |
| 24/Feb/2003 | Loan In From Sender: OAKHILL/232302 Vendor: CLEVELAND/M30229 | In | - | NASHV ZOO / 2002 | - | - | - | - |
| - | - | - | - | CLEVELAND / M30229 | Donation To (Ownership Only) NASHV ZOO/2002 | - | Out | 26/Oct/2012 |
| 26/Oct/2012 | Donation From Vendor: CLEVELAND/M30229 | - | In | NASHV ZOO / 2002 | Donation To BERENS J/UNDETERM+ | Out | Out | 24/Nov/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Feb/2003 / 9Y,9M,12D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Mei/NASHV ZOO] |
| **Dam** | [GAN: 6157631 \| 989813/OAKHILL] [GAN: 6157631 \| 989813/OAKHILL] | **Intl Stdbk#** | [1209/OAKHILL] [1209/NASHV ZOO] |
| | | **Local ID** | [M30229/CLEVELAND] [232302/OAKHILL] [2002/NASHV ZOO] |
| **Sire** | [GAN: 25605810 \| 999918/OAKHILL] [GAN: 25605810 \| 999918/OAKHILL] | **Transponder** | [062-532-604/NASHV ZOO] |

## DBM12-00056 | [CLEVELAND/M30228]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Feb/2003 | Birth/Hatch | - | In | CLEVELAND / M30228 | - | - | - | - |
| - | - | - | - | CLEVELAND / M30228 | Loan Out To (Change in Reported Holder) NASHV ZOO/2001 | - | - | 24/Feb/2003 |
| - | - | - | - | CLEVELAND / M30228 | Donation To (Ownership Only) NASHV ZOO/2001 | - | Out | 26/Oct/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 12/Feb/2003 / 9Y,8M,14D at the time of last unconfirmed disposition |
| **Rearing** | - | **Local ID** | [M30228/CLEVELAND] |
| **Dam** | [GAN: 6157631 \| 989813/OAKHILL] | | |
| **Sire** | [GAN: 25605810 \| 990312/CLEVELAND] | | |

## MGH13-00079 | [TORONTO/47588]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/2013 | Birth/Hatch | In | In | NZP-CRC / 114879 | Donation To NASHV ZOO/4087 | Out | Out | 20/Jun/2013 |
| 20/Jun/2013 | Donation From NZP-CRC/114879 | In | In | NASHV ZOO / 4087 | Loan Out To NZP-CRC/UNDETERM+ | Out | - | 27/Feb/2014 |
| 27/Feb/2014 | Loan In From Vendor: NASHV ZOO/4087 | In | - | NZP-CRC / 114879 | Loan Transfer To TORONTO/47588 | Out | - | 30/Jul/2014 |
| 30/Jul/2014 | Donation From Sender: NZP-CRC/114879 Vendor: NASHV ZOO/4087 | In | In | TORONTO / 47588 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 4087 | Donation To (Ownership Only) TORONTO/UNDETERM+ | - | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/2013 / 4Y,1M,9D |
| **Rearing** | Hand | **House Name** | [MINGMA/TORONTO] [Mingma/NZP-CRC] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1609/TORONTO] [1609/NZP-CRC] |
| | | **Local ID** | [47588/TORONTO] [4087/NASHV ZOO] [114879/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] | **Transponder** | [4B001A096A/TORONTO] [4B001A096A/NZP-CRC] |



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## MGH13-00080 | [NASHV ZOO/4088]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Feb/2013 | Birth/Hatch | In | In | NZP-CRC / 114880 | Donation To NASHV ZOO/UNK | Out | Out | 20/Jun/2013 |
| 20/Jun/2013 | Donation From NZP-CRC/114880 | In | In | NASHV ZOO / 4088 | Donation To SANDWICH/UNDETERM+ | Out | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 05/Feb/2013 / 1Y,5M,25D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Kali/NZP-CRC] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1610/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] | **Local ID** | [114880/NZP-CRC] [4088/NASHV ZOO] |
| | | **Transponder** | [4B1400356D/NZP-CRC] |

## MIG12-11904827 | [NASHV ZOO/2317]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | In | In | TACOMA / T03M02 | Loan Out To NASHV ZOO/2317 | Out | - | 17/Feb/2005 |
| 17/Feb/2005 | Loan In From Sender: TACOMA/T03M02 Vendor: TACOMA/T03M02 | In | - | NASHV ZOO / 2317 | Death | Out | - | 06/Oct/2006 |
| - | - | - | - | TACOMA / T03M02 | Death (Ownership Only) | - | Out | 06/Oct/2006 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Point Defiance Zoo & Aquarium |
| **Enclosure** | - | **Birth Date/Age** | 03/Apr/2003 / 3Y,6M,3D at the time of death |
| **Rearing** | Hand | **House Name** | [Kwanjai/NASHV ZOO] [KWAN JAI/TACOMA] |
| **Dam** | [GAN: 2425883 \| 98M018/TACOMA] [GAN: 2425883 \| 98M018/TACOMA] | **Intl Stdbk#** | [1212/NASHV ZOO] |
| | | **Local ID** | [2317/NASHV ZOO] [T03M02/TACOMA] |
| **Sire** | [GAN: MIG12-29404008 \| 98M006/TACOMA] [GAN: MIG12-29404008 \| 98M006/TACOMA] | **Regional Studbook #** | [1210-AZA /TACOMA] |
| | | **Tattoo** | [00-0630-F740/NASHV ZOO] |
| | | **Transponder** | [00-0630-F740/TACOMA] |

## MIG12-27296538 | [AUDUB SSC/080]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Sep/1988 | Birth/Hatch | In | In | BATONROUG / M1979 | Loan Out To AUDUBON/1030 | Out | - | 19/Dec/1989 |
| 19/Dec/1989 | Loan In From Vendor: BATONROUG/M1979 | In | - | AUDUBON / 1030 | Loan Return To Owner BATONROUG/M1979 | Out | - | 28/Jun/1990 |
| 28/Jun/1990 | Loan Return to Us Sender: AUDUBON/1030 | In | - | BATONROUG / M1979 | Loan Out To MONROE/221980 | Out | - | 17/Aug/1990 |
| 17/Aug/1990 | Loan In From Vendor: BATONROUG/M1979 | In | - | MONROE / 221980 | Loan Return To Owner BATONROUG/1797 | Out | - | 06/Nov/1991 |
| 06/Nov/1991 | Loan Return to Us Sender: MONROE/221980 | In | - | BATONROUG / M1979 | Loan Out To NASHV ZOO/940017 | Out | - | 30/Jan/1992 |
| 30/Jan/1992 | Loan In From Sender: BATONROUG/M1979 Vendor: BATONROUG/M1979 | In | - | NASHV ZOO / 940017 | Loan Transfer To AUDUB SSC/080 | Out | - | 20/Nov/1998 |
| 20/Nov/1998 | Loan Return to Us Sender: NASHV ZOO/940017 | In | - | BATONROUG / M1979 | Loan Out To AUDUB SSC/080 | Out | - | 20/Nov/1998 |
| 20/Nov/1998 | Loan In From Vendor: BATONROUG/M1979 | In | - | AUDUB SSC / 080 | Death | Out | - | 28/Jul/2001 |
| - | - | - | - | BATONROUG / M1979 | Death (Ownership Only) | - | Out | 28/Jul/2001 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | BREC's Baton Rouge Zoo |
| **Enclosure** | - | **Birth Date/Age** | 09/Sep/1988 / 12Y,10M,19D at the time of death |
| **Rearing** | Parent | **House Name** | [JUSTIN/NASHV ZOO] [Justin/AUDUB SSC] [MONTY/AUDUBON] |
| **Dam** | [GAN: MIG12-27681282 \| M1661/BATONROUG] [GAN: MIG12-27681282 \| M1661/BATONROUG] [GAN: MIG12-27681282 \| M1661/BATONROUG] [GAN: MIG12-27681282 \| M1661/BATONROUG] | **Intl Stdbk#** | [780/NASHV ZOO] [780/AUDUB SSC] [780/AUDUBON] |
| | | **Local ID** | [221980/MONROE] [940017/NASHV ZOO] [080/AUDUB SSC] [M1979/BATONROUG] [1030/AUDUBON] [M1979/AUDUB SSC] [1979/BATONROUG] [PLT16-05778-IC/AUDUBON] |
| | | **Old Accession Number** | |
| **Sire** | [GAN: 5046411 \| M1660/BATONROUG] [GAN: 5046411 \| M1660/BATONROUG] [GAN: 5046411 \| M1660/BATONROUG] [GAN: 5046411 \| M1660/BATONROUG] | **Regional Studbook #** | [780-AZA /BATONROUG] |
| | | **Studbook Name** | [MONTE/NASHV ZOO] |
| | | **Transponder** | [028-056-586/NASHV ZOO] [028056586/AUDUB SSC] |
| | | **Undetermined** | [Local ID: 1030/AUDUBON] |

## MIG12-28453146 | [AUDUB SSC/226]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Apr/1999 | Birth/Hatch | In | In | BUFFALO / 99M52 | Donation To OAKHILL/999917 | Out | Out | 23/Sep/1999 |
| 23/Sep/1999 | Donation From BUFFALO/99M52 | In | In | OAKHILL / 999917 | Loan Out To NASHV ZOO/1656 | Out | - | 09/Dec/2000 |
| 10/Dec/2000 | Loan In From Sender: OAKHILL/999917 Vendor: OAKHILL/999917 | In | - | NASHV ZOO / 1656 | Loan Transfer To AUDUB SSC/226 | Out | - | 24/Sep/2003 |
| - | - | - | - | OAKHILL / 999917 | Sale (Ownership Only) AUDUB SSC/226 | - | Out | 18/Aug/2003 |
| 24/Sep/2003 | Purchase OAKHILL/999917 | In | In | AUDUB SSC / 226 | Death | Out | Out | 14/Dec/2009 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Buffalo Zoo |
| **Enclosure** | - | **Birth Date/Age** | 07/Apr/1999 / 10Y,8M,7D at the time of death |
| **Rearing** | Hand | **House Name** | [Joe/AUDUB SSC] [Joe/OAKHILL] [Joe G/BUFFALO] [Joe/NASHV ZOO] |
| **Dam** | [UNK / UNKNOWN] [GAN: 6080928 \| 90M86/BUFFALO] [GAN: 6080928 \| 90M86/BUFFALO] [GAN: 6080928 \| 90M86/BUFFALO] | **Intl Stdbk#** | [1099/OAKHILL] [1099/NASHV ZOO] [1099/BUFFALO] |
| | | **Local ID** | [226/AUDUB SSC] [999917/OAKHILL] [99M52/BUFFALO] [1656/NASHV ZOO] |
| **Sire** | [UNK / UNKNOWN] [GAN: 23616661 \| 90M25/BUFFALO] [GAN: 23616661 \| 90M25/BUFFALO] [GAN: 23616661 \| 90M25/BUFFALO] | **Regional Studbook #** | [1099-AZA /AUDUB SSC] |
| | | **Transponder** | [00-0639-DFCF/AUDUB SSC] |



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## MIG12-28557550 | [NASHV ZOO/940013]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/1991 | Loan In From Vendor: SCHWARTZ/NONE | In | - | NASHV ZOO / 940013 | - | - | - | - |
| 09/Nov/1998 | Donation From Vendor: SCHWARTZ/NONE | - | In | NASHV ZOO / 940013 | Loan Out To AUDUB SSC/077 | Out | - | 20/Nov/1998 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940013 | In | - | AUDUB SSC / 077 | Loan Return To Owner NASHV ZOO/940013 | Out | - | 14/Feb/2002 |
| 15/Feb/2002 | Loan Return to Us Sender: AUDUB SSC/077 | In | - | NASHV ZOO / 940013 | Loan Out To DENVER/A02247 | Out | - | 12/Jun/2002 |
| 13/Jun/2002 | Loan In From Vendor: NASHV ZOO/940013 | In | - | DENVER / A02247 | Loan Return To Owner NASHV ZOO/940013 | Out | - | 17/Dec/2002 |
| 17/Dec/2002 | Loan Return to Us Sender: DENVER/A02247 | In | - | NASHV ZOO / 940013 | Loan Out To FOUTS J/NONE | Out | - | 12/Jan/2004 |
| 19/Jul/2005 | Loan In From Vendor: NASHV ZOO/940013 | In | - | TULSA / 15062 | Loan Return To Owner NASHV ZOO/940013 | Out | - | 10/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940013 | Loan Out To (Change in Reported Holder) PRIVATE/NONE | - | - | 11/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940013 | Death (Ownership Only) | - | Out | 04/Apr/2006 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Undetermined
**Dam** [UNK / UNKNOWN] [UNK / UNKNOWN]
**Sire** [UNK / UNKNOWN] [UNK / UNKNOWN]

**Birth Type** Captive Born
**Birth Location** Jamaica / Hanover (en) (parish) (JM)
**Birth Date/Age** 02/Mar/1990 / 16Y,1M,2D at the time of death
**House Name** [Cirrus/AUDUB SSC] [KAI/NASHV ZOO] [Cirrus/NASHV ZOO] [KAI/DENVER] [CIRRUS/DENVER] [KAI/TULSA]
**Intl Stdbk#** [905/AUDUB SSC] [905/NASHV ZOO] [905/TULSA] [905/DENVER]
**Local ID** [077/AUDUB SSC] [940013/NASHV ZOO] [A02247/DENVER] [15062/TULSA]
**Old Accession Number** [HVH14-04538-IC/TULSA] [077/TULSA] [A02247/TULSA]
**Studbook Name** [TAI/NASHV ZOO] [TAI/DENVER] [TAI/TULSA]
**Transponder** [028033895/AUDUB SSC] [028-033-895/NASHV ZOO] [028033895/DENVER] [AVID*028*033*895/TULSA]
**Undetermined** [ISI# 15062/TULSA]

