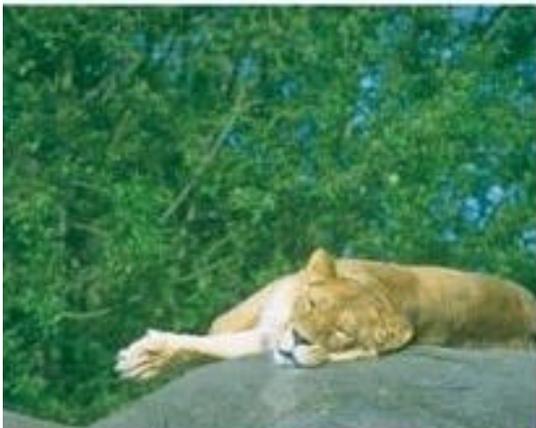


**2005 FELID TAG  
ANNUAL REPORT**

**Editors: Norah Fletchall  
and William Swanson**



Saint Louis Zoo  
St. Louis, Missouri



## TABLE OF CONTENTS

Executive Summary of Annual Conference .....	3
Past and Future Sites and Hosts of Felid TAG Meetings .....	5
Felid TAG Steering Committee Report Summary .....	6
Narrative Summations – Special Topic: African Felids .....	10
Narrative Summations – Plenary Session Presentations .....	38
Working Group Reports .....	58
Studbook, SSP and PMP Reports .....	67
Participant List .....	84

Cover Photos and Artwork - provided by the St. Louis Zoo

## EXECUTIVE SUMMARY OF ANNUAL MEETING

The Annual Mid-year Meeting for the North American Felid Taxon Advisory Group (TAG) was held March 18-20, 2005 at the Holiday Inn Select Downtown in Saint Louis, Missouri, hosted by the St. Louis Zoo. The Felid TAG co-chairs, steering committee and meeting participants wish to thank the St. Louis Zoo President and CEO Dr. Jeffrey Bonner, the Local Host Steve Bircher, the Meeting Organizer Ann Weinhardt and the numerous other staff members and volunteers at the St. Louis Zoo for their tremendous efforts in organizing an exceptional mid-year meeting. As in the previous three years, the Felid TAG also is extremely indebted to the IAMS Company for their financial support of the mid-year meeting and their continued assistance with conservation efforts for nondomestic felids. We also are grateful to several local companies in St. Louis (Gateway Food Service, OE Brokerage, OfficeMax, Osage Marketing, Sysco Food Services) that provided sponsorship support for the meeting.

Beginning in 2005, the Felid TAG steering committee decided that the mid-year meeting agenda each year should be focused on one special topic to allow more in-depth interaction and discussion of specific felid-related issues. This year, the special topic selected was African Felids. Accordingly, the Felid TAG invited several speakers working with African felids in range countries to present their research findings at the TAG meeting. Invited speakers included Dr. Sarah Durant from the Zoological Society of London who studies cheetahs in Tanzania, Dr. Alex Sliwa from the Wuppertal Zoo who conducts field research with black-footed cats in South Africa and Dr. Dewald Keet, a veterinarian studying disease issues in African lions. The St. Louis Zoo, Brookfield Zoo and Omaha's Henry Doorly Zoo generously covered travel expenses of the invited speakers and the Felid TAG, with financial support of the IAMS Company, was able to provide some additional support. In addition, several U.S.-based curators, scientists and veterinarians gave presentations focused on ongoing conservation projects and research studies in cheetahs, black-footed cats and other African felids.

Other speakers presented brief updates and progress reports that focused on various management, veterinary and research issues with non-African felids. We also were honored this year to have a presentation by one of the two co-chairs for the IUCN/SCC Cat Specialist Group (CSG), Dr. Cristine Breitenmoser, who gave us an overview of CSG activities. Working groups were convened during the meeting to focus on in situ conservation efforts with African felids but also to address the Standardized Guidelines for Large and Small Cats, develop an outline for the first Felid TAG husbandry course, and explore educational initiatives with small felids. At the conclusion of the TAG meeting, brief status updates were provided by population managers for most of the Felid SSPs, PMPs and DERPs.

Prior the start of the mid-year meeting on March 16<sup>th</sup> and 17<sup>th</sup>, several SSPs and PMPs (Clouded Leopard, Ocelot, Amur Leopard, Fishing Cat, Pallas' Cat, Black-footed Cat, Cheetah, Lion) took the opportunity to convene population management/planning meetings. A half-day Small Felid Workshop, organized by Danny Morris and Michelle Claud, also was held to follow up on addressing priority small cat issues identified at the 2004 Mid-year meeting. We appreciate the efforts of all the speakers, program leaders and other meeting participants who attended the mid-year TAG meeting this year.

The 2006 Mid-year Felid TAG meeting will be hosted by the Denver Zoological Gardens and is scheduled for April 8<sup>th</sup> -10<sup>th</sup>, 2006 with SSP meetings to be held on April 5<sup>th</sup> and 6<sup>th</sup>. The special topic for this meeting will be Temperate Asian Felids (eg., Amur tiger, Amur leopard, snow leopard, Pallas' cat). Additional meeting information will be posted soon on the Felid TAG website ([www.felidtag.org](http://www.felidtag.org)). We look forward to seeing each of you at next year's TAG meeting (and maybe on the slopes if you're up for some springtime skiing!).

Bill Swanson and Norah Fletchall, Felid TAG Co-Chairs

## **Past and Future Sites and Hosts of Felid TAG Meetings**

- 1991 – Conservation and Research Center, Front Royal, VA (David Wildt)
- 1992 – Conservation and Research Center, Front Royal, VA (David Wildt)
- 1993 – Conservation and Research Center, Front Royal, VA (David Wildt)
- 1994 – Conservation and Research Center, Front Royal, VA (David Wildt)
- 1995 – S.O.S. Care, Inc., Escondido, CA (Pat Quillen)
- 1996 – S.O.S. Care, Inc., Escondido, CA (Pat Quillen)
- 1997 – S.O.S. Care, Inc., Escondido, CA (Pat Quillen)
- 1998 – Oklahoma City Zoo, Oklahoma City, OK (Jack Grisham)
- 1999 – Disney’s Animal Kingdom, Lake Buena Vista, FL (Jill Mellen)
- 2000 – Riverbanks Zoo and Garden, Columbia, SC (Alan Shoemaker)
- 2001 – Regional AZA Conference, Chattanooga, TN
- 2002 – Oregon Zoo, Portland, OR (Michelle Schireman)
- 2003 – Dallas Zoo, Dallas, TX (Ken Kaemmerer)
- 2004 – Albuquerque Biological Park, Albuquerque, NM (Lynn Tupa)
- 2005 – Saint Louis Zoo, St. Louis, MO (Steve Bircher) - Special topic: African felids
- 2006 – Denver Zoo, Denver, CO (B.J. Schoeberl) – Special topic: Temperate Asian felids
- 2007 – Nashville Zoo, Nashville, TN (Rick Schwartz) – Special topic: Tropical Asian felids
- 2008 – Conservation and Research Center, Front Royal, VA (Jack Grisham) - tentative
- 2009 – Cincinnati Zoo & Botanical Garden, Cincinnati, OH (Bill Swanson) - tentative