## MIG12-28833772 | [BEKESBRNE/H21062]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Feb/2010 | Birth/Hatch | In | In | NZP-CRC / 114538 | Loan Out To NASHV ZOO/3276 | Out | - | 09/Jul/2010 |
| 10/Jul/2010 | Donation From NZP-CRC/114538 | In | In | NASHV ZOO / 3276 | Donation To NZP-CRC/114538 | Out | Out | 17/Oct/2010 |
| 17/Oct/2010 | Loan Return to Us Sender: NASHV ZOO/3276 | In | - | NZP-CRC / 114538 | Donation To BEKESBRNE/H21062 | Out | Out | 22/Nov/2010 |
| 23/Nov/2010 | Donation From NZP-CRC/114538 | In | In | BEKESBRNE / H21062 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 14/Feb/2010 / 7Y,1M,0D
**House Name** [Tai-Wada/NASHV ZOO] [Tai-Wada/BEKESBRNE] [Tai-Wada/NZP-CRC]
**Intl Stdbk#** [1461/NASHV ZOO] [1461/BEKESBRNE] [1461/NZP-CRC]
**Local ID** [3276/NASHV ZOO] [114538/NZP-CRC] [H21062/BEKESBRNE]
**Transponder** [4A7A6C140B/NASHV ZOO] [FDX-A 4A7 A6C 140B/BEKESBRNE] [4A7A6C140B/NZP-CRC] [1D14A7A6C140B/BEKESBRNE]

## MIG12-28905589 | [CINCINNAT/110101]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Feb/2002 | Birth/Hatch | In | In | OAKHILL / 222201 | Loan Out To NASHV ZOO/1805 | Out | - | 04/Mar/2002 |
| ~ from 03/Mar/2002 to 05/Mar/2002 | Loan In From Sender: OAKHILL/222201 Vendor: OAKHILL/222201 | In | - | NASHV ZOO / 1805 | - | - | - | - |
| - | - | - | - | OAKHILL / 222201 | Donation To (Ownership Only) NASHV ZOO/1805 | - | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From Vendor: OAKHILL/222201 | - | In | NASHV ZOO / 1805 | Donation To SANDIEGOZ/505009 | Out | Out | 26/Jan/2005 |
| 26/Jan/2005 | Donation From NASHV ZOO/1805 | In | In | SANDIEGOZ / 505009 | Donation To OMAHA/18896 | Out | Out | 25/Feb/2009 |
| 25/Feb/2009 | Donation From SANDIEGOZ/505009 | In | In | OMAHA / 18896 | Donation To CINCINNAT/110101 | Out | Out | 16/Nov/2010 |
| 16/Nov/2010 | Donation To OMAHA/18896 | In | In | CINCINNAT / 110101 | Death | Out | Out | 18/Jan/2014 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL]
**Sire** [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 19/Feb/2002 / 11Y,10M,30D at the time of death
**House Name** [Dottie/NASHV ZOO] [DOTTIE/SANDIEGOZ] [Dottie/OMAHA] [Dottie/CINCINNAT]
**Intl Stdbk#** [1176/NASHV ZOO] [1176/SANDIEGOZ] [1176/OMAHA] [1176/OAKHILL]
**Local ID** [1805/NASHV ZOO] [505009/SANDIEGOZ] [222201/OAKHILL] [18896/OMAHA] [110101/CINCINNAT]
**Tattoo** [BK15/OMAHA] [BK15/[Thigh/Inner,Left]/SANDIEGOZ]
**Transponder** [015-266-847/NASHV ZOO] [0006684224/OMAHA] [00-0668-4224/[Interscapular/-]/SANDIEGOZ] [01-5266-847/[Interscapular/-]/SANDIEGOZ]



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## MIG12-28905590 | [CINCINNAT/110100]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Feb/2002 | Birth/Hatch | In | In | OAKHILL / 222202 | Loan Out To NASHV ZOO/1806 | Out | - | 04/Mar/2002 |
| ~ from 03/Mar/2002 to 05/Mar/2002 | Loan In From Sender: OAKHILL/222202 Vendor: OAKHILL/222202 | In | - | NASHV ZOO / 1806 | - | - | - | - |
| - | - | - | - | OAKHILL / 222202 | Donation To (Ownership Only) NASHV ZOO/1806 | - | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From Vendor: OAKHILL/222202 | - | In | NASHV ZOO / 1806 | Donation To SANDIEGOZ/505010 | Out | Out | 26/Jan/2005 |
| 26/Jan/2005 | Donation From NASHV ZOO/1806 | In | In | SANDIEGOZ / 505010 | Donation To OMAHA/18897 | Out | Out | 25/Feb/2009 |
| 25/Feb/2009 | Donation From SANDIEGOZ/505010 | In | In | OMAHA / 18897 | Donation To CINCINNAT/110100 | Out | Out | 16/Nov/2010 |
| 16/Nov/2010 | Donation To OMAHA/18897 | In | In | CINCINNAT / 110100 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 19/Feb/2002 / 15Y,0M,23D |
| **Rearing** | Hand | **House Name** | [Tevi/NASHV ZOO] [Tevi/CINCINNAT] [TEVI/SANDIEGOZ] [Tevi/OMAHA] |
| **Dam** | [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] | **Intl Stdbk#** | [1177/NASHV ZOO] [1177/SANDIEGOZ] [1177/OMAHA] [1177/OAKHILL] |
| | | **Local ID** | [505010/SANDIEGOZ] [1806/NASHV ZOO] [110100/CINCINNAT] [222202/OAKHILL] [18897/OMAHA] |
| | | **Tattoo** | [SB1177/[Thigh/Inner,Left]/SANDIEGOZ] [SB1177/OMAHA] |
| **Sire** | [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] | **Transponder** | [01-8854-562/[Interscapular/-]/SANDIEGOZ] [00-0668-2E5F/[Interscapular/-]/SANDIEGOZ] [018-854-562/NASHV ZOO] [0006682E5F/OMAHA] |
| | | **Undetermined** | [110100 / Tevi/CINCINNAT] |

## MIG12-29394338 | [CINCINNAT/105033]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Feb/2003 | Birth/Hatch | - | In | METROZOO / Y3M068 | - | - | - | - |
| 18/Feb/2003 | Birth/Hatch Owner: METROZOO/Y3M068 | In | - | ALEXANDRI / M00150 | Loan Transfer To NASHV ZOO/2231 | Out | - | 05/Apr/2004 |
| - | - | - | - | METROZOO / Y3M068 | Loan Out To (Change in Reported Holder) NASHV ZOO/2231 | - | - | 04/Apr/2004 |
| 05/Apr/2004 | Donation From METROZOO/Y3M068 | In | In | NASHV ZOO / 2231 | Loan Out To CINCINNAT/105033 | Out | - | 10/Jun/2005 |
| - | - | - | - | METROZOO / Y3M068 | Donation To (Ownership Only) NASHV ZOO/2231 | - | Out | 22/Apr/2004 |
| 10/Jun/2005 | Loan In From Sender: NASHV ZOO/2231 Vendor: NASHV ZOO/2231 | In | - | CINCINNAT / 105033 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Alexandria Zoological Park |
| **Enclosure** | - | **Birth Date/Age** | 18/Feb/2003 / 14Y,0M,24D |
| **Rearing** | Hand | **House Name** | [Sheegwa/NASHV ZOO] [Sheegwa/CINCINNAT] [Sheegwa/METROZOO] [Sheegwa/ALEXANDRI] |
| **Dam** | [GAN: MIG12-29395850 \| 99M015/ALEXANDRI] [GAN: MIG12-29395850 \| M01661/METROZOO] [GAN: MIG12-29395850 \| M01661/METROZOO] [GAN: MIG12-29395850 \| M01661/METROZOO] | **Intl Stdbk#** | [1210/METROZOO] |
| | | **Local ID** | [2231/NASHV ZOO] [Y3M068/METROZOO] [105033/CINCINNAT] [M00150/ALEXANDRI] |
| **Sire** | [GAN: 13331940 \| M00002/ALEXANDRI] [GAN: 13331940 \| M00002/ALEXANDRI] [GAN: 13331940 \| M00002/ALEXANDRI] [GAN: 13331940 \| M00002/ALEXANDRI] | **Regional Studbook #** | [1210-AZA /NASHV ZOO] [1210-AZA /CINCINNAT] [1210-AZA /ALEXANDRI] |
| | | **Transponder** | [062-264-588/NASHV ZOO] [062*264*588/CINCINNAT] |
| | | **Undetermined** | [105033/Sheegwa/CINCINNAT] |

## MIG12-29472273 | [TACOMA/T11M23]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Mar/2011 | Birth/Hatch | In | In | NASHV ZOO / 3483 | Loan Out To TACOMA/UNKNOWN | Out | - | 22/Sep/2011 |
| 22/Sep/2011 | Loan In From Sender: NASHV ZOO/3483 Vendor: NASHV ZOO/3483 | In | - | TACOMA / T11M23 | Loan Transfer To DENVER/UNK | Out | - | 15/Nov/2011 |
| - | - | - | - | NASHV ZOO / 3483 | Loan Out To (Change in Reported Holder) DENVER/A11300 | - | - | 15/Nov/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 19/Mar/2011 / 5Y,11M,23D |
| **Rearing** | Hand | **House Name** | [Lisu/NASHV ZOO] [Lisu/TACOMA] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1502/NASHV ZOO] [1502/TACOMA] |
| | | **Local ID** | [3483/NASHV ZOO] [T11M23/TACOMA] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Transponder** | [052*845*284/TACOMA] |



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## MIG12-29535740 | [BEKESBRNE/H21063]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 24/May/2010 | Birth/Hatch | In | In | NASHV ZOO / 3268 | Donation To NZP-CRC/114639 | Out | Out | 17/Oct/2010 |
| 17/Oct/2010 | Donation From NASHV ZOO/3268 | In | In | NZP-CRC / 114639 | Donation To BEKESBRNE/H21063 | Out | Out | 22/Nov/2010 |
| 23/Nov/2010 | Donation From NZP-CRC/114639 | In | In | BEKESBRNE / H21063 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 24/May/2010 / 6Y,9M,18D |
| **Rearing** | Hand | **House Name** | [Matsi/NASHV ZOO] [Matsi/BEKESBRNE] [Matsi/NZP-CRC] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1468/NASHV ZOO] [1468/BEKESBRNE] [1468/NZP-CRC] |
| | | **Local ID** | [3268/NASHV ZOO] [114639/NZP-CRC] [H21063/BEKESBRNE] |
| | | **Old Accession Number** | [3268/NZP-CRC] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Transponder** | [048096087/NASHV ZOO] [048096087/NZP-CRC] |

## MIG12-29566005 | [LOWRY/102947]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Mar/2011 | Birth/Hatch | In | In | NZP-CRC / 114659 | Donation To NASHV ZOO/3599 | Out | Out | 09/Sep/2011 |
| 09/Sep/2011 | Donation From NZP-CRC/114659 | In | In | NASHV ZOO / 3599 | Donation To LOWRY/UNKNOWN | Out | Out | 27/Sep/2011 |
| 27/Sep/2011 | Donation From NASHV ZOO/3599 | In | In | LOWRY / 102947 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 28/Mar/2011 / 5Y,11M,14D |
| **Rearing** | Hand | **House Name** | [Malee/LOWRY] |
| **Dam** | [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] [GAN: 26979184 \| 114487/NZP-CRC] | **Intl Stdbk#** | [1478/NZP-CRC] [1478/LOWRY] |
| | | **Local ID** | [114659/NZP-CRC] [3599/NASHV ZOO] [102947/LOWRY] |
| | | **Transponder** | [4B01751F00/NZP-CRC] [4B01751F00/NASHV ZOO] [#4B01751F00/LOWRY] [AVID*072*596*873/LOWRY] |
| **Sire** | [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] [GAN: MIG12-29565971 \| 114393/NZP-CRC] | | |

## MIG12-29615729 | [LOWRY/102946]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 22/Mar/2011 | Birth/Hatch | In | In | NASHV ZOO / 3484 | Donation To LOWRY/UNKNOWN | Out | Out | 27/Sep/2011 |
| 27/Sep/2011 | Donation From NASHV ZOO/3484 | In | In | LOWRY / 102946 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 22/Mar/2011 / 5Y,11M,20D |
| **Rearing** | Hand | **House Name** | [Yim/NASHV ZOO] [Yim/LOWRY] |
| **Dam** | [GAN: MIG12-29823528 \| 3247/NASHV ZOO] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1503/NASHV ZOO] [1503/LOWRY] |
| | | **Local ID** | [3484/NASHV ZOO] [102946/LOWRY] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Transponder** | [AVID*072*613*096/LOWRY] |

## MIG12-29615901 | [NASHV ZOO/940008]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Feb/1992 | Birth/Hatch | In | In | NASHV ZOO / 940008 | Loan Out To AUDUB SSC/078 | Out | - | 20/Nov/1998 |
| 20/Nov/1998 | Loan In From Vendor: NASHV ZOO/940008 | In | - | AUDUB SSC / 078 | Undetermined NASHV ZOO/ | Out | - | 10/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940008 | Donation To (Ownership Only) AUDUB SSC/078 | - | Out | 08/Jun/2004 |
| 11/Oct/2005 | Donation From AUDUB SSC/078 | In | In | NASHV ZOO / 940008 | Loan Out To BERENS J/NONE | Out | - | 11/Oct/2005 |
| - | - | - | - | NASHV ZOO / 940008 | Death (Ownership Only) | - | Out | 17/Sep/2010 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 28/Feb/1992 / 18Y,6M,20D at the time of death |
| **Rearing** | Hand | **House Name** | [MALONI/NASHV ZOO] [Maloni/AUDUB SSC] |
| **Dam** | [UNK / UNKNOWN] [GAN: MIG12-6262463 \| 940009/NASHV ZOO] | **Intl Stdbk#** | [939/NASHV ZOO] [939/AUDUB SSC] |
| | | **Local ID** | [940008/NASHV ZOO] [078/AUDUB SSC] |
| **Sire** | [UNK / UNKNOWN] [GAN: 20022635 \| 940012/NASHV ZOO] | **Studbook Name** | [MALONI/NASHV ZOO] |
| | | **Transponder** | [028-054-574/NASHV ZOO] [028054574/AUDUB SSC] [00-0611-460E/AUDUB SSC] |



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## MIG12-29615903 | [METROZOO/11M109]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Mar/2011 | Birth/Hatch | In | In | NASHV ZOO / 3482 | Donation To METROZOO/11M109 | Out | Out | 13/Nov/2011 |
| 12/Nov/2011 | Donation From NASHV ZOO/3482 | In | In | METROZOO / 11M109 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 19/Mar/2011 / 5Y,11M,23D |
| **Rearing** | Hand | **House Name** | [Rajasi/NASHV ZOO] [Rajasi/METROZOO] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1501/NASHV ZOO] [1501/METROZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Local ID** | [3482/NASHV ZOO] [11M109/METROZOO] |

## MIG12-29689759 | [AUDUB SSC/230]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Mar/2000 | Birth/Hatch | In | In | OAKHILL / 202005 | Loan Out To COLUMBUS/200027 | Out | - | 21/Mar/2000 |
| 13/Mar/2000 | Loan In From Vendor: OAKHILL/202005 | In | - | COLUMBUS / 200027 | Loan Transfer To NASHVILLE/1629 | Out | - | 20/Sep/2000 |
| 20/Sep/2000 | Loan In From Vendor: OAKHILL/202005 | In | - | NASHV ZOO / 1629 | Loan Transfer To AUDUB SSC/230 | Out | - | 08/Oct/2003 |
| - | - | - | - | OAKHILL / 202005 | Loan Out To (Change in Reported Holder) NASHV ZOO/1629 | - | - | 20/Oct/2000 |
| - | - | - | - | OAKHILL / 202005 | Sale (Ownership Only) AUDUB SSC/230 | - | Out | 18/Aug/2003 |
| 08/Oct/2003 | Purchase OAKHILL/202005 | In | In | AUDUB SSC / 230 | Death | Out | Out | 07/Mar/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 05/Mar/2000 / 14Y,0M,2D at the time of death |
| **Rearing** | Hand | **House Name** | [Sammy/NASHV ZOO] [Sammy/COLUMBUS] [Sammy/AUDUB SSC] |
| **Dam** | [UNK / UNKNOWN] [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] | **Intl Stdbk#** | [1115/NASHV ZOO] [1115/COLUMBUS] |
| | | **Local ID** | [1629/NASHV ZOO] [200027/COLUMBUS] [202005/OAKHILL] [230/AUDUB SSC] |
| **Sire** | [UNK / UNKNOWN] [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] | **Regional Studbook #** | [1115-AZA /AUDUB SSC] |
| | | **Transponder** | [00-01C5-77C0/COLUMBUS] [00-01C5-6C1F/AUDUB SSC] |

## MIG12-29689770 | [AUDUB SSC/229]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 05/Mar/2000 | Birth/Hatch | In | In | OAKHILL / 202004 | Loan Out To COLUMBUS/200026 | Out | - | 21/Mar/2000 |
| 13/Mar/2000 | Loan In From Vendor: OAKHILL/202004 | In | - | COLUMBUS / 200026 | Loan Transfer To NASHVILLE/1628 | Out | - | 20/Sep/2000 |
| - | - | - | - | OAKHILL / 202004 | Loan Out To (Change in Reported Holder) NASHV ZOO/1628 | - | - | 20/Sep/2000 |
| 20/Sep/2000 | Loan In From Vendor: OAKHILL/202004 | In | - | NASHV ZOO / 1628 | Loan Transfer To AUDUB SSC/229 | Out | - | 08/Oct/2003 |
| - | - | - | - | OAKHILL / 202004 | Sale (Ownership Only) AUDUB SSC/229 | - | Out | 18/Aug/2003 |
| 08/Oct/2003 | Purchase OAKHILL/202004 | In | In | AUDUB SSC / 229 | Death | Out | Out | 16/Nov/2013 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Oakhill Avian Center |
| **Enclosure** | - | **Birth Date/Age** | 05/Mar/2000 / 13Y,8M,11D at the time of death |
| **Rearing** | Hand | **House Name** | [Reese/NASHV ZOO] [Reese/COLUMBUS] [Reese/AUDUB SSC] |
| **Dam** | [UNK / UNKNOWN] [GAN: MIG12-26037277 \| 959513/OAKHILL] [GAN: MIG12-26037277 \| 959513/OAKHILL] | **Intl Stdbk#** | [1114/NASHV ZOO] [1114/COLUMBUS] |
| | | **Local ID** | [1628/NASHV ZOO] [202004/OAKHILL] [200026/COLUMBUS] [229/AUDUB SSC] |
| **Sire** | [UNK / UNKNOWN] [GAN: MIG12-26037278 \| 959515/OAKHILL] [GAN: MIG12-26037278 \| 959515/OAKHILL] | **Regional Studbook #** | [1114-AZA /AUDUB SSC] |
| | | **Transponder** | [00-01C5-77C0/AUDUB SSC] |



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## MIG12-29689772 | [AUDUB SSC/227]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Jul/1999 | Birth/Hatch | In | In | OAKHILL / 999913 | Loan Out To COLUMBUS/992042 | Out | - | 30/Jul/1999 |
| 30/Jul/1999 | Loan In From Sender: OAKHILL/999913 Vendor: OAKHILL/999913 | In | - | COLUMBUS / 992042 | Loan Transfer To NASHVILLE/1678 | Out | - | 25/Mar/2001 |
| - | - | - | - | OAKHILL / 999913 | Loan Out To (Change in Reported Holder) NASHV ZOO/1678 | - | - | 25/Mar/2001 |
| 25/Mar/2001 | Loan In From Vendor: OAKHILL/999913 | In | - | NASHV ZOO / 1678 | Loan Transfer To AUDUB SSC/227 | Out | - | 24/Sep/2003 |
| - | - | - | - | OAKHILL / 999913 | Sale (Ownership Only) AUDUB SSC/227 | - | Out | 18/Aug/2003 |
| 24/Sep/2003 | Purchase OAKHILL/999913 | In | In | AUDUB SSC / 227 | Death | Out | Out | 11/Mar/2015 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [1033 / OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL]
**Sire** [1034 / OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 07/Jul/1999 / 15Y,8M,4D at the time of death
**House Name** [Rosebud/NASHV ZOO] [Rosebud/COLUMBUS] [Rosebud/AUDUB SSC]
**Intl Stdbk#** [1105/OAKHILL] [1105/COLUMBUS] [1105/NASHV ZOO] [1105/AUDUB SSC]
**Local ID** [999913/OAKHILL] [1678/NASHV ZOO] [992042/COLUMBUS] [227/AUDUB SSC]
**Transponder** [00-01C5-2C2C/COLUMBUS] [00-01C5-2C2C/NASHV ZOO] [00-0639-E62F/AUDUB SSC] [00-01C5-2C2C/AUDUB SSC]

## MIG12-29747461 | [LOWRY/101758]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Apr/2001 | Birth/Hatch | - | In | CLEVELAND / M10424 | - | - | - | - |
| 07/Apr/2001 | Birth/Hatch Owner: CLEVELAND/M10424 | In | - | OAKHILL / 212113 | Loan Transfer To COLUMBUS/201018 | Out | - | 04/May/2001 |
| - | - | - | - | CLEVELAND / M10424 | Loan Out To (Change in Reported Holder) COLUMBUS/201018 | - | - | 04/May/2001 |
| 04/May/2001 | Loan In From Sender: OAKHILL/212113 Vendor: CLEVELAND/M10424 | In | - | COLUMBUS / 201018 | Loan Transfer To NASHV ZOO/1824 | Out | - | 28/Sep/2002 |
| 23/Aug/2002 | Loan In From Vendor: CLEVELAND/M10424 | In | - | NASHV ZOO / 1824 | Loan Transfer To LOWRY/101758 | Out | - | 13/Jan/2003 |
| - | - | - | - | CLEVELAND / M10424 | Loan Out To (Change in Reported Holder) NASHVILLE/1824 | - | - | 16/Sep/2002 |
| - | - | - | - | CLEVELAND / M10424 | Loan Out To (Change in Reported Holder) LOWRY/101758 | - | - | 13/Jan/2003 |
| 13/Jan/2003 | Loan In From Sender: NASHV ZOO/1824 Vendor: CLEVELAND/M10424 | In | - | LOWRY / 101758 | Loan Transfer To DENVER/A11224 | Out | - | 24/Aug/2011 |
| - | - | - | - | CLEVELAND / M10424 | Donation To (Ownership Only) DENVER/A11224 | - | Out | 24/Aug/2011 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 982073/COLUMBUS] [GAN: 6157631 | 982073/COLUMBUS] [GAN: MIG12-26037277 | 959513/OAKHILL]
**Sire** [959518 / OAKHILL] [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 990312/CLEVELAND] [GAN: 25605810 | 990312/CLEVELAND]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 07/Apr/2001 / 10Y,4M,17D at the time of last unconfirmed disposition
**House Name** [Mattie/CLEVELAND] [Maddie/NASHV ZOO] [Mattie/COLUMBUS] [Mattie/LOWRY]
**Intl Stdbk#** [1135/CLEVELAND] [1135/NASHV ZOO] [1135/OAKHILL] [1135/LOWRY]
**Local ID** [M10424/CLEVELAND] [1824/NASHV ZOO] [201018/COLUMBUS] [212113/OAKHILL] [101758/LOWRY]
**Old Accession Number** [Oakhill ID 212113/NASHV ZOO] [Oakhill 212113/LOWRY] [Nashville Zoo 1824/LOWRY] [Columbus Zoo 201018/LOWRY]
**Regional Studbook #** [1135-AZA /CLEVELAND] [1135-AZA /COLUMBUS] [1135-AZA /LOWRY]
**Transponder** [00-013F-0976/LOWRY] [00-013F-0976/NASHV ZOO] [00-013F-0976/CLEVELAND] [00-013F-0976/COLUMBUS]



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## MIG12-29747462 | [LOWRY/101759]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 10/Jun/2001 | Birth/Hatch | In | In | OAKHILL / 212122 | Loan Out To COLUMBUS/201032 | Out | - | 05/Jul/2001 |
| 05/Jul/2001 | Loan In From Sender: OAKHILL/212122 Vendor: OAKHILL/212122 | In | - | COLUMBUS / 201032 | Loan Transfer To NASHV ZOO/1823 | Out | - | 28/Sep/2002 |
| - | - | - | - | OAKHILL / 212122 | Loan Out To (Change in Reported Holder) NASHV ZOO/1823 | - | - | 28/Sep/2002 |
| 28/Sep/2002 | Loan In From Sender: COLUMBUS/201032 Vendor: OAKHILL/212122 | In | - | NASHV ZOO / 1823 | Loan Transfer To LOWRY/101759 | Out | - | 13/Jan/2003 |
| 13/Jan/2003 | Loan In From Sender: NASHV ZOO/1823 Vendor: OAKHILL/212122 | In | - | LOWRY / 101759 | - | - | - | - |
| - | - | - | - | OAKHILL / 212122 | Loan Out To (Change in Reported Holder) LOWRY/101759 | - | - | 14/Jan/2003 |
| 12/Feb/2006 | Ownership Transfer for Animal in on Loan | - | - | LOWRY / 101759 | Loan Transfer To DENVER/A11223 | Out | - | 24/Aug/2011 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL] [GAN: MIG12-26037277 | 959513/OAKHILL]
**Sire** [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL] [GAN: MIG12-26037278 | 959515/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 10/Jun/2001 / 15Y,9M,4D
**House Name** [Tenchi/COLUMBUS] [Tenchi/NASHV ZOO] [Tenchi/LOWRY] [Tenchi/OAKHILL]
**Intl Stdbk#** [1136/NASHV ZOO] [1136/LOWRY] [1136/OAKHILL]
**Local ID** [201032/COLUMBUS] [1823/NASHV ZOO] [101759/LOWRY] [212122/OAKHILL]
**Old Accession Number** [Columbus Zoo 201032/LOWRY] [Nashville Zoo 1823/LOWRY]
**Regional Studbook #** [1136-AZA /COLUMBUS]
**Transponder** [00-01BF-9987/COLUMBUS] [00-01BF-9987/NASHV ZOO] [00-01BF-9987/LOWRY] [00-01BF-9987/OAKHILL]

## MIG12-29823486 | [METROZOO/11M110]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/May/2011 | Birth/Hatch | In | In | NZP-CRC / 114677 | Donation To NASHV ZOO/UNK | Out | Out | 09/Sep/2011 |
| 09/Sep/2011 | Donation From NZP-CRC/114677 | In | In | NASHV ZOO / 3600 | Donation To METROZOO/11M110 | Out | Out | 13/Nov/2011 |
| 12/Nov/2011 | Donation From NASHV ZOO/3600 | In | In | METROZOO / 11M110 | - | - | - | - |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 13/May/2011 / 5Y,10M,1D
**House Name** [Serai/METROZOO]
**Intl Stdbk#** [1504/METROZOO] [1504/NASHV ZOO]
**Local ID** [11M110/METROZOO] [3600/NASHV ZOO] [114677/NZP-CRC]

## MIG12-29823527 | [NASHV ZOO/3145]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/2009 | Birth/Hatch | In | In | NASHV ZOO / 3145 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29615646 | 2810/NASHV ZOO]
**Sire** [GAN: MIG12-29823526 | 2809/NASHV ZOO]