## ***Felid TAG Steering Committee Meeting***

March 18, 2005

In attendance:

Bill Swanson, Norah Fletchall, Bonnie Breitbeil, Tarren Wagener, Ron Tilson, Steve Bircher, Alan Shoemaker, Ken Kaemmerer, Kimberly Davidson, Danny Morris, Jack Grisham, Lee Simmons

### **New Member Orientation**

In part due to IAMS sponsorship, we were able to provide \$500 for a keeper travel scholarship this year. The 2005 scholarship was awarded to Kevin Vander Molen of the Sacramento Zoo. The TAG also contributed \$150 to each of our invited foreign speakers to assist with their travel costs in addition to deferring their registration fees.

### **Great Cat and Rare Canid Act of 2005**

This Act, similar to the Tiger/Rhino Act, was introduced in the U.S. Congress last year but never reached the floor for a vote. It is being re-introduced this year. Defenders of Wildlife assisted the primary sponsor Congressman Shaw with writing the legislation. Of concern, the Act does not provide any meaningful funding for small cat conservation (except for the Iberian lynx), but efforts by the TAG to amend the wording of the Act were unsuccessful. The Act potentially does provide substantial funding for in situ conservation of larger cats, including cheetahs, snow leopards, lions and clouded leopards, and merits Felid TAG support. What actions should the FTAG take to help support this act? The Act was assigned to the Subcommittee on Fisheries, Conservation, Wildlife and Oceans. The Act needs to come out of this subcommittee first and be introduced for a vote in the House. Steve Olsen will notify the Felid TAG is the Act comes up for a vote. The Legislative Caucus is coming up and the TAG could send letters to those Zoo Directors attending this meeting, but this Act might not be the AZA's priority issue. It might be advisable to draft a letter to have ready to distribute to AZA zoos if the Act comes up for a vote.

**Action Item:** Shoe will draft a letter to send to legislators.

**Editors' note:** Letters of support for the Act from the Felid TAG were sent to all of the members of the Subcommittee in April. To our knowledge, the Act has not come up for discussion or a vote within the Subcommittee this year.

### **Felid Husbandry Course**

Tarren has been working on organizing this course, and a working group at the Mid-year meeting focused on course development. The advantages and disadvantages of developing the course through the AZA Board of Regents versus through the Felid TAG alone were discussed. Cons: AZA courses can be expensive to attend and are increasingly difficult and time-consuming to get approved. Pros: College credit and a Master's degree program are available. Alternatively, it may be possible to hold a Felid TAG sponsored course over two days in conjunction with the Mid-year meeting, with some overlap with the SSP meetings. The target audience would be anyone interested in felid husbandry issues, but keepers would be a priority. The course would be primarily lecture based, with some hands-on

training possible depending on the Host zoo and the nature of its cat collection. A separate registration fee would be required and the attendees must stay in the Host hotel. Instructors would be zoo keepers, SSP coordinators, TAG chairs, scientists, veterinarians, and educators. The course could be held every other year or alternated each year between large and small cats. If the course is successful, it may evolve into a Board of Regents course.

**Action item:** Move forward with developing the course in conjunction with the Mid-year meeting, with the first course to be offered in 2007.

### **Felid TAG Logo**

Does the Felid TAG need a logo? Logos are useful for marketing purposes and for 'branding'.

**Action item:** Dusty will look into getting some prototype logos created.

### **Felid Herpes Virus Biosurvey**

There is growing concern about routine PCR testing for herpes virus because positive results are being mis-interpreted and affecting the movement of cats for population management. A broad-based study of herpes virus prevalence might alleviate the fear of receiving cats that have positive PCR results but are lacking any clinical signs. The goal is to identify five or six zoos with large cat collections that will collect conjunctival biopsies during annual exams for PCR testing, including zoos with or without Pallas' cats and or cheetahs. A standard research protocol will be needed for review by collaborating institutions.

**Action item:** Bill will discuss this study further with possible collaborating zoos and university researchers.

### **Pregnancy Test for Felines**

A urine-based pregnancy test for felines may have been identified but until results are published, the specific test used needs to remain confidential. Urine samples from cats in breeding situations are needed to test for cross-species applicability.

**Action item:** Bill will contact facilities. Species coordinators should provide Bill with their breeding recommendations.

### **Sand Cat SSP/Studbook**

Kim Clark has resigned as Sand Cat SSP coordinator and International studbook keeper. A position announcement needs to be sent to the AZA for posting. It is recommended that the International studbook keeper and SSP coordinator be the same individual, and International studbook keepers need to be approved through their office at the Zoological Society of London.

**Action item:** Shoe will contact AZA about the SSP/studbook vacancy.

**Editor's note:** Kara Akers at The Living Desert was selected by the TAG steering committee to be the new Sand Cat SSP coordinator and studbook keeper.

### **Travel Scholarship**

The current selection process worked well for identifying a suitable scholarship recipient. However, the SC would like to see a breakdown of votes in the future.

### **Shoe's Contract**

Shoe's two-year service contract to the TAG is up for renewal in 2006. The item was tabled pending further consultation with Shoe.

### **CEF Proposals**

Education category: Approved TAG endorsement of proposal entitled "Wild Cat Conservation Education in Thailand's Khao Yai National Park", submitted by Karen Povey.

Field Conservation category: Approved TAG endorsement of research proposal entitled "Understanding the role of physiology in reintroduction success: Stress and reproduction in reintroduced Canada lynx", submitted by Dr. Jeffrey Lucas.

**Action Item:** Norah will write the letter of endorsement for Karen Povey and Bill will write the letter of endorsement for Dr. Jeffrey Lucas.

Bill will contact the other investigators who submitted proposals to explain why their proposals were not endorsed by the FTAG.