**Birth Type** Captive Born
**Birth Location** Nashville Zoo at Grassmere
**Birth Date/Age** 30/May/2009 / 7Y,9M,14D
**House Name** [Luk/NASHV ZOO]
**Intl Stdbk#** [1442/NASHV ZOO]
**Local ID** [3145/NASHV ZOO]
**Transponder** [048*090*573/NASHV ZOO]

## MIG12-29823529 | [NASHV ZOO/3146]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/May/2009 | Birth/Hatch | In | In | NASHV ZOO / 3146 | Loan Out To GREENWICH/UNDETERM+ | Out | - | 21/Dec/2014 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29615646 | 2810/NASHV ZOO]
**Sire** [GAN: MIG12-29823526 | 2809/NASHV ZOO]

**Birth Type** Captive Born
**Birth Location** Nashville Zoo at Grassmere
**Birth Date/Age** 30/May/2009 / 7Y,9M,14D
**House Name** [Chet/NASHV ZOO]
**Intl Stdbk#** [1443/NASHV ZOO]
**Local ID** [3146/NASHV ZOO]
**Transponder** [048*092*118/NASHV ZOO]



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## MIG12-29823530 | [NASHV ZOO/3172]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Jul/2009 | Birth/Hatch | In | In | NZP-CRC / 114452 | Donation To NASHVILLE/3172 | Out | Out | 14/Aug/2009 |
| 14/Aug/2009 | Donation From NZP-CRC/114452 | In | In | NASHV ZOO / 3172 | Loan Out To COLUMBUS/209147 | Out | - | 14/Aug/2009 |
| 14/Aug/2009 | Loan In From Sender: NASHV ZOO/3172 Vendor: NASHV ZOO/3172 | In | - | COLUMBUS / 209147 | Loan Return To Owner NASHV ZOO/3172 | Out | - | 04/Jan/2010 |
| 04/Jan/2010 | Loan Return to Us Sender: COLUMBUS/209147 | In | - | NASHV ZOO / 3172 | Loan Out To GREENWICH/UNDETERM+ | Out | - | 21/Dec/2014 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC] [GAN: MIG12-29565950 | 114297/NZP-CRC]
**Sire** [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC] [GAN: MIG12-29565947 | 114296/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 09/Jul/2009 / 7Y,8M,5D
**House Name** [Baylie/COLUMBUS] [Baylie/NASHV ZOO] [Baylie/NZP-CRC]
**Intl Stdbk#** [1449/NASHV ZOO]
**Local ID** [209147/COLUMBUS] [114452/NZP-CRC] [3172/NASHV ZOO]
**Regional Studbook #** [1449-AZA /COLUMBUS] [1449-AZA /NZP-CRC]
**Transponder** [048*098*577/NASHV ZOO]

## MIG12-29899816 | [NZP-WASH/114146]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 12/Jun/2002 | Birth/Hatch | In | In | OAKHILL / 222216 | Donation To NASHV ZOO/1821 | Out | Out | 30/Jun/2002 |
| 30/Jun/2002 | Donation From OAKHILL/222216 | In | In | NASHV ZOO / 1821 | Loan Out To COLUMBUS/203009 | Out | - | 18/Mar/2003 |
| 18/Mar/2003 | Loan In From Sender: NASHV ZOO/1821 Vendor: NASHV ZOO/1821 | In | - | COLUMBUS / 203009 | Loan Transfer To NZP-WASH/114146 | Out | - | 11/Aug/2006 |
| - | - | - | - | NASHV ZOO / 1821 | Loan Out To (Change in Reported Holder) NZP-WASH/114146 | - | - | 11/Aug/2006 |
| 11/Aug/2006 | Loan In From Vendor: NASHV ZOO/1821 | In | - | NZP-WASH / 114146 | Death | Out | - | 24/Nov/2015 |
| - | - | - | - | NASHV ZOO / 1821 | Death (Ownership Only) | - | Out | 24/Nov/2015 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [1081 / OAKHILL] [1081 / OAKHILL] [GAN: 6157631 | 989813/OAKHILL] [GAN: 6157631 | 989813/OAKHILL]
**Sire** [1093 / OAKHILL] [1093 / OAKHILL] [GAN: 25605810 | 999918/OAKHILL] [GAN: 25605810 | 999918/OAKHILL]

**Birth Type** Captive Born
**Birth Location** Oakhill Avian Center
**Birth Date/Age** 12/Jun/2002 / 13Y,5M,12D at the time of death
**House Name** [Tai/NZP-WASH] [Tai/NASHV ZOO] [Tai/COLUMBUS]
**Intl Stdbk#** [1180/OAKHILL] [1180/NASHV ZOO]
**Local ID** [114146/NZP-WASH] [222216/OAKHILL] [1821/NASHV ZOO] [203009/COLUMBUS]
**Regional Studbook #** [1180-AZA /NZP-WASH] [1180-AZA /COLUMBUS]
**Transponder** [00-0639-102C/NZP-WASH] [0639-1D2C/COLUMBUS]

## MIG12-29908024 | [SANFORD/11C171]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/Mar/2011 | Birth/Hatch | In | In | NZP-CRC / 114658 | Donation To TACOMA/T11M21 | - | Out | 09/Sep/2011 |
| - | - | - | - | NZP-CRC / 114658 | Loan Transfer To (Physical Only) NASHV ZOO/3598 | Out | - | 09/Sep/2011 |
| 09/Sep/2011 | Loan In From Vendor: TACOMA/T11M21 | In | - | NASHV ZOO / 3598 | Loan Transfer To TACOMA/T11M21 | Out | - | 22/Sep/2011 |
| 22/Sep/2011 | Donation From NZP-WASH/114658 | In | In | TACOMA / T11M21 | Donation To SANFORD/11C171 | Out | Out | 26/Jan/2012 |
| 27/Jan/2012 | Donation From TACOMA/T11M21 | In | In | SANFORD / 11C171 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [114487 / SMITHSON] [GAN: 26979184 | 114487/NZP-CRC]
**Sire** [114393 / SMITHSON] [GAN: MIG12-29565971 | 114393/NZP-CRC]

**Birth Type** Captive Born
**Birth Location** Smithsonian Conservation Biology Institute
**Birth Date/Age** 28/Mar/2011 / 5Y,11M,14D
**House Name** [SABAH/SANFORD] [Sabah/TACOMA]
**Intl Stdbk#** [1477/SANFORD] [1477/TACOMA]
**Local ID** [3598/NASHV ZOO] [11C171/SANFORD] [114658/NZP-CRC] [T11M21/TACOMA]
**Old Accession Number** [1641/SANFORD] [FCH13-00203/SPECIE360]
**Transponder** [4B1B242911/NASHV ZOO] [4B1B242911/TACOMA] [4B1B242911/SANFORD] [4B1B242911/NZP-CRC]



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## MIG12-30090037 | [LITTLEROC/7282]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 03/Apr/2003 | Birth/Hatch | - | In | CLEVELAND / M30413 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 03/Apr/2003 | Birth/Hatch Owner: CLEVELAND/M30413 | In | - | TACOMA / T03M03 | Loan Transfer To NASHV ZOO/2318 | Out | - | 17/Feb/2005 |
| 17/Feb/2005 | Loan Transfer From Sender: TACOMA/T03M03 Vendor: CLEVELAND/M30413 | In | - | NASHV ZOO / 2318 | Loan Transfer To NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | TACOMA / T03M03 | Loan Transfer To (Physical Only) NZP-CRC/113958 | Out | - | 24/Feb/2005 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) NZP-CRC/113958 | - | - | 24/Feb/2005 |
| 24/Feb/2005 | Loan In From Vendor: CLEVELAND/M30413 | In | - | NZP-CRC / 113958 | Loan Transfer To HOUSTON/22865 | Out | - | 20/Feb/2007 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 22/Feb/2007 | Loan In From Sender: NZP-CRC/113958 Vendor: CLEVELAND/M30413 | In | - | HOUSTON / 22865 | Loan Transfer To LITTLEROC/7282 | Out | - | 01/Oct/2012 |
| - | - | - | - | CLEVELAND / M30413 | Loan Out To (Change in Reported Holder) HOUSTON/22865 | - | - | 22/Feb/2007 |
| 01/Oct/2012 | Loan In From Sender: HOUSTON/22865 Vendor: CLEVELAND/M30413 | In | - | LITTLEROC / 7282 | - | - | - | - |
| - | - | - | - | CLEVELAND / M30413 | Donation To (Ownership Only) LITTLEROC/7282 | - | Out | 01/Oct/2012 |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [98MO18 / TACOMA] [GAN: 2425883 | 980716/CLEVELAND] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA] [GAN: 2425883 | 98M018/TACOMA]
**Sire** [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA] [GAN: MIG12-29404008 | 98M006/TACOMA]

**Birth Type** Captive Born
**Birth Location** Point Defiance Zoo & Aquarium
**Birth Date/Age** 03/Apr/2003 / 13Y,11M,11D
**House Name** [RAMA/TACOMA] [Rama/LITTLEROC] [RAMA/NZP-CRC] [Rama/NASHV ZOO] [Rama/CLEVELAND] [Rama/HOUSTON]
**Intl Stdbk#** [1211/LITTLEROC] [1211/CLEVELAND] [1211/HOUSTON] [1211/NZP-CRC] [1211/NASHV ZOO]
**Local ID** [T03M03/TACOMA] [7282/LITTLEROC] [113958/NZP-CRC] [2318/NASHV ZOO] [M30413/CLEVELAND] [22865/HOUSTON]
**Old Accession Number** [2318 at Nashville Zoo/NZP-CRC] [M30413 at Cleveland/NZP-CRC]
**Regional Studbook #** [1211-AZA /TACOMA]
**Tattoo** [1211/LITTLEROC] [1211/NZP-CRC] [1211/HOUSTON]
**Transponder** [00-0630-DEA1/TACOMA] [00-0630-DEA1 Trovan/LITTLEROC] [00-0630-DEA1/NZP-CRC] [00-0630-DEA1/NASHV ZOO] [00-0630-DEA1/HOUSTON]

## MIG12-6262463 | [NASHV ZOO/940009]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 08/Mar/1988 | Birth/Hatch | In | In | KANSASCTY / 102195 | Loan Out To CROWN/UNK | Out | - | 15/Sep/1988 |
| - | - | - | - | KANSASCTY / 102195 | Loan Out To (Change in Reported Holder) NASHV ZOO/940009 | - | - | 17/Jan/1992 |
| 17/Jan/1992 | Loan In From Vendor: KANSASCTY/102195 | In | - | NASHV ZOO / 940009 | Loan Transfer To TIGER HAV/UNKNOWN | Out | - | 18/Sep/2002 |
| - | - | - | - | KANSASCTY / 102195 | Loan Out To (Change in Reported Holder) TIGER HAV/UNK | - | - | 18/Sep/2002 |
| - | - | - | - | KANSASCTY / 102195 | Death (Ownership Only) | - | Out | 25/Oct/2002 |

**Sex/Contraception** Female / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Parent
**Dam** [525 / STUDBOOK] [GAN: 20620572 | 102009/KANSASCTY] [GAN: 20620572 | 102009/KANSASCTY]
**Sire** [530 / STUDBOOK] [GAN: 20620105 | 102008/KANSASCTY] [GAN: 20620105 | 102008/KANSASCTY]

**Birth Type** Captive Born
**Birth Location** Kansas City Zoo
**Birth Date/Age** 08/Mar/1988 / 14Y,7M,17D at the time of death
**House Name** [BENWA/NASHV ZOO]
**Intl Stdbk#** [701/KANSASCTY] [701/NASHV ZOO]
**Local ID** [102195/KANSASCTY] [940009/NASHV ZOO]
**Studbook Name** [BENWA (KC-5)/NASHV ZOO]

## TYY12-00030 | [NASHV ZOO/3680]

**Individual** **Clouded leopard** **Vulnerable (VU)** **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Feb/2012 | Birth/Hatch | In | In | NASHV ZOO / 3680 | - | - | - | - |

**Sex/Contraception** Male / -
**Hybrid Status** Not a hybrid
**Enclosure** -
**Rearing** Hand
**Dam** [GAN: MIG12-29823528 | 3247/NASHV ZOO]
**Sire** [GAN: MIG12-29823527 | 3145/NASHV ZOO]

**Birth Type** Captive Born
**Birth Location** Nashville Zoo at Grassmere
**Birth Date/Age** 13/Feb/2012 / 5Y,1M,1D
**House Name** [Drupada/NASHV ZOO]
**Intl Stdbk#** [1587/NASHV ZOO]
**Local ID** [3680/NASHV ZOO]
**Transponder** [068 777 844/NASHV ZOO]



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### TYY12-00031 | [SAN ANTON/S12017]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Feb/2012 | Birth/Hatch | In | In | NASHV ZOO / 3681 | Loan Out To SAN ANTON/S12017 | Out | - | 18/Sep/2012 |
| 18/Sep/2012 | Loan In From Sender: NASHV ZOO/3681 Vendor: NASHV ZOO/3681 | In | - | SAN ANTON / S12017 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 13/Feb/2012 / 5Y,1M,1D |
| **Rearing** | Hand | **House Name** | [INDIRA/SAN ANTON] |
| **Dam** | [GAN: MIG12-29823528 \| 3247/NASHV ZOO] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1588/NASHV ZOO] [1588/SAN ANTON] |
| | | **Local ID** | [3681/NASHV ZOO] [S12017/SAN ANTON] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Transponder** | [068 636 346/NASHV ZOO] [068 636 346/SAN ANTON] |

### TYY12-00059 | [HOUSTON/27287]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Mar/2012 | Birth/Hatch | In | In | NASHV ZOO / 3704 | Donation To HOUSTON/27287 | Out | Out | 09/Sep/2012 |
| 06/Sep/2012 | Donation From NASHV ZOO/3704 | In | In | HOUSTON / 27287 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 11/Mar/2012 / 0Y,5M,29D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Tarak/HOUSTON] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1589/HOUSTON] [1589/NASHV ZOO] |
| | | **Local ID** | [27287/HOUSTON] [3704/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Transponder** | [068*778*631/HOUSTON] [068 778 631/NASHV ZOO] |

### TYY12-00060 | [NASHV ZOO/3705]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 11/Mar/2012 | Birth/Hatch | In | In | NASHV ZOO / 3705 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 11/Mar/2012 / 5Y,0M,3D |
| **Rearing** | Hand | **House Name** | [Tula/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1590/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Local ID** | [3705/NASHV ZOO] |
| | | **Transponder** | [079 563 012/NASHV ZOO] |

### TYY12-00064 | [NASHV ZOO/3714]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 07/Mar/2012 | Birth/Hatch | In | In | NZP-CRC / 114756 | Donation To NASHV ZOO/3714 | Out | Out | 29/Mar/2012 |
| 30/Mar/2012 | Donation From NZP-CRC/114756 | In | In | NASHV ZOO / 3714 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Smithsonian Conservation Biology Institute |
| **Enclosure** | - | **Birth Date/Age** | 07/Mar/2012 / 5Y,0M,7D |
| **Rearing** | Hand | **House Name** | [Nuri/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29565950 \| 114297/NZP-CRC] [GAN: MIG12-29565950 \| 114297/NZP-CRC] | **Intl Stdbk#** | [1593/NASHV ZOO] |
| | | **Local ID** | [3714/NASHV ZOO] [114756/NZP-CRC] |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] [GAN: MIG12-29565947 \| 114296/NZP-CRC] | **Regional Studbook #** | [1593-AZA /NZP-CRC] |
| | | **Transponder** | [084 379 016/NASHV ZOO] |

### TYY12-00260 | [NASHV ZOO/3481]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 19/Mar/2011 | Birth/Hatch | In | In | NASHV ZOO / 3481 | Death | Out | Out | 21/Mar/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 19/Mar/2011 / 0Y,0M,2D at the time of death |
| **Rearing** | Hand | **Local ID** | [3481/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | | |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | | |



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### TYY12-00270 | [NASHV ZOO/3566]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 09/Jul/2011 | Birth/Hatch | In | In | NASHV ZOO / 3566 | Death | Out | Out | 10/Jul/2011 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 09/Jul/2011 / 0Y,0M,1D at the time of death |
| **Rearing** | Parent | **Local ID** | [3566/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | | |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | | |

### TYY12-00314 | [SANDIEGOZ/512192]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/Aug/2012 | Birth/Hatch | In | In | NASHV ZOO / 3859 | Loan Out To SANDIEGOZ/UNDETERM+ | Out | - | 01/Dec/2012 |
| 01/Dec/2012 | Loan In From Vendor: NASHV ZOO/3859 | In | - | SANDIEGOZ / 512192 | Loan Transfer To FOUTS J/UNK | Out | - | 25/Apr/2013 |
| - | - | - | - | NASHV ZOO / 3859 | Loan Out To (Change in Reported Holder) FOUTS J/UNDETERM+ | - | - | 25/Apr/2013 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 25/Aug/2012 / 4Y,6M,17D |
| **Rearing** | Undetermined | **House Name** | [RIKI SAN/SANDIEGOZ] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1604/NASHV ZOO] |
| | | **Local ID** | [512192/SANDIEGOZ] [3859/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Transponder** | [07-7294-779/[Interscapular/-]/SANDIEGOZ] [077-294-779/NASHV ZOO] |

### TYY12-00315 | [SANDIEGOZ/512191]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/Aug/2012 | Birth/Hatch | In | In | NASHV ZOO / 3860 | Donation To SANDIEGOZ/UNDETERM+ | Out | Out | 01/Dec/2012 |
| 01/Dec/2012 | Donation From NASHV ZOO/3860 | In | In | SANDIEGOZ / 512191 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 25/Aug/2012 / 4Y,6M,17D |
| **Rearing** | Undetermined | **House Name** | [HAUI SAN/SANDIEGOZ] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1605/NASHV ZOO] |
| | | **Local ID** | [512191/SANDIEGOZ] [3860/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Transponder** | [07-7277-540/[Interscapular/-]/SANDIEGOZ] [077-277-540/NASHV ZOO] |

### TYY12-00316 | [COLUMBUS/212072]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 25/Aug/2012 | Birth/Hatch | In | In | NASHV ZOO / 3861 | Loan Out To COLUMBUS/212072 | Out | - | 03/Oct/2012 |
| 03/Oct/2012 | Loan In From Sender: NASHV ZOO/3861 Vendor: NASHV ZOO/3861 | In | - | COLUMBUS / 212072 | Loan Transfer To TANGAN WP/UNDETERM+ | Out | - | 22/Nov/2013 |
| - | - | - | - | NASHV ZOO / 3861 | Loan Out To (Change in Reported Holder) TANGAN WP/UNDETERM+ | - | - | 22/Nov/2013 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 25/Aug/2012 / 4Y,6M,17D |
| **Rearing** | Hand | **House Name** | [Ting/COLUMBUS] |
| **Dam** | [GAN: MIG12-29615646 \| 2810/NASHV ZOO] | **Intl Stdbk#** | [1606/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 2809/NASHV ZOO] | **Local ID** | [3861/NASHV ZOO] [212072/COLUMBUS] |

### TYY12-00327 | [NASHV ZOO/3873]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Sep/2012 | Birth/Hatch | In | In | NASHV ZOO / 3873 | Loan Out To COLUMBUS/212071 | Out | - | 03/Oct/2012 |
| 03/Oct/2012 | Loan In From Sender: NASHV ZOO/3873 Vendor: NASHV ZOO/3873 | In | - | COLUMBUS / 212071 | Loan Return To Owner NASHV ZOO/3873 | Out | - | 18/Feb/2014 |
| 18/Feb/2014 | Loan Return to Us Sender: COLUMBUS/212071 | In | - | NASHV ZOO / 3873 | Donation To SANDWICH/UNDETERM+ | Out | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Species Hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 04/Sep/2012 / 1Y,10M,26D at the time of lost ISIS tracking |
| **Rearing** | - | **House Name** | [Tae/COLUMBUS] |
| **Dam** | [GAN: MIG12-29823530 \| 114452/NZP-CRC] | **Intl Stdbk#** | [1607/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823529 \| 3146/NASHV ZOO] | **Local ID** | [3873/NASHV ZOO] [212071/COLUMBUS] |



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### TYY12-00328 | [NASHV ZOO/3874]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Sep/2012 | Birth/Hatch | In | In | NASHV ZOO / 3874 | Death | Out | Out | 11/Oct/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Species Hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 04/Sep/2012 / 0Y,1M,7D at the time of death |
| **Rearing** | - | **Intl Stdbk#** | [1608/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823530 \| 114452/NZP-CRC] | **Local ID** | [3874/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823529 \| 3146/NASHV ZOO] | | |

### TYY12-00329 | [NASHV ZOO/3875]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 04/Sep/2012 | Birth/Hatch | In | In | NASHV ZOO / 3875 | Death | Out | Out | 04/Sep/2012 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 04/Sep/2012 / 0Y,0M,0D at the time of death |
| **Rearing** | - | **Local ID** | [3875/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823530 \| 114452/NZP-CRC] | | |
| **Sire** | [GAN: MIG12-29823529 \| 3146/NASHV ZOO] | | |

### TYY13-00636 | [NASHV ZOO/4008]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Mar/2013 | Birth/Hatch | In | In | NASHV ZOO / 4008 | Donation To SANDWICH/UNDETERM+ | Out | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 26/Mar/2013 / 1Y,4M,4D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Hari/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823530 \| 114452/NZP-CRC] | **Intl Stdbk#** | [1618/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823529 \| 3146/NASHV ZOO] | **Local ID** | [4008/NASHV ZOO] |
| | | **Transponder** | [079-560-048/NASHV ZOO] |

### TYY13-00637 | [SANDIEGOZ/513255]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Mar/2013 | Birth/Hatch | In | In | NASHV ZOO / 4009 | Sale SANDIEGOZ/513255 | Out | Out | 24/Dec/2013 |
| 17/Dec/2013 | Purchase NASHV ZOO/4009 | In | In | SANDIEGOZ / 513255 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 26/Mar/2013 / 3Y,11M,16D |
| **Rearing** | Undetermined | **House Name** | [GANDA/SANDIEGOZ] [Ganda/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823530 \| 114452/NZP-CRC] [GAN: MIG12-29823530 \| 3172/NASHV ZOO] | **Intl Stdbk#** | [1619/SANDIEGOZ] |
| | | **Local ID** | [513255/SANDIEGOZ] [4009/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823529 \| 3146/NASHV ZOO] [GAN: MIG12-29823529 \| 3146/NASHV ZOO] | **Old Accession Number** | [DNY14-14887-IC/SANDIEGOZ] |
| | | **Transponder** | [00-8790-513/[Interscapular/-]/SANDIEGOZ] [008-790-513/NASHV ZOO] |
| | | **Undetermined** | [Merged ÿ00021 513255 008790513/SANDIEGOZ] |

### TYY13-00638 | [NASHV ZOO/4010]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 26/Mar/2013 | Birth/Hatch | In | In | NASHV ZOO / 4010 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 26/Mar/2013 / 3Y,11M,16D |
| **Rearing** | - | **House Name** | [Rajani/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29615646 \| 500007/KHAOKHEOW] | **Local ID** | [4010/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823526 \| 500014/KHAOKHEOW] | **Transponder** | [008-783-563/NASHV ZOO] |

### TYY13-00735 | [NASHV ZOO/4041]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Apr/2013 | Birth/Hatch | In | In | NASHV ZOO / 4041 | Donation To SANDWICH/UNDETERM+ | Out | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 30/Apr/2013 / 1Y,3M,0D at the time of lost ISIS tracking |
| **Rearing** | Hand | **House Name** | [Padma/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823528 \| 520048/KHAOKHEOW] | **Intl Stdbk#** | [1620/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Local ID** | [4041/NASHV ZOO] |
| | | **Transponder** | [009-048-827/NASHV ZOO] |



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### TYY13-00736 | [TORONTO/47589]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 30/Apr/2013 | Birth/Hatch | In | In | NASHV ZOO / 4042 | Loan Out To NZP-CRC/UNDETERM+ | Out | - | 27/Feb/2014 |
| 27/Feb/2014 | Loan In From Vendor: NASHV ZOO/4042 | In | - | NZP-CRC / 115032 | Loan Transfer To TORONTO/47589 | Out | - | 30/Jul/2014 |
| 30/Jul/2014 | Donation From Sender: NZP-CRC/115032 Vendor: NASHV ZOO/4042 | In | In | TORONTO / 47589 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 4042 | Donation To (Ownership Only) TORONTO/UNDETERM+ | - | Out | 30/Jul/2014 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 30/Apr/2013 / 3Y,10M,14D |
| **Rearing** | Hand | **House Name** | [PAVARTI/TORONTO] [Pavarti/NZP-CRC] [Pavarti/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823528 \| 520048/KHAOKHEOW] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1621/TORONTO] [1621/NZP-CRC] [1621/NASHV ZOO] |
| | | **Local ID** | [47589/TORONTO] [4042/NASHV ZOO] [115032/NZP-CRC] |
| | | **Transponder** | [009-045-871/TORONTO] [009-045-871/NZP-CRC] [009-045-871/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | | |

### TYY14-01479 | [NASHV ZOO/4630]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 14/Mar/2014 | Birth/Hatch | - | In | NASHV ZOO / 4630 | - | - | - | - |
| - | - | - | - | NASHV ZOO / 4630 | Loan Out To (Change in Reported Holder) HOUSTON/29539 | - | - | 14/Nov/2014 |
| - | - | - | - | NASHV ZOO / 4630 | Donation To (Ownership Only) HOUSTON/29539 | - | Out | 10/Feb/2016 |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Denver Zoological Garden |
| **Enclosure** | - | **Birth Date/Age** | 14/Mar/2014 / 1Y,10M,27D at the time of lost ISIS tracking |
| **Rearing** | - | **Local ID** | [4630/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29472273 \| 3483/NASHV ZOO] | | |
| **Sire** | [A11299 / DENVER] | | |

### TYY15-01541 | [NASHV ZOO/4723]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 13/Mar/2015 | Birth/Hatch | In | In | NASHV ZOO / 4723 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 13/Mar/2015 / 2Y,0M,1D |
| **Rearing** | Hand | **House Name** | [Sip Saam/NASHV ZOO] |
| **Dam** | [GAN: TYY12-00064 \| 3714/NASHV ZOO] | **Intl Stdbk#** | [1784/NASHV ZOO] |
| **Sire** | [GAN: TYY12-00030 \| 3680/NASHV ZOO] | **Local ID** | [4723/NASHV ZOO] |
| | | **Transponder** | [981020013925953/NASHV ZOO] |

### TYY15-01545 | [SYRACUSE/M16181]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Mar/2015 | Birth/Hatch | In | In | NASHV ZOO / 4728 | Donation To SYRACUSE/M16181 | Out | Out | 14/Oct/2016 |
| 14/Oct/2016 | Donation From NASHV ZOO/4728 | In | In | SYRACUSE / M16181 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 18/Mar/2015 / 1Y,11M,24D |
| **Rearing** | Hand | **House Name** | [NATIDA/NASHV ZOO] [Natida/SYRACUSE] |
| **Dam** | [GAN: TYY12-00060 \| 3705/NASHV ZOO] | **Intl Stdbk#** | [1785/NASHV ZOO] |
| **Sire** | [GAN: TYY12-00030 \| 3680/NASHV ZOO] | **Local ID** | [4728/NASHV ZOO] [M16181/SYRACUSE] |
| | | **Transponder** | [981020013898827/NASHV ZOO] |