Cheetah Conservation Compendium: the TAG declined to endorse this project as it was felt this was a species-specific issue and should be reviewed by the Cheetah SSP.

### **SC Election**

**Action item:** Bonnie will conduct elections in the Fall for those SC terms that expire at the end of 2005.

### **2006 Meeting Location**

Topeka, Denver and Omaha all offered to host the meeting. The TAG will provide meeting information to Topeka and Denver and wait for their response before having the SC vote on the location. The special topic for 2006 will be Temperate Asian felids.

**Editor's note:** The Denver Zoo was selected to host the 2006 meeting.

### **Other Items**

Time Conflicts: The SC discussed the time conflict between completing the meeting agenda and attending "zoo day" at the Host zoo. The TAG would like to continue with zoo visits as it attracts people to the meeting, but logistics such as transportation, proximity of the zoo to hotel, and meeting space all factor into the amount of time available for "zoo day". The SC decided to continue having a "zoo day" each year, and will try to allocate more time for the zoo visit. One possibility is beginning the TAG meeting on Thursday evening or starting meetings at 8 am instead of 9 am. It also was suggested that the TAG allow more time for presentations by international colleagues (note: invited speakers were allowed 45 minutes each this year, which appeared adequate).

Pumas: Four zoos are requesting pumas for their collections over next few years. Michelle Schireman is having difficulty obtaining cats from State Fish & Wildlife Departments, and demographics are showing a declining population. One option is to begin breeding pumas

again in AZA institutions. However, Kim would like to conduct a space survey first to see if any zoos have surplus cougars available.

**Action item:** Danny will talk to Michelle about the puma population and get back to the SC. Kim will contact State Wildlife Departments regarding potential availability of cats.

Website and Listserve: FTAG Annual Reports and RCPs should be archived on the TAG website. Norah will review and combine the reports, scan documents as needed and compile everything onto CDs. The TAG listserv is under-utilized. Shoe will contact species coordinators to remind them to submit relevant information to the FTAG listserv.

Advisors to the FTAG: The TAG advisor list is outdated and needs updating.

**Action item:** Bonnie will email the list to SC for review and comment.

Meeting adjourned.

## ***African Felids: Current In situ and Ex situ Programs and Issues***

### **Cheetah Keeper Training Workshop: Empowering the Next Generation**

Jack Grisham, Smithsonian's National Zoological Park

The Cheetah SSP held a one-day workshop on the development of a keeper-training workshop. The concept of this workshop was to share the information that has been learned by the Cheetah SSP with the next generation of cheetah keepers. Over the years, information learned about cheetah husbandry, veterinary issues, exhibit design and conservation has not been passed on. How did this happen? Staff with the experience either: retired, got promoted, just didn't share the information or all the above. Even if the information was passed on, sometimes it was not utilized. We need to do better than this!

The course will be modeled after the successful red panda, Mexican gray wolf, rhinoceros, and otter keeper training workshops. The workshop will be two and one half days long and be held at White Oak Conservation Center. Cost to be determined and will be held in February/March 2006.

The suggested course outline will include, but not be limited to, hands-on demonstrations and classroom sessions. Classroom sessions will not be longer than two hours at a time, with a mixture of hands on interactions. Issues to be addressed are: exhibit design, introductions, natural history, population management, regional breeding centers, veterinary issues, disease, reproductive physiology, conservation education, historical management, staffing, animal management (record keeping, behavior, training, etc). Hands on demonstration will include: immobilizations, cat movements, male movement in breeding strategies, when to intervene, female in estrus, and training.

The overall goal of this program is to give cheetah managers all the tools they need to manage cheetahs in the best possible way and, if breeding takes place, this will be icing on the cake.

---

---

### **Regional Breeding Centers for Cheetah Management**

Jack Grisham, Smithsonian's National Zoological Park

In April 2003 a workshop on global ex situ cheetah management was held at the Fossil Rim Wildlife Center in Glen Rose, Texas. Participants included the Cheetah SSP Management Group, representatives from South Africa, Namibia and Holland. Discussion focused on the gradual decline in ex situ populations, especially in North America. The reasons for this decline in North America were: SSP focused on older, valuable females in the population; leukoencephalopathy; transfers did not take place due to disease concerns (including *Helicobacter*); SSP members failed to follow breeding recommendation transfers for

unknown reasons, the art of breeding and managing cheetahs was lost due to keeper attrition and failure to train the next generation.

After lengthy discussion, a recommendation came forth to develop Regional Breeding Centers, modeled after Wassanar Cheetah Center, Holland and DeWildt Cheetah Centre in South Africa. The Criteria essential for a cheetah breeding center include: large breeding and holding space sufficient to house up to 30 animals; an experienced staff; long range institutional commitment; facilities off-exhibit with minimal public interface; a commitment to participate in EEP/AAP/SSP, etc. sanctioned programs and a commitment to fund-raise to support in situ conservation. The Cheetah SSP Management Group approved this program on November 2003 at the Master Plan meeting in Columbus, Ohio.

The centers work in the following ways: Regional collection planning would make recommendations, center and partners facilities would arrange details of breeding loans, partner zoo facilities would be assured of having exhibit animals, center and partner facility veterinarians would determine reasonable standards for minimizing disease issues and consistent protocols for moving and management cheetahs to minimize stress.

Four centers are in effect: Fossil Rim Wildlife Center; White Oak Conservation Center; Ohio Consortium (Cincinnati, Columbus, Toledo, Cleveland) and San Diego. There are additional possible centers: Smithsonian's National Zoo Conservation Research Center, Wildlife Safari and the St. Louis Zoo. The first breeding success took place this past year in Ohio with the Cincinnati Zoo breeding a female moved to their Farm from Columbus. Four cubs were produced and moved back to the Toledo Zoo once they were old enough to be moved.

The Breeding Center concept has made one small step in two years and hope abounds for increased success with using the principles developed over the years in the art of cheetah management and husbandry.

---

### **Conserving Cheetahs in Tanzania: Science, Capacity and Conservation Action**

Sarah Durant, Zoological Society of London

This presentation covers the evolution of a project from a long term research project – the Serengeti Cheetah Project - on an individual species at a local level into a national program for carnivore conservation – the Tanzania Carnivore Program.