### TYY15-01612 | [NASHV ZOO/4806]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/May/2015 | Birth/Hatch | In | In | NASHV ZOO / 4806 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 28/May/2015 / 1Y,9M,14D |
| **Rearing** | Hand | **House Name** | [Faith/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1791/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Local ID** | [4806/NASHV ZOO] |



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### TYY15-01613 | [NASHV ZOO/4807]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 28/May/2015 | Birth/Hatch | In | In | NASHV ZOO / 4807 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Female / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 28/May/2015 / 1Y,9M,14D |
| **Rearing** | Hand | **House Name** | [Hope/NASHV ZOO] |
| **Dam** | [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1792/NASHV ZOO] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Local ID** | [4807/NASHV ZOO] |

### TYY15-01728 | [NASHV ZOO/4936]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 18/Sep/2015 | Donation From FOUTS J/UNDETERM+ | In | In | NASHV ZOO / 4936 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Tanganyika Wildlife Co (animal supply) |
| **Enclosure** | - | **Birth Date/Age** | 24/May/2015 / 1Y,9M,18D |
| **Rearing** | Hand | **House Name** | [Jack/NASHV ZOO] |
| **Dam** | [Undetermined / FOUTS J] | **Intl Stdbk#** | [1793/NASHV ZOO] |
| **Sire** | [GAN: TYY12-00315 \| 3860/NASHV ZOO] | **Local ID** | [4936/NASHV ZOO] |
| | | **Transponder** | [981020013905983/NASHV ZOO] |

### TYY16-01901 | [NY BRONX/E16019]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 27/Jun/2016 | Birth/Hatch | In | In | NASHV ZOO / 5194 | Sale NY BRONX/UNDETERM+ | Out | Out | 09/Sep/2016 |
| 09/Sep/2016 | Purchase NASHV ZOO/5194 | In | In | NY BRONX / E16019 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / Medical method- surgical(Active) | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 27/Jun/2016 / 0Y,8M,15D |
| **Rearing** | - | **House Name** | [Riley/NY BRONX] |
| **Dam** | [GAN: MIG12-29823528 \| 3247/NASHV ZOO] | **Intl Stdbk#** | [1815/NY BRONX] |
| **Sire** | [GAN: MIG12-29823527 \| 3145/NASHV ZOO] | **Local ID** | [5194/NASHV ZOO] [E16019/NY BRONX] |

### TYY17-02087 | [NASHV ZOO/5364]

**Individual** | **Clouded leopard** | **Vulnerable (VU)** | **Neofelis nebulosa**

| Date in | Acquisition - Vendor/Local ID | Phy | Own | Reported By | Disposition - Recipient/Local ID | Phy | Own | Date out |
|---|---|---|---|---|---|---|---|---|
| 01/Mar/2017 | Birth/Hatch | In | In | NASHV ZOO / 5364 | - | - | - | - |

| | | | |
|---|---|---|---|
| **Sex/Contraception** | Male / - | **Birth Type** | Captive Born |
| **Hybrid Status** | Not a hybrid | **Birth Location** | Nashville Zoo at Grassmere |
| **Enclosure** | - | **Birth Date/Age** | 01/Mar/2017 / 0Y,0M,13D |
| **Rearing** | - | **Local ID** | [5364/NASHV ZOO] |
| **Dam** | [GAN: TYY12-00060 \| 3705/NASHV ZOO] | | |
| **Sire** | [GAN: MIG12-29565947 \| 114296/NZP-CRC] | | |



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## CONTAINER REQUIREMENT 72

**The illustrations shown in this Container Requirement are examples only. Containers that conform to the principle of written guidelines for the species but look slightly different will still meet the IATA standards.**

**Applicable to:**

Bear species
Binturong
Cheetah
Jaguar
Leopard species
Lion species
Panther species
Puma species
Snow leopard
Tasmanian devil
Tiger

***Note:***
*The above species must be provided with space to lie comfortably but not turn around, except for bear species and binturong which must have space to turn around. There must be at least a 10 cm (4 in) clearance around the animal when standing in a normal position.*

***Note:***
*Should a veterinary certificate be provided stating that the large cat being shipped is suitable to be transported in a container which permits it to turn around, that container may be accepted for shipment.*

STATE VARIATIONS: GBG-01/02/03/04, USG-Variations

OPERATOR VARIATIONS: CO-04/05/09, QF-01, SV-01

### 1. CONTAINER CONSTRUCTION

**Materials**

Hardwood, metal, 1.3 cm minimum (½ in) plywood or similar material, welded mesh, iron bars.

**Principles of Design**

The following principles of design must be met in addition to the General Container Requirements outlined at the beginning of this chapter.

**Dimension**

The height of the container must allow the animal to stand erect with its head extended and the length must permit it to lie in the prone position. The measurements will vary with the species involved.

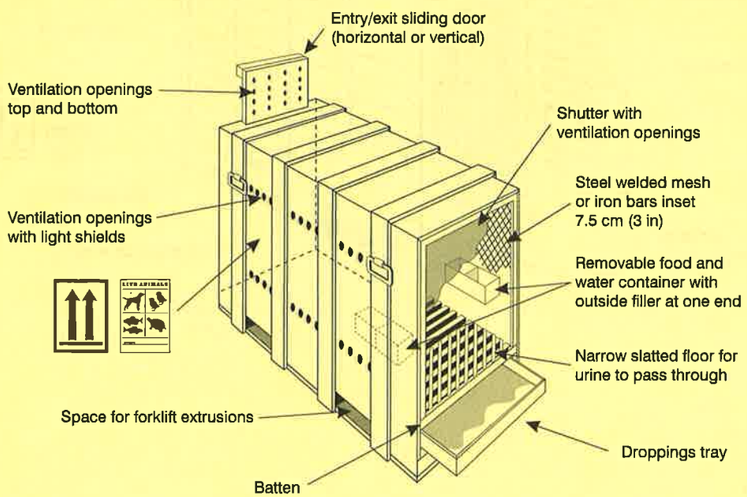
**Frame**

The frame must be made from solid wood or metal bolted or screwed together. The frame must provide the spacer bar requirement of 2.5 cm (1 in) depth to the sides for air circulation. When the weight of the container plus animal exceeds 60 kg (132 lb), or the animal is very aggressive the frame must have additional metal re-enforcing braces.

**Sides**

Suitable plywood or similar material must line the frame to give a smooth and strong interior.

**EXAMPLE:**








**Floor**

The floor must either be constructed in a narrow slatted form over a liquid proof tray in such a manner that all the excreta falls onto the tray or, if a slatted floor is not required for that species, it must be leak-proof and covered by sufficient absorbent material in order to prevent any excreta escaping.

When slats are used, they must be resistant to destruction by the animal. Expanded metal may be preferable with some species.

**Roof**

Must be solid.

**Doors**

Sliding or hinged entry/exit door must be provided. The front entry/exit door and the opposite end must be made of welded steel mesh or strong iron bars. The iron bars must be spaced in such a way that the animal cannot pass its legs between them.

Alternatively, the front entry/exit door may be made from heavy plywood, steel lined, with ventilation openings, while the end is made of welded steel mesh or strong iron bars. When welded steel mesh or strong iron bars are used, they must be covered with a light sliding wooden shutter. The upper two thirds of the shutter must have either ventilation openings of 10 cm (4 in) or slats with 7 cm (2¾ in) spaces between them, in order to reduce the disturbance to the animal and to protect the handlers.

The mesh or bars may also be covered with burlap or similar material instead of the shutter.

The door must be fastened with screws or bolts in order to prevent accidental opening.

**Ventilation**

Ventilation openings must be placed at heights that will provide through ventilation at all levels, particularly when the animal is lying down in a prone position. Exterior meshed ventilation openings, with a minimum diameter of 2.5 cm (1 in), must be made on the sides, entry door and roof, as shown in the illustration.

**Spacer Bars/Handles**

Must be made to a depth of 2.5 cm (1 in), and formed from the framework of the container.

**Feed and Water Containers**

Food and water containers must be fixed off the floor, to prevent soiling, at the front of the container. Safe outside access must be provided for filling in emergency.

**Special Requirements**

Bears and other strong clawing animals must have the container totally lined with sheet iron or other hard metal sheeting with ventilation openings punched through to the exterior.

**Forklift Extrusions**

Must be provided if the total weight of the container plus animal exceeds 60 kg (132 lb).

**Multiple Containers**

When more than one animal is to be carried in a container, multiples of the above requirements must apply. The container can be divided into compartments by the use of partitions made of metal grills. There must be a separate access into each compartment. Compatible animals that are not likely to harm each other during shipment need not be separated by a partition.

### 2. PREPARATIONS BEFORE DISPATCH (see Chapter 5)

Food intake must be reduced 2 to 3 days before shipment. A light meal may be given prior to dispatch and food must be provided in case of emergency.

These species must be kept in darkened containers to avoid stimulus from their surroundings. They have the tendency to become aggressive and belligerent if disturbed by outside interference or noise.

### 3. FEEDING AND WATERING GUIDE (for emergency use only)

Animals do not normally require feeding or watering during 24 hours following the time of dispatch.

If feeding or watering is required due to an unforeseen delay, feed once daily, preferably late afternoon, 1 kg of meat per 20 kg (1 lb per 22 lb) of live weight. Polar bears will also eat fish and brown bears like fish and fruit.

### 4. GENERAL CARE AND LOADING (see Chapters 5 and 10)

Animals covered by this Container Requirement prefer to travel in darkness or semi-darkness.

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# ESA Blanket Permit 31674C

1 message

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, May 8, 2017 at 10:17 AM
To: marla.waddell@pdza.org

Good morning Ms. Waddell,
REF: 31674C

Our office received your request for a blanket import permit under the Endangered Species Act (ESA) for 16 clouded leopards (*Neofelis nebulosa*). In order to complete your request, please reply to the following:

1) Please complete question #19, the disqualification factor, and provide an electronic copy of this page for our records.

2) Page 230 of your application package includes the text "Place holder for Andy Goldfarb CV, Place holder for Shannon Smith CV, Place holder for Kadie Burrone CV, Place holder for Piper Leiper CV." If you would like the CV for these four staff members included in your application, please provide them electronically.

**If we do not receive the information requested above within 45 days from the date of this message, your incomplete application will be placed in our inactive files and we will not complete your request for a permit.**

Please do not hesitate to contact us if you have further questions.

Respectfully,

Adrienne Lohe
Permits Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
703-358-1986

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# ESA Blanket Permit 31674C

10 messages

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, May 8, 2017 at 10:17 AM
To: marla.waddell@pdza.org

Good morning Ms. Waddell,
REF: 31674C

Our office received your request for a blanket import permit under the Endangered Species Act (ESA) for 16 clouded leopards (*Neofelis nebulosa*). In order to complete your request, please reply to the following:

1) Please complete question #19, the disqualification factor, and provide an electronic copy of this page for our records.

2) Page 230 of your application package includes the text "Place holder for Andy Goldfarb CV, Place holder for Shannon Smith CV, Place holder for Kadie Burrone CV, Place holder for Piper Leiper CV." If you would like the CV for these four staff members included in your application, please provide them electronically.

**If we do not receive the information requested above within 45 days from the date of this message, your incomplete application will be placed in our inactive files and we will not complete your request for a permit.**

Please do not hesitate to contact us if you have further questions.

Respectfully,

Adrienne Lohe
Permits Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
703-358-1986

---

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 10:21 AM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Thank you Ms. Lohe. I just returned from some time off, but will address these questions either today or tomorrow at the latest.

Marla Waddell

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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Before printing, think about the environment

**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 7:18 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** ESA Blanket Permit 31674C

[Quoted text hidden]

---

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, May 8, 2017 at 12:34 PM
To: Marla Waddell <Marla.Waddell@pdza.org>

Hi Marla,

Thank you. I apologize for the multiple emails, however, I do have a few more questions in addition to the two questions in the previous email. In order to complete your application, please reply to the following:

1) Please provide detailed information regarding which projects will be used to meet enhancement requirements under the ESA for your application. Your history of contributing to in-situ programs is commendable, but realize that each application submitted to this office must reflect **current and future** in-situ activities. Please explain such activities by describing **each zoo's long-term commitments** to provide conservation benefit to wild clouded leopard populations.

2) Please estimate how many of the 16 cubs will be going to each zoo.

If your application meets all of the criteria under CITES and the ESA, we will be able to issue a blanket authorization for the import of the 16 cubs from Thailand. Please be aware that although we can provide a letter stating the authorized activity, we will not be providing individual import permits until each cub is born and the proper breeders statements, individual identifying information, and other necessary documentation is provided to us.

If you have any questions, please give me a call.

**If we do not receive the information requested above within 45 days from the date of this message, your incomplete application will be placed in our inactive files and we will not complete your request for a permit.**

Respectfully,

Adrienne Lohe
Permits Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
703-358-1986
[Quoted text hidden]
--
Adrienne Lohe
Permits Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
703-358-1986

---

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 12:57 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Not a problem. I will forward these new questions to the proper people and remind them that there is a strict deadline.

Thanks for your help!

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 9:34 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** Re: ESA Blanket Permit 31674C

[Quoted text hidden]

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**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 1:56 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Adrienne,

Regarding your reference to Question #19. I don't see actual question numbers on the application. There are lettered sections, but I don't see numbers. Could you please let me know where this question is listed in the application? I must be missing something.

Also, I apologize for not adding the four CV's that were listed. This application was really tough to put together, and I just spaced on those. I have attached the CV's you listed.

Thank you,

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 7:18 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** ESA Blanket Permit 31674C

Good morning Ms. Waddell,

[Quoted text hidden]

**4 attachments**

**Andy_Goldfarb_resume.pdf**
126K

**Kadie Burrone Resume.pdf**
23K

**Piper 2016 Elephant Barn Resume.pdf**
43K

**Shannon 2016 resume.pdf**
200K

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, May 8, 2017 at 2:02 PM
To: Marla Waddell <Marla.Waddell@pdza.org>

Hi Marla,

Thanks for the CVs--not a problem. It was a very long application!