#### **The Serengeti Cheetah Project**

The Serengeti Cheetah Project is the longest running ongoing study of wild cheetah. It was initiated in 1974 by George and Lory Frame, and taken over after a two year gap in 1980-1990 by Tim Caro. The author has been running the project since this time. The core of the project activities rests on the long term monitoring of individual cheetahs which can be

easily recognised by their unique spot patterns. The project has uncovered much of what we know about cheetahs in the wild, including the unique ranging patterns and social system of the cheetah, whereby females move across large overlapping home ranges of around 800 km<sup>2</sup>, whilst males are often territorial and hold small resource based territories. Males also are often social, forming coalitions of 2-3 individuals, which are usually, but not necessarily related. This system is unique amongst mammals.

One of the key advantages of a long term study is that it allows us to estimate the demographic parameters of a population. These parameters are crucial for assessing long term viability of populations and exploring and understanding management options. Cheetahs on the Serengeti plains have a very high mortality, and only one cub out of 20 survives to independence at 18 months. Most of this mortality is due to predation, principally lions. The most vulnerable period for cheetah cubs is the first two months of life when they are confined to a lair whilst their mother leaves every day to hunt. Mortality is also high in the first two weeks after the cubs leave the den, when they follow their mother and start to eat at kills. After this period mortality begins to drop off and is relatively low after 4 months. Whilst the causes of cub mortality can be determined through close observation of den sites, the causes of adult mortality are much more difficult to determine. The Serengeti is characterised by a high density of scavengers and hence carcasses are rarely found. However the project has documented adult mortality due to lions, other cheetahs (all males), goring by prey whilst hunting, road kills and snaring. There have also been a couple of deaths where the cause was not determined, but could have been disease.

Overall survival is much higher for females than males, with an average of 85% and 70% for adult survival, and 68% and 39% for adolescent survival for females and males respectively; whilst recruitment, the number of cubs reared to 12 months per female, averages 0.53. However recruitment varies markedly with the lion population in the study area, such that when the lion population is high recruitment falls to below 0.1, whereas when the lion population is low it is close to 0.8. Population viability analysis using these parameters has demonstrated that the relationship between recruitment and lion density has important implications for long term viability. An isolated population of cheetahs under a high lion density is predicted to go extinct within 40 years whereas a population of cheetahs under a low lion density is extremely unlikely to go extinct even over 100 years. Fortunately, the study population is not isolated, but is contiguous with the much larger Serengeti population and, as the park is not fenced, with a larger population outside the protected area system. Nonetheless, the analysis demonstrates that the long term survival of cheetahs at times of high lion densities may well depend on the survival of cheetahs outside the protected area system where lion densities are lower.

The Serengeti national park is bordered to the south and east by areas inhabited by traditional Maasai pastoralist communities. Tom Maddox, working under the Serengeti Cheetah Project, looked at the potential of these areas for cheetah conservation during the course of his PhD. He showed that cheetahs were perceived as less of a problem to both humans and livestock than the other large predators common in the ecosystem: lions; leopards and spotted hyaenas. The overall perceived loss of livestock due to predation was relatively low compared to other causes.

## **The Tanzania Cheetah Conservation Program**

The Serengeti Cheetah Project has now expanded into a national program, the Tanzania Cheetah Conservation Program, and is now building on its findings to improve the conservation of cheetahs. The program is currently focussing on a number of activities in the Serengeti and elsewhere. Many of these activities are driven by the priorities set by the Global Cheetah Conservation Action Plan established by the Global Cheetah Forum:

- *Long term demography:* Monitoring individually recognised cheetahs in the long term study area remains an important activity. Aims to monitor factors influencing cheetah survival and reproduction in the wild as an input to management and other actions that ensure their long term conservation.
- *Protocols for genetic management:* As cheetah populations become increasingly fragmented, they then may need to be managed genetically within a meta-population framework. This project aims to establish management protocols through accurate genetic models of diversity loss. To do this the project makes use of the well known study population to establish paternity of cubs and hence the proportion of cheetahs contributing to the gene pool in each generation. It does this through faecal sampling of known individual cheetahs, DNA extraction and genetic analysis.
- *Public awareness and visitor education:* Aims to reduce visitor disturbance to cheetahs and to increase public understanding of cheetah conservation needs using education materials such as leaflets and posters.
- *Serengeti carnivore census:* Aims to establish a long term monitoring plan for carnivores on the Serengeti plains. This census implements a twice annual carnivore count using distance transect sampling techniques. One census has already taken place demonstrating that the method is effective for monitoring lions, golden jackals and spotted hyaena, whilst a further count, taking place this year should add cheetah, bat eared foxes and black backed jackals to this list. The program is working to ensure that the census is incorporated into the routine ecological monitoring program of the Serengeti National Park.
- *Human carnivore conflict:* Aims to broaden surveys to beyond the Serengeti region to assess conflict and the potential of areas outside PAs for cheetah conservation in other regions in Tanzania. Two students, including Maurus Msuha, project manager of the Tanzania Carnivore Program, will be starting their PhDs in 2005 addressing this topic.
- *Cheetah Census Project:* This is a major activity of the project, and aims to test and implement different methodologies for assessing and monitoring cheetah populations. The program addresses priorities established in the Global Cheetah Conservation Action Plan and aims to provide reliable quantitative information on cheetah distribution and abundance. This is a major priority if conservationists are to influence governmental and international policy on cheetah conservation. The project has made use of the

Serengeti study area, one of the few areas where cheetah population size is known, as a trial area to test new techniques, providing information on the relative feasibility, cost and reliability of four key techniques (intensive searching and individual recognition; spoor counts; use of tourist photographs and transect counts) and additional preliminary information on a fifth – the use of sniffer dogs to locate cheetah scat. Together with Yolán Friedmann from CBSG SA and EWT, the project organised and hosted the Cheetah Monitoring Workshop in Tanzania in June 2004. This workshop reviewed potential monitoring techniques, and has produced a report and aims to produce a manual within the next 6 months. By bringing in key monitoring experts to advise on techniques, the workshop initiated contact with cheetah conservationists and established lasting advisory networks to ensure good survey design and effective data analysis. Finally, new survey areas were prioritised according to urgency, threat and conservation potential and representatives from range states agreed to implement two surveys of two new areas in the next two years. This information will feed into a GIS analysis and forms an important first step towards a global survey.

### **The Tanzania Carnivore Program**

The Tanzania Carnivore Program was established in 2002, through a grant from the Darwin Initiative, within the Tanzanian Wildlife Research Institute (TAWIRI), the parastatal organisation that oversees wildlife research across the country, and which is mandated to advise the government on wildlife policy. The program aims to increase the capacity of Tanzanian wildlife authorities to ensure the conservation of carnivore biodiversity, as well as providing an institutional framework for the Tanzania Cheetah Conservation Program and other carnivore conservation projects in Tanzania. Tanzania is a hotspot for carnivore biodiversity, holding over half of Africa's carnivores and globally important populations of threatened species of large carnivores, including cheetahs, wild dogs and lions.

When the program was established there was a lack of information about most carnivore species in Tanzania, little national capacity for carnivore monitoring and threat assessment, no information dissemination about carnivore conservation and no national policy for carnivore conservation. The Tanzania Carnivore Program aims to address these gaps, by increasing capacity, gathering data, raising awareness and co-ordinating and promoting carnivore research and conservation. It has a three year objective of producing a national action plan for carnivore conservation. The program employs three scientific staff: Maurus Mshu, the project manager; Alex Lobora, the GIS and database manager; Jerome Kimaro, the PR officer; an administrator, Flora Kipuyu, and field assistants Zawadi Mbwambo and Chediel Kazaeli.

The program has built a carnivore centre with 5 offices and a meeting room and provided computers, internet access, a library and field equipment. It has also provided training in carnivore monitoring, GIS, field surveys and the production of information materials. The project has 3 key data gathering activities:

- *The carnivore atlas project*: This project is modelled on the globally successful bird atlas project, and has established a network of volunteer contributors of carnivore

sighting information that is used to provide distribution maps of all carnivore species in Tanzania. These maps are posted on the project web site, are updated regularly, and provide contributors with frequent feedback. The maps provide important preliminary distribution data to inform the national conservation action plan.

- *Cheetah and Wild Dog Watch campaigns*: These are used to encourage people to send in photographs of cheetahs and wild dogs that can be used for monitoring individuals, and hence provide more detailed information for these species than that collected through the atlas project.
- *Camera trap surveys*: These surveys aim to address gaps in coverage apparent in the atlas project and establish densities in priority areas. The program has established a team of Tanzanian trainers and field assistants who are able to design and implement surveys. A series of surveys are planned that will prioritise areas where little is known and with high biodiversity.

The program has extensive outreach and dissemination activities, which are aimed to encourage participation with the program's data gathering activities and to disseminate information about carnivore conservation activities in Tanzania. The program has produced a number of posters and stickers, a quarterly project newsletter, Carnivore NewsBites, organised a number of talks and workshops and has an active web site and email network. The program is now recognised by all the wildlife management authorities, conservation NGOs and research institutions in Tanzania and also has strong links with the wildlife tourism sector. The carnivore centre regularly hosts national meetings, talks, seminars and stakeholder meetings and the program has established an extensive list of volunteer data contributors.

In 2005 the program will be working through TAWRI with the wildlife management authorities within Tanzania to establish a National Action Plan for Carnivore Conservation. As part of this process the program has already held the first national workshop for wild dogs. A further 4 workshops are planned covering other carnivore species (cheetahs; lions and leopards; hyaenas and other carnivores). The action plan will provide a framework and strategy for carnivore conservation across the country. Tanzania will thus become the second country in Africa to produce such a plan for carnivore conservation, and will help enable the country to move to the forefront of carnivore conservation in Africa.

#### **Acknowledgements:**

Our Tanzania Partners, TAWRI and TANAPA have been crucial to the success of the projects and programs described here. A number of different individuals have also contributed to these activities including research assistants to the Serengeti Cheetah Project: Tony Collins, Sarah Cleaveland, Lisa Gilby, Lindsay Turnbull, Isla Graham, Jos Milner, Jane Wisby, Ghislaine & Ian Sayers, Anne Hilborn, students: Claire FitzGibbon (PhD), Karen Laurenson (PhD), Tom Maddox (PhD), John Shemkunde (MSc), and project manager Sultana Bashir. In addition the program relies on a wide network of collaborators and advisors including Yolán Friedmann, Gus Mills, Megan Parker, Rosie Woodroffe, Amy Dickman, Ray Hilborn, Meggan Craft, Paul Funston, Kathy Homewood, Marcella Kelly,

Charles Foley, Lara Foley, David Moyer and Chris Carbone. The program is also grateful to its network of volunteer data contributors and the support it receives from a wide variety of stakeholders. Finally the activities described here have been supported by a wide variety of donors including the Darwin Initiative, Wildlife Conservation Society, Zoological Society of London, Howard G Buffett Foundation, St. Louis Zoo, The Royal Society, National Geographic Society, People's Trust for Endangered Species and the Times Christmas Appeal.

---

***Formal Training Programs by the National Zoological Park within Southern Africa***

Dr. David Wildt, Smithsonian National Zoological Park-Conservation and Research Center

There is nothing comparable to the biocomplexity of Africa. Africa's landscapes and wildlife have long inspired, educated and motivated people to connect philosophically and financially to nature. However, these commitments have largely emanated from a tiny segment of Africa's people - generally colonialists, ex-patriots, tourists and some of the minority Caucasian citizenry. For the vast majority of Africans, there is a need to enhance the appreciation and understanding of the continent's unique environments and biodiversity. There is the need to empower local people to directly assist in the scientific study, education, management and protection of natural resources, especially Africa's wildlife heritage that is critical to contemporary and future economic stability. And, it is crucial that all African citizens understand the environmental services provided by its ecosystems and the dire consequences if these ecosystems, and the biodiversity they hold, are not preserved.

The Smithsonian Institution has a long, distinguished record of capacity building worldwide to support treasured landscapes and wildlife. This has been accomplished by a dedicated faculty of scientists and educators who share expertise and experiences through interactive training and mentoring. The Smithsonian's National Zoological Park (SNZP) has had active research programs throughout Africa since 1980. As part of its mission and dedication to biodiversity conservation, the SNZP is committed to training local scientists, educators and managers who ultimately are responsible for sustaining healthy environments and ecosystems.

To date, the SNZP has had two active programs. The first involved a partnership with Cheetah Outreach of Cape Town (South Africa) that involved a needs assessment, 'visioning' workshop followed by (1) participation in 'species awareness' workshops and (2) the training of 'star' South African teachers at SNZP and in Northern Virginia schools for the past 4 years. The second involved coordinating a Capacity Needs Assessment Workshop for southern Africa in January 2002 in Namibia. The objective was to brainstorm with regional stakeholders on how to link local people (from professionals to rural communities) to the unique habitats, wildlife resources and need for self-sustainability. The passion demonstrated by workshop participants was incentive for SNZP to conduct an inaugural course in January 2003 with private sector support. This course (on

Conservation Biology and Wildlife Management) provided a basis for securing a significant grant from the U.S. State Department. SNZP has developed a partnership with the Cheetah Conservation Fund and Wilderness Safaris and has had excellent participation and cooperation from the Ministry of Higher Education and the Ministry of Environment and Tourism.