Regarding #19, you can use the application form found on our website: https://www.fws.gov/international/pdf/permit-application-form-3-200-37-export-import-interstate-and-foreign-commerce-take-of-animals.pdf
On page 6 of the PDF you can find question 19. You can return a PDF of that page with 19 completed.

Thank you,
Adrienne
[Quoted text hidden]
--
Adrienne Lohe
Permits Biologist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
703-358-1986

---

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 2:09 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Thanks,

I will check that out.

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 11:03 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** Re: ESA Blanket Permit 31674C

Hi Marla,

[Quoted text hidden]
[Quoted text hidden]

---

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 2:16 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Adrienne,

Well that was easy. Here is the answer to question #19.

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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Before printing, think about the environment

**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 11:03 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** Re: ESA Blanket Permit 31674C

Hi Marla,

[Quoted text hidden]
[Quoted text hidden]

---

**Question 19.pdf**
16K

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**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, May 8, 2017 at 2:21 PM
To: Marla Waddell <Marla.Waddell@pdza.org>

Marla,

Great, thank you. I'll wait to hear back about my last two questions.

Respectfully,
Adrienne
[Quoted text hidden]

---

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, May 8, 2017 at 2:23 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Sounds good. I have sent them out to the parties that can address them.

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 11:22 AM

[Quoted text hidden]

[Quoted text hidden]

th

[redacted]

[redacted] Defiance Zoo & Aquarium Tacoma, WA

**Staff Biologist**

- Provides husbandry, care and training (protected contact) of Asian elephants, Sumatran tigers, tapirs, gibbons, siamangs, anoas, and various other species including blood withdrawal, eye examinations, application of medications, etc.
- Writes and implements animal training plans
- Writes animal safety protocols
- Presents keeper talks and other presentations
- Assists in the design of animal enclosures and exhibits
- Performs exhibit maintenance and repair
- Executes the acquisition/disposition of animals
- Assists veterinary staff with animal physicals and other medical procedures
- Provides animal enrichment for all species
- Maintains animal records
- Serves on the Zoo's Safety Committee
- Serves as an active member on the Zoo's Lethal Restraint Team
- Conducts interviews for media, newspapers, and other venues
- Serves as interim project manager for the Thailand Clouded Leopard Consortium: spends between two and four months each year overseeing local staff and breeding program of clouded leopard population at Khao Kheo Open Zoo in Thailand
- Served as surrogate "dad" to neonate clouded leopard cubs
- Coordinated with Wild Aid researchers and Khao Yai rangers in Thailand for pug mark identifications

[redacted]2[redacted] Dreamworld Coomera, QLD Australia

**Assistant Manager Tiger Island Display**

- Managed nine staff members including training, hiring, disciplinary actions, and performance evaluations
- Managed daily operations of Bengal tiger interactive exhibit and cougar exhibit
- Managed the husbandry, care and training of ten Bengal tigers and two cougars
- Implemented animal safety protocols
- Assisted veterinary staff with animal physicals and other medical procedures
- Conditioned and desensitized tigers to accept a variety of medical procedures including blood withdrawal, hand injection of vaccinations, urine collection, present an open mouth, ultrasound, radiographs, etc.
- Trained and conditioned non–handled adult tigers to travel in a transport container
- Handled and trained a variety of animals including tiger, cougar, dingo, wombat, reptiles, birds of prey, etc.
- Presented animal interpretive programs with tigers and cougars

emphasizing natural behaviors and wildlife conservation

- Coordinated with in-situ conservation organizations to support Sumatran and Bengal tiger projects
- Assisted in the design of animal enclosures and exhibits
- Executed the acquisition/disposition of animals
- Maintained animal records and reports
- Conducted extensive public relations duties including appearances on numerous local, national, and international television programs, radio talk shows, and newspaper interviews
- Licensed and trained to use a .30-.30 rifle in accordance with escaped animal protocol

[redacted] [redacted] World Africa USA Vallejo, CA

**Supervisor Tiger Island**

- Managed six staff members including scheduling, training, hiring, disciplinary actions, and performance evaluations
- Managed daily operations of Bengal tiger interactive exhibit
- Managed the husbandry, care and training of fourteen Bengal tigers, two cougars and one African lion
- Hand-raised (from birth to adulthood) tigers, cougars, lions and hyenas
- Trained tigers for medical procedures
- Assisted veterinary staff with animal physicals and other medical procedures
- Implemented animal safety protocols
- Handled the acquisition/disposition of animals
- Oversaw the construction of a new tiger exhibit
- Conceived and implemented design for an under water viewing window for park guests to observe tigers swimming and diving in water
- Wrote, choreographed, and produced a show script for the new Tiger Island display
- Organized and oversaw the design and construction of a temporary tiger display in conjunction with Exxon and the Dallas State Fair, Texas (1996 and 1997)
- Transported six adult tigers and two tiger cubs to and from Texas
- Spokesperson for Marine World appearing on many local, national and international television programs

[redacted] [redacted] World Africa USA Vallejo, CA

**Senior Trainer Tiger Island**

- Trained staff on training techniques, husbandry, and protocol in the handling of big cats
- Provided the husbandry, care and training of Bengal tigers, cougars, and a female lioness
- Provided the general maintenance of animal enclosures and exhibits
- Hand-raised and trained tiger, lion and cougar cubs and handled through adulthood
- Distributed oral medications and gave hand injections and annual vaccinations
- Trained tigers and cougars to perform in various magic illusions in Marine World's "Magic of Animals" show
- Presented public demonstrations with the cats emphasizing natural behaviors
- Prepared and distributed animal diets
- Maintained animal records and reports

[redacted] Marine World Africa USA Vallejo, CA

**Trainer Tiger Island**

- Provided the husbandry, care and training of Bengal tigers, cougars, and a female lioness
- Provided the general maintenance of animal enclosures and exhibits
- Hand-raised and trained tiger, lion and cougar cubs and handled through adulthood
- Presented public demonstrations with the cats emphasizing natural behaviors
- Prepared and distributed animal diets
- Maintained animal records and reports

[redacted] Marine World Africa USA Vallejo, CA

**Apprentice Trainer Tiger Island**

- Provided the husbandry, care and training of Bengal tigers, cougars, and a female lioness
- Provided the general maintenance of animal enclosures and exhibits
- Hand-raised and trained tiger, lion and cougar cubs and handled through adulthood
- Presented public demonstrations with the cats emphasizing natural behaviors
- Prepared and distributed animal diets
- Maintained animal records and reports

[redacted] [redacted] World Africa USA Redwood City, CA

**Lead Animal Keeper**

- Supervised four keepers
- Prepared weekly schedules and assigned daily duties
- Provided general cleaning and maintenance of animal holding facilities and exhibits for numerous primates (spider monkey, capuchin monkey, etc.), carnivores (tiger, lion, cheetah, etc.) and large hoof stock (rhino, giraffe, eland, zebra, camel, etc.)
- Prepared and distributed animal diets
- Designed and built capture enclosures for large hoof stock (rhinos, giraffes, antelope, etc.)
- Assisted in veterinary procedures
- Assisted in capture, restraint and movement of numerous species to new location of Park
- Assisted elephant staff with cleaning, night feeds and loading guests for rides

[redacted] Marine World Africa USA Redwood City, CA

**Animal Keeper**

- Provided general cleaning and maintenance of animal holding facilities and exhibits for numerous primates (spider monkey, capuchin monkey, etc.), carnivores (tiger, lion, cheetah, etc.) and large hoof stock (rhino, giraffe, eland, zebra, camel, etc.)
- Prepared and distributed animal diets

**Consulting Experience**

Made design recommendations to builders/designers, assessed designs for efficiency of operation of tiger enclosures and displays, advised on raising cubs and/or training of adult tigers, gave Power Point presentations on medical training procedures for big cats (USDA), for the following organizations:

Wild Felid Advocacy Center of Washington (2013 – present)
Wild Cat Haven, Oregon (2010)
Cat Tales Zoological Park, WA. (2008 – present)
Siegfried & Roy Productions (2008)
Dreamworld, Australia (2007, 2008)
USDA, St Louis, MO and Washington DC (2005, 2006)
Black Pine Animal Park
Six Flags Marine World, CA (2000)
Warner Bros. Television Series *Beastmaster* (1999 - 2002)
Texas State Fair, TX (1996, 1997)
Colorado's Ocean Journey, CO (1996)
Paradise Safari Park, England (1995)
Oregon Tiger Sanctuary, OR (1994 - 1997)
Walt Disney's Motion Picture's *Jungle Book* (1994)

**Volunteer Experience**

Marine World Africa USA Veterinary Clinic, (1985 -1987)
Sacramento Zoo (Sept. 1984 - March 1985)
U.C. Davis Veterinary Hospital (March 1983 - Sept. 1984)

**Professional Associations**

AAZK member 2002-present

**KADIE BURRONE**

[redacted]

[redacted]

Behavior - [redacted]

## EMPLOYMENT

**Elephant Barn Staff Biologist,** Point Defiance Zoo and Aquarium, Tacoma, WA

[redacted]

- Daily diet preparation, feeding, cleaning, observation, and enrichment of Asian Elephants, clouded leopards, muskoxen, and reindeer.
- Hand reared and socialized five litters of clouded leopard cubs (6.3.3) and three tigers (0.1 Malayan and 1.1 Sumatran)
- Training behaviors for husbandry and veterinary procedures using operant conditioning
- Perform keeper talks and private encounters
- Daily record keeping (ZIMS and enrichment program)
- Train interns, new hires, and volunteers on daily duties

**Asia Forest Temporary Keeper,** Point Defiance Zoo and Aquarium, Tacoma, WA

[redacted]

- [redacted] feeding, cleaning, observation, and enrichment of White-cheeked gibbon, siamangs, small-clawed otters, Malayan tapir, Indian crested porcupine, lowland anoa, and Sumatran tigers.

**Village Keeper,** Wildlife Safari, Winston, OR

[redacted]

- Daily feeding, cleaning, observation, and enrichment of small primates, a variety of mammals, birds, reptiles, amphibians, and invertebrates
- Hand raising four red ruffed lemurs born May 2010 and a Wallaroo
- Training behaviors for husbandry and veterinary procedures using operant conditioning
- Perform keeper talks and private encounters
- Emergency response team; trained to handle fire arms

**Carnivore Keeper,** Wildlife Safari, Winston, OR

[redacted]

- Daily feeding, cleaning, observation, and enrichment of lions, black bears, and brown bears
- Training behaviors for husbandry and veterinary procedures using operant conditioning
- Perform keeper talks and private encounters
- Assist in creating and executing protocols for daily operations and animal introductions
- Train interns, new hires, and volunteers on daily duties
- Coordinate intern applications and conduct interviews
- Fully cross trained in the Cheetah Department
- Emergency response team; trained to handle fire arms

[redacted]

**EXPERIENCE:**

**Elephant Barn Staff Biologist** [redacted]
Point Defiance Zoo & Aquarium

- Husbandry of Asian elephants, clouded leopards, muskoxen, and reindeer.
- Training of aforementioned species.
- Diet and supplement preparation.
- Monitor health and behavior of animals in care, communicate with veterinary staff and administer medications.
- Shifting animals on and off exhibit.
- Develop, administer and record enrichment.
- Deliver interpretive talks.
- Neonatal care and socialization of clouded leopard cubs.

**Wild Wonders Outdoor Theater Seasonal Keeper** [redacted]
Point Defiance Zoo & Aquarium

- Husbandry of multiple species, including invertebrates, reptiles, mammals and birds.
- Experience handling a variety of animals including multiple species of reptile, domestic rats, African white-bellied hedgehog, three-banded armadillo, opossum, North American beaver, burrowing owl, and American kestrel.
- Presentation of formal and informal animal programs.
- Clean and set up of holdings.
- Diet and supplement preparation.
- Husbandry and training of rats in quarantine.
- Monitor health and behavior of animals in care, and communicate observations with full-time staff.
- Develop, deliver, and record enrichment.

**Asian Forest Sanctuary Part Time Keeper** [redacted]
Point Defiance Zoo & Aquarium

- Husbandry of clouded leopards, Sumatran and Malayan tigers, white-cheeked gibbons, siamangs, Asian small-clawed otters, Indian crested porcupines, lowland anoa, Malayan tapirs, muskoxen, reindeer, and wood duck.
- Clean and set up exhibits, holdings, and elephant barn.
- Diet and supplement preparation.
- Monitor health and behavior of animals in care, and communicate observations with full-time staff.
- Aid full-time staff with training, safely shifting animals on and off exhibit, and veterinary procedures.
- Assist full-time staff with the neonatal care and continued free contact socialization of 2 litters of clouded leopard cubs.

**Rocky Shores Intern** [redacted]
Point Defiance Zoo & Aquarium

- Husbandry of Pacific walruses, harbor seals, sea otters, Arctic foxes, Magellanic penguins, and tufted puffins.
- Clean exhibits and holdings.
- Diet preparation and feeding of marine mammals and birds.
- Assist full-time staff with training sessions.
- Monitor behavior and communicate observations with full-time staff.
- Deliver and record enrichment.
- Communicate effectively with public, both formally and informally.

[redacted]

SHANNON MARIE SMITH
[redacted]

[redacted]

Experience in a wide variety of roles within a zoo setting, including animal husbandry, administration, and independent research. Excellent communication, organizational, public relations, and teamwork skills. Works effectively with all levels of staff, from volunteers to upper management. Positive, flexible, and enthusiastic. Creative problem solving skills.