To date, two courses have been conducted in 'Conservation Biology and Wildlife Management'. This 4-week course provides didactic and field opportunities to young scientists making the transition from the theoretical world of the university/polytechnicon to management and scientific practice. The audience has been biologists (in training at universities or graduates in management, research or tourism). A second course focused on 'Wildlife Capture and Relocation'. This 2-week course addressed the safe and effective handling and management of wildlife, including for widespread growing interest in game ranching as a viable land use option. The third course has been in 'Environmental Education' taught in partnership with the nongovernmental organization Environmental Education Conservation Global. This 2-week course has focused on environmental awareness techniques for teachers, resource users, decision-makers and school children. The course covers techniques in environmental education, social marketing, project planning and communications. The goal has been to demonstrate how communication and problem solving methods can be used to encourage environmentally sound attitudes and behaviors. The second Environmental Education course will be conducted at the Cheetah Conservation Fund in April 2005. Additionally, discussions are planned with the Ministry of Environment and Tourism to modify the Conservation Biology and Wildlife Management course into three 1 week workshops to be provided to Namibian communal conservancies, to commence in summer 2005.

---

### **Update on Cheetah Research Activities within Namibia and the USA**

Adrienne Crosier, Laurie Marker, Budhan Pukazhenth, JoGayle Howard and David E. Wildt

Most of the recent emphasis on cheetah research by the Smithsonian's National Zoological Park (SNZP) has been in partnership with the Cheetah Conservation Fund (CCF), Namibia. This has included the on-site presence of a post-doctoral fellow (Dr. Crosier) whose primary responsibility has been in (1) conducting cheetah male sperm biology research and (2) assisting in capacity building of local Namibians in biomedical techniques. The ultimate goal of the research has been to create a better understanding of male cheetah biology and the creation of a 'user-friendly' sperm cryopreservation technique to enhance the existing Namibian Cheetah Genome Resource Bank (GRB). This repository is valuable for basic and applied investigations, serves as an insurance policy for wild cheetahs and may become a resource for new genes that could be transported into the USA to assist in genetic management. Our studies have demonstrated that sperm from Namibian cheetahs is remarkably similar in quality to that collected previously from cheetahs living in captivity in North America or southern Africa or from free-living cheetahs in Tanzania. More than

200 seminal samples from 97 males also have allowed examination of the impact of age on sperm production and quality. Although there is no difference in testes volume in young males 12 to 24 months versus 25 to 120 months of age, the latter males produce more total motile spermatozoa. Younger males also tend to produce slightly more malformed sperm head defects, an incidence that declines with age. In terms of sperm cryopreservation, we have learned that the sperm acrosome is more sensitive than overall motility to methods associated with cryoprotectant addition and withdrawal. A user-friendly technique that involves the slow cooling of sperm over liquid nitrogen vapor has allowed acceptable levels of post-thaw sperm survival. Approximately 150 good quality frozen semen samples currently exist in the Namibian GRB.

Although SNZP efforts will continue with CCF, we also are initiating a new project in partnership with North American zoos and the Cheetah SSP. The purpose is to understand the cause of low fertility in cheetahs of >8 years of age. The project will focus on two potential causes, the first begin altered endocrine function in aged females. This aspect will require the frequent collection of fecal samples for endocrine comparisons among three age groups (2-5 years; 6-8 years; > 8 years). The second target will be oocyte quality. In this phase of the study, individuals from the three age groups will be stimulated with hormones and oocytes recovered laparoscopically for assessment and *in vitro* fertilization. The reproductive tract also will be assessed thoroughly by ultrasound. Any resulting embryos will be frozen or (at the request of the home institution) transferred into an appropriate conspecific female. Institutions interested in participating in this project should contact JoGayle Howard (HowardJG@si.edu) or Budhan Pukazhenti (PukazhentiB@si.edu) at the SNZP.

---

### **Field Research with Black-Footed Cats (*Felis nigripes*) in South Africa**

Dr. Alex Sliwa, Zoologischer Garten Wuppertal

The first field study on the ecology and behavior of the black-footed cat ran from December 1992 until September 1998. This has so far been one of the few long-term field studies on a small wild cat species. I was able to capture 21 individual cats on 50 occasions. 17 of those were radio-collared and followed directly for 3125 hrs and over a distance of 2000 km. I watched 1725 prey captures and documented the position of 11,000 urine spray marks. 11 different sponsors provided funds, however the most important equipment for this study, a 4x4 vehicle and radio-telemetry equipment, had previously been purchased for a field study on aardwolves (*Proteles cristatus*) (Sliwa 1996). The study was conducted on the 11,000 ha game farm "Benfontein", 8 km southeast of Kimberley in the Northern Cape Province of South Africa. The habitat is comprised of a mixture of short and long grass steppe and savannah with average annual rainfall of 430 mm. Cats were captured in custom made live traps or followed to their hole before being dug out. Anaesthetized cats were examined for health condition and age estimation and subsequently fitted with a 50 g radio-collar with a battery life of 6-8 months. 7 Males and 10 females were followed directly after initial habituation to a 4x4 vehicle. Five resident males used average annual ranges of 20.7 km<sup>2</sup>

(100 % Minimum Convex polygon-MCP) and 7 adult females used ranges of 10 km<sup>2</sup>. Intra-sexual overlap was slight while between the sexes large. One male overlapped with up to 4 females (Sliwa 2004).

Distances moved by the cats averaged 8 km/ night. Cats were active throughout the night with only short resting periods that were hard to distinguish from stationary hunting behavior. The other two main hunting styles were a slow stalk and a fast trot (Sliwa 1994). Hunting success was high with one vertebrate captured every 50 minutes (Olbricht & Sliwa 1997). 1725 prey items seen killed belonging to at least 53 species were categorized into 8 size and group classes. Considering prey mass the cats took 72% mammals, 26% birds and only 2% invertebrates, amphibians and reptiles. Average prey size was 24 g. Male black-footed cats kill larger prey than females. Females kill more small birds than males – who kill more larger mammals – like hares. Both sexes take more large prey in winter – females switch to smaller prey in summer and spring/autumn. Females show larger variation in prey size taken over the seasons than males, which have a relatively stable diet composition year-round. This is due to females provisioning kittens with small prey items (Sliwa 2001). There is a large guild of smaller carnivores present competing for food. Communication is mainly through scent marking with urine and during the mating season via loud calling. Males compete for females during mating, making excursions outside their range for copulations with females (5 copulating pairs watched). Kittens are born in spring and summer, with maternity dens found in dead hollowed-out termite mounds and springhare dens. Black-footed cats interact with several non-prey species, the Cape owl (*Asio capensis*) being a food-parasite. No active predation has been witnessed, but cats have been threatened by pairs of jackals and other potential predators are present. While the results of this field study have been published in a wide variety of scientific journals, newspapers, magazines, newsletters and books, there is still a wealth of data to be written up: range use, reproduction, hunting strategies, marking behavior and blood chemistry. Numerous talks and presentations were given to South African TV, to schools and outings with locals to raise public knowledge and conservation awareness.

The International studbook shows a constant slow decline of captive black-footed cats. While the SSP population is still small but stable, the African population is growing due to the recent inclusion of successful breeders into the studbook. The most catastrophic decline is seen in the European population with only 5 cats currently. This population was reduced to 20% of its size in 5 years. The main mortality cause is through AA-Amyloidosis. Worldwide AA-amyloidosis amounts to at least 70% of deaths in captive *F. nigripes*, approaching 100% in European cats. The average creatinine values from wild black-footed cats (n=38) were in general lower than those of captives ones. A method for pre-mortem AA-Amyloidosis recognition was developed at Wuppertal and Frankfurt Zoo through collaboration with F. Taugner from the Free University Berlin. Subcutaneous fat samples taken from sedated cats were prepared and Congo red stained sections were examined under cross-polarized light for presence of fibrillar proteins – proof for AA-Amyloidosis. Likewise, amyloid detection was through immunohistochemistry. Black-footed cats within the EEP are regularly tested for presence of amyloid fibrills via collection of subcutaneous fat and colon samples. Post-mortem testing is done from all organs. The aim of this testing

is to find out about the onset of the disease in individuals of different lineages, both *ex-situ* and *in-situ* and if there is a sex and age related influence of the disease.

A new *in-situ* project started in 2002. So far it is funded by 5 AZA Zoos and its aims are: to confirm the distribution of black-footed cats in areas already included in the distribution range to improve on map-base conservation action planning. To look at the habitat range this species covers. The Northern Cape Province encompasses about a third of the currently known distribution range. To collect hair and blood samples from live captured cats or skins and other remains for DNA studies for inbreeding status or possible sub-specific status of populations. Collect further reference blood values and samples for amyloid testing. Build up of the present database for the species at the McGregor Museum, Kimberley. Principal investigators are Corné Anderson, zoologist, Beryl Wilson, zoological collection manager both at the McGregor Museum and Alex Sliwa, curator Wuppertal Zoo. So far all known museum specimens of *F. nigripes* were entered on a map to identify large gaps in the species distribution, where ground truthing is necessary for confirmation. One collection trip to Bushmanland has found cats killed by farmers during predator control. Live trapping was unsuccessful. One collaborative trapping period on Benfontein game farm together with Jason Herrick, Cincinnati Zoo and Nadine Lamberski, San Diego Zoo resulted in the capture of one male cat. Aims are to intensify efforts in the Northern Cape Province, while funds are needed for further equipment and running costs to support field-researchers and coordinators. Collaboration is welcomed with other zoos or researchers i.e. for work on genetic samples.

Future field projects could look at distribution of black-footed cats in other provinces of South Africa, but also in Namibia and Botswana. An ecological field study in the southeastern distribution range would be desirable to examine validity of the sub-species *F.n.thomasi* and whether these cats have different ecological needs. Collaboration between the EEP and SSP has been through exchange of information and registering of the captive stock in the International studbook. Also a sample from a wild female cat has been sent to the US for disease research. Future collaboration between all programs regarding *in-situ* and *ex-situ* work is paramount. The PAAZAB should be included to establish joint husbandry standards, for information sharing and for breeding exchanges of captive-bred cats.

**Olbricht, G. & Sliwa, A. 1997.** In situ and ex situ observations and management of black-footed cats (*Felis nigripes*). Int. Zoo Yb. **35**: 81-89.

**Sliwa, A. 1994.** Diet and Feeding Behaviour of the Black-footed Cat (*Felis nigripes* Burchell, 1824) in the Kimberley Region, South Africa. Der Zoologische Garten **64** (1): 83-96.

**Sliwa, A. 1996.** A functional analysis of scent marking and mating behaviour in the aardwolf, *Proteles cristatus* (Sparman, 1783). Unpublished Ph.D. dissert. University of Pretoria, Pretoria, 192 pp.

**Sliwa, A. 2001.** Seasonal and sex-specific prey composition of black-footed Cats (*Felis nigripes*). Abstract No. 343, 8th International Theriological Congress, 12-17 August, 2001, Sun City, South Africa.

**Sliwa, A. 2004.** Home range size and social organisation of black-footed cats (*Felis nigripes*). Mammalian Biology **69** (2): 96-107.

**Linking Ex Situ and In Situ Conservation in Black-Footed Cats**

Jason Herrick, Nadine Lamberski, Beryl Wilson, Corné Anderson, Bill Swanson, and Alex Sliwa

The current status of the black-footed cat (*Felis nigripes*) SSP population is arguably the most critical of all of the cat SSPs. It has been recommended that the captive population should consist of 80 individuals with ~90% genetic diversity for a period of ~100 years in order to ensure proper genetic management. However, there are currently only 26 individuals, of which 17 are offspring or “grandchildren” of a single pair. Consequently, genetic diversity is already below 90% (87.5%). In addition, breeding is poor among most of the current population, including some potential founders who have not yet reproduced. To make matters worse, captive cats also don’t live very long, with <20% of cats living more than 6 (females) or 7 (males) years. As a result, the population has averaged a 4% population decline each year since 1988. If this trend continues, <1% of the current genetic diversity will be retained in ~100 years unless more founders are brought into the population. In order to deal with some of these problems, the Black-footed Cat SSP has prioritized improved breeding of unrelated and underrepresented animals and importation of founders from Africa, in addition to research into the causes of amyloidosis and coordination of *ex situ* efforts with *in situ* research. The Cincinnati Zoo and Botanical Garden recently received a 2 year grant from Morris Animal Foundation to begin investigating the basic reproductive biology of this species and development of assisted reproductive technologies to facilitate genetic management. Longitudinal monitoring of fecal hormone metabolites (estrogen, progesterone, and testosterone) will be conducted on 7.6 individuals in 5 institutions in order to characterize basic endocrine parameters, such as the length of the estrous cycle and estrus, the hormonal changes associated with pregnancy and pseudo-pregnancy, and the incidence of spontaneous ovulation. This basic information will also allow identification of cycling and noncycling females, comparisons between breeders and nonbreeders, diagnosis of pregnancy, prediction of parturition, and comparisons between reproductive status, age, diet, health status, and housing conditions.