**EXPERIENCE**

[redacted]
[redacted] and Aquarium (PDZA)
Staff Biologist

- Responsible currently for daily husbandry, enrichment, and shaping and conditioning behaviors in 0.2 Asian elephants, 3.3 Clouded leopards, 0.1 muskoxen, and 0.1 reindeer
- Experience hand rearing and socialization of 6 litters (9.5.0) clouded leopard cubs. Oversee staff scheduling of 24hr feeds. Responsible for shipping cubs to and from other facilities to pair for breeding.
- Animals previously worked with: red wolves, snow leopards, Langurs, Siamangs, Malayan and Sumatran tigers, Malayan tapirs, lowland anoa, crested porcupine, Burmese python, blind cave fish, Goliath birdeater spider, pygmy and Nubian goats, junglefowl, Bali mynahs, and Satyr tragopans.
- Perform exhibit upkeep and maintenance
- Maintains staff schedule and daily record keeping for all animals (written and ZIMS)
- Order feed, medical and staff supplies

[redacted]
Point Defiance Zoo and Aquarium (PDZA)
Staff Biologist, Part-time

- Responsible for shaping and conditioning behaviors and the socializations of beluga whales, pacific walrus, harbor porpoise, and California sea lion for public presentations and daily management of the animals.
- Perform educational interpretive duties formally over microphone during peak seasons and marine mammal training sessions, and informally during interaction with visitors outside of sessions.
- Responsible for husbandry and preparing and distributing diets for marine mammals and coatimundi, pygmy marmosets, golden lion tamarins, fruit bats, aardvarks, Emerald tree boas, Gila monsters, peach throated monitors, naked mole rats, screech owl, and tiger quolls.
- Responsible for staff scheduling for all zoological areas.
- Assist veterinarian with rounds, examinations, surgeries and necropsies.
- Assisted veterinarians and staff with electro-ejaculation and artificial insemination of captive SSP red wolves.
- Project assistant for National Marine Fisheries Service in the collection of tagging, measurement, tissue sample, and release of harbor seals in Washington State. Responsible for maintain California sea lions during holding period prior to interstate relocation.

- Project Assistant for Woods Hole Oceanographic Institution in producing video tapes for PDZA of beluga births and other videos for WHOI
- Assistant to Chairperson, 1994 IMATA Conference. Solicited donations, promoted and

[redacted]

18. Who should we contact if we have questions about the application? (Include name, phone number, and email):

19. **Disqualification Factor**. A conviction, or entry of 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 disqualifies any such person from receiving or exercising the privileges of a permit, unless such disqualification has been expressly waived by the Service Director in response to a written petition. (50 CFR 13.21(c)) Have you or any of the owners of the business, if applying as a business, been convicted, or entered a plea of guilty or nolo contendere, forfeited collateral, or are currently under charges for any violations of the laws mentioned above?

☐ Yes ☑ No If you answered "Yes" provide: a) the individual's name, b) date of charge, c) charge(s), d) location of incident, e) court, and f) action taken for each violation.

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

1 message

**Marla Waddell** <Marla.Waddell@pdza.org> Tue, Jun 13, 2017 at 2:35 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Hi Adrienne,

Attached please find updated information with regards to the Clouded Leopard Blanket permit application #US31674C/9. Please feel free to contact me if you have any other questions regarding this submission.

Thank you,

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 11:22 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** Re: ESA Blanket Permit 31674C

Marla,

Great, thank you. I'll wait to hear back about my last two questions.

Respectfully,

Adrienne

On Mon, May 8, 2017 at 2:16 PM, Marla Waddell <Marla.Waddell@pdza.org> wrote:

> Adrienne,
>
> Well that was easy. Here is the answer to question #19.
>
> Marla
>
> Marla Waddell | Registrar | Hospital Administrator
> Point Defiance Zoo & Aquarium | Metro Parks Tacoma
>
> 5400 N. Pearl Street
>
> Tacoma, WA 98407
>
> T: 253.404.3654 | F: 253.404-3827 | www.pdza.org
>
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>
> **From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
> **Sent:** 08 May, 2017 11:03 AM
> **To:** Marla Waddell <Marla.Waddell@pdza.org>
> **Subject:** Re: ESA Blanket Permit 31674C
>
> Hi Marla,
>
> Thanks for the CVs--not a problem. It was a very long application!
>
> Regarding #19, you can use the application form found on our website: https://www.fws.gov/international/pdf/permit-application-form-3-200-37-export-import-interstate-and-foreign-commerce-take-of-animals.pdf
>
> On page 6 of the PDF you can find question 19. You can return a PDF of that page with 19 completed.

Thank you,

Adrienne

On Mon, May 8, 2017 at 1:56 PM, Marla Waddell <Marla.Waddell@pdza.org> wrote:

Adrienne,

Regarding your reference to Question #19. I don't see actual question numbers on the application. There are lettered sections, but I don't see numbers. Could you please let me know where this question is listed in the application? I must be missing something.

Also, I apologize for not adding the four CV's that were listed. This application was really tough to put together, and I just spaced on those. I have attached the CV's you listed.

Thank you,

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 08 May, 2017 7:18 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** ESA Blanket Permit 31674C

Good morning Ms. Waddell,

REF: 31674C

Our office received your request for a blanket import permit under the Endangered Species Act (ESA) for 16 clouded leopards (*Neofelis nebulosa*). In order to complete your request, please reply to the following:

1) Please complete question #19, the disqualification factor, and provide an electronic copy of this page for our records.

2) Page 230 of your application package includes the text "Place holder for Andy Goldfarb CV, Place holder for Shannon Smith CV, Place holder for Kadie Burrone CV, Place holder for Piper Leiper CV." If you would like the CV for these four staff members included in your application, please provide them electronically.

**If we do not receive the information requested above within 45 days from the date of this message, your incomplete application will be placed in our inactive files and we will not complete your request for a permit.**

Please do not hesitate to contact us if you have further questions.

Respectfully,

Adrienne Lohe

Permits Biologist

Division of Management Authority

U.S. Fish and Wildlife Service

5275 Leesburg Pike, MS: IA

Falls Church, VA 22041-3803

703-358-1986

--

Adrienne Lohe

Permits Biologist

Division of Management Authority

U.S. Fish and Wildlife Service

5275 Leesburg Pike, MS: IA

Falls Church, VA 22041-3803

703-358-1986

--

Adrienne Lohe

Permits Biologist

Division of Management Authority

U.S. Fish and Wildlife Service

5275 Leesburg Pike, MS: IA

Falls Church, VA 22041-3803

703-358-1986

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**USFWS question regarding funding 2017 -Final.docx**
16K

# Response to questions from USFWS regarding future funding/enhancement for Clouded leopards (Blanket permit application #US31674C/9)

1) Please provide detailed information regarding which projects will be used to meet enhancement requirements under the ESA for your application. Your history of contributing to in-situ programs is commendable, but realize that each application submitted to this office must reflect **current and future** in-situ activities. Please explain such activities by describing **each zoo's long-term commitments** to provide conservation benefit to wild clouded leopard populations.

The projects that Point Defiance Zoo & Aquarium, National Zoo and Nashville Zoo support in range countries have a wide range of impacts on clouded leopards in the wild. Much of the information we have gained with this species results from field work associated with GPS studies of radio-collared clouded leopards as well as opportunistic camera trap studies throughout their range. Understanding clouded leopard distribution and numbers, as well as habitat use (including how animals respond to different logging approaches i.e. indiscriminate vs. reduced-impact logging activities) provides critical information and data for clouded leopards which assists with assigning IUCN status and informs local and country-wide conservation management, land-use, translocation and recovery strategies.

Point Defiance Zoo & Aquarium:

At a minimum we will continue to collaborate with our long-standing partners (Oxford University, Leibniz Institute for Zoo and Wildlife Research, Zoological Parks Organization, Thailand) in Malaysian Borneo, mainland Malaysia and Thailand. Other projects will be considered on a merit based assessment as they are submitted. PDZA has a Conservation Committee consisting of curatorial, keeper, education, veterinary, scientific and administrative staff as well as 3 laypersons that evaluate and score all proposals submitted for funding (which occurs on a yearly basis). Our criteria include:

- Project Background: Is the justification for the project sound and are the goals of the project clear?
- Methodology: Is the methodology for the project appropriate at clear?
- Project Team: Do the investigators have the necessary skills to carry out the project?
- Conservation Value: Is the project likely to have a high conservation return for the investment?
- Ability to measure success: Are there clear objectives and measures of success in place?

Since 2002, we have contributed over $300,000 to clouded leopard projects with an average of $24,100/year. We remain committed to clouded leopard conservation and anticipate contributing at least $20,000 yearly towards enhancement for the species.

Nashville Zoo

Nashville Zoo is committed to contributing $50,000 to field studies over the next five years. The monies from Nashville will be coming through PDZA to ensure that the projects they fund undergo a rigorous evaluation process (see above). At a minimum, Nashville Zoo will be providing funding in $10,000 annual installments to the long-standing partners in the areas stated above.

National Zoo

Dr. Nucharin Songsasen, a Research Biologist at the Smithsonian Conservation Biology Institute, contributed $3,000 toward research that included clouded leopards in 2016. For the next 5 years, she is planning on contributing $10,000 - 20,000 each year to conduct field surveys in Thailand that will include clouded leopards (as well as dhole).

2) Please estimate how many of the 16 cubs will be going to each zoo.

Six (6) to Nashville, six (6) to National, and four (4) to Point Defiance.

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Mon, Jun 19, 2017 at 9:41 AM
To: Marla Waddell <Marla.Waddell@pdza.org>

Hi Marla,

Thank you, I have received your additional information and added it to your file. I will notify you once your receipt of application notice has been published in the Federal Register.

Respectfully,
Adrienne
[Quoted text hidden]

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Marla Waddell** <Marla.Waddell@pdza.org> Mon, Jun 19, 2017 at 9:44 AM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Thanks for letting me know it was received!

Have a great week,

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

T: 253.404.3654 | F: 253.404-3827 | www.pdza.org

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 19 June, 2017 6:42 AM
**To:** Marla Waddell <Marla.Waddell@pdza.org>
**Subject:** Re: ESA Blanket Permit 31674C (Clouded Leopards)

[Quoted text hidden]

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Wed, Jun 21, 2017 at 1:55 PM
To: Marla Waddell <Marla.Waddell@pdza.org>

Hi Marla,

Can you please provide a copy of the license or registration, if any, under the Animal Welfare Act regulations of the U.S. Department of Agriculture (9 CFR 2) for each of the three zoos?

This was not requested on the application form, but it will be helpful in our review of your application.

Thank you!

Respectfully,
Adrienne
[Quoted text hidden]

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Marla Waddell** <Marla.Waddell@pdza.org> Thu, Jun 22, 2017 at 12:34 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

Here you go Adrienne. Regarding the National Zoo, here is their response: Since the Smithsonian Institution and therefore the Smithsonian National Zoo is a federal agency we are not required by USDA to have a USDA license.

Let me know if you have any other questions.

Marla

Marla Waddell | Registrar | Hospital Administrator
Point Defiance Zoo & Aquarium | Metro Parks Tacoma

5400 N. Pearl Street

Tacoma, WA 98407

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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 21 June, 2017 10:55 AM

[Quoted text hidden]

[Quoted text hidden]

**3 attachments**

**2017 Permit.pdf**
202K

**USDA2016-17-Nashville.pdf**
385K

**USDA2017-18 Nashville.pdf**
482K

USDA

**EXPIRATION DATE: FEBRUARY 13, 2018**

**United States Department of Agriculture**

**Marketing and Regulatory Programs**

**Animal and Plant Health Inspection Service**

**Animal Care**

This is to certify that

METRO PARKS TACOMA

is a licensed under the

CLASS C EXHIBITOR

# Animal Welfare Act

**(7 U.S.C. 2131 et seq.)**

Certificate No. 91-C-0003

Customer No. 3416

Deputy Administrator

APHIS FORM 7007 (NOV 99)

*Previous editions are obsolete.*

USDA

**EXPIRATION DATE: JULY 2, 2017**

**United States Department of Agriculture**

**Marketing and Regulatory Programs**

**Animal and Plant Health Inspection Service**

**Animal Care**

This is to certify that

NASHVILLE ZOO

is a licensed under the

CLASS C EXHIBITOR

# Animal Welfare Act

**(7 U.S.C. 2131 et seq.)**

Certificate No.

63-C-0131

Customer No.

7457

Deputy Administrator

APHIS FORM 7007 (NOV 99)

*Previous editions are obsolete.*

USDA

**United States Department of Agriculture**

**Marketing and Regulatory Programs**

**Animal and Plant Health Inspection Service**

**Animal Care**

**EXPIRATION DATE: JULY 02, 2018**

This is to certify that

NASHVILLE ZOO

is a licensed under the

CLASS C EXHIBITOR

# Animal Welfare Act

**(7 U.S.C. 2131 et seq.)**

Certificate No. 63-C-0131

Customer No. 7457

Deputy Administrator

APHIS FORM 7007 (NOV 99)

*Previous editions are obsolete.*

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Lohe, Adrienne** <adrienne_lohe@fws.gov> Thu, Jun 22, 2017 at 1:33 PM
To: Marla Waddell <Marla.Waddell@pdza.org>

Thank you Marla!

Adrienne
[Quoted text hidden]

**Lohe, Adrienne <adrienne_lohe@fws.gov>**

# RE: ESA Blanket Permit 31674C (Clouded Leopards)

**Marla Waddell** <Marla.Waddell@pdza.org> Thu, Jun 22, 2017 at 1:39 PM
To: "Lohe, Adrienne" <adrienne_lohe@fws.gov>

No problem. ☺

Marla Waddell | Registrar | Hospital Administrator
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**From:** Lohe, Adrienne [mailto:adrienne_lohe@fws.gov]
**Sent:** 22 June, 2017 10:34 AM

[Quoted text hidden]

[Quoted text hidden]