Semen collection and evaluation will also be performed on 5.0 males in 4 institutions in order to characterize sperm quality (morphology, motility, and acrosomal status) and quantity (sperm concentration and number), as well as determine the relationships between ejaculate traits and fecal testosterone concentrations. This information will allow for the identification of males producing “good” and “bad” sperm, comparison of breeding and non-breeding males, and determination of the relationships between ejaculate traits and the age, health status, and husbandry of male cats. Research is also being conducted on the development of sperm cryopreservation, *in vitro* fertilization (IVF), and embryo transfer (ET). Sperm cryopreservation will allow the genes of old, valuable males to be banked for long-term preservation and transportation between institutions without the stress associated with relocation of the male. *In vitro* fertilization, in combination with ET, will allow this frozen sperm to be used to produce offspring in a more efficient manner (i.e., more potential offspring per ejaculate) than artificial insemination. Specifically, we will be comparing two methods of sperm freezing (in pellets on dry ice or in straws over liquid

nitrogen vapor), sperm motility and function over time in two culture media before and after freezing and IVF success in the same two media before and after freezing.

Preliminary studies indicate that motility of fresh sperm (n= 3 ejaculates from 3 males) over time is similar in both media during the expected time of fertilization *in vitro*. In addition, early attempts of IVF with fresh sperm (n=21 oocytes from 2 females) indicate that fertilization rates are similar in both media (~50%), but a new feline-specific medium may improve embryo quality. These techniques are also being incorporated into concurrent field studies aimed at collecting and freezing sperm from wild black-footed cats in order to import new founders, in the form of frozen sperm, without taking animals out of South Africa. With the valuable assistance of Dr. Alex Sliwa's colleagues in South Africa at DeBeers Consolidated Mines (see below), one wild male black-footed cat was caught in September 2004 and a high quality sperm sample was collected. A total of 15 straws of frozen semen are currently in storage in South Africa at the Wildlife Biological Resource Centre in Pretoria and await importation for offspring production via IVF/ET.

A field study was initiated in September 2004 to begin assessing the health and reproductive status of free-living black-footed cats. This project is a continuation of Dr. Alex Sliwa's work on Benfontein in the Northern Cape Province, RSA. In addition to the initial health and reproductive assessments, genetic material and other biological samples were collected. Samples were banked for future studies at the Wildlife Biological Resource Center in Pretoria.

Two trap lines (10 and 11 traps each) were set on 16 occasions over 17 days. Traps were not set on one evening due to inclement weather. Each line extended approximately 2 km. The location of the lines was based on previous experiences. Pigeons and passerines were used as bait. Cod liver oil was used as an attractant initially but this was switched to Scrubbs cloudy ammonia and finally to female domestic cat urine. There was a lot of activity around the traps and yellow mongoose, genet, polecat, and Cape fox were successfully trapped and released. Trap lines were moved every 3-5 days. Traps were moved for a variety of reasons such as after the capture of the first animal, consistent bait stealing, lack of activity, or rain.

A single male black-footed cat, *Felis nigripes*, was trapped during this period of time. The age was estimated as 18 months and the weight 1.7 kg). The cat was anesthetized with medetomidine and ketamine by intramuscular injection while restrained in the trap. It was then transported to the laboratory for further evaluation. Isoflurane was used as a supplemental agent. Rectal temperature 39 C, hear rate 78-82 bpm, respiratory rate 40-60 bpm, oxygen saturation 92-100%. There were no anesthetic complications. The animal was in good body and hair coat condition but had a mild flea and tick infestation. Both ticks and fleas were preserved in alcohol. There were no other abnormal exam findings except for a healing bite wound on the tail. Urine was collected by cystocentesis for a urinalysis and urine protein:creatinine ratio. Blood was collected (approx. 8 ml) for a complete blood count and serum chemistry panel. Serum was saved and later banked at WBRC. A skin biopsy from the inside of the left ear pinna was taken for WBRC as were hair samples. A small fat sample was obtained surgically at the request of Dr. Sliwa . A small amount of

feces were recovered from the rectum and revealed a large number of nematode larvae. The cat was permanently identified with a Trovan transponder (658FFAE).

The cat was transported back to the site of capture while under anesthesia and placed in a spring hare burrow for recovery. The medetomidine was antagonized with atipamezole. The cat recovered and left the burrow sometime prior to dusk that same evening.

Blood and urine samples were taken to Kimberley Hospital for analysis by Dr. Stan Harvey and Jean Winter. The CBC, chemistry panel, urinalysis, and urine protein:creatinine ratio were within normal limits for both domestic cats and captive black-footed cats. Hemoparasites were not present. Overall, the cat was in good health.

Health issues are a prime concern for captive management. Thirty-nine necropsy reports from captive animals were reviewed from 1986-1999; 87% of reports included a diagnosis of renal failure. All cases were due to renal amyloidosis. The average age at the time of death was 4.2 years. An additional 14 necropsy reports were reviewed from 2000 until the present time. The average age at the time of death was 7.0 years. 43% of deaths during the past 5 years were due to renal failure. Three out of 6 cases of renal failure were due to amyloidosis. There seems to be a decreasing prevalence of amyloidosis in the captive population but this disease remains a significant cause of death. Recent information from Dr. Karen Terio suggests that amyloidosis in the captive population has a familial predisposition.

Limited data suggests that amyloidosis occurs in free-living cats but the prevalence and impact on population size is not known. Future in situ and ex situ studies will continue to be a collaborative effort and will include distribution studies, genetic analysis, reproductive studies, and health assessments.

---

---

### ***Bovine Tuberculosis and its Effect on Lions (*Panthera leo*) in the Kruger National Park***

D F Keet,\* A Michel, Kirsty Brebner, N. Kriek and D G A Meltzer

\*Chief State Veterinarian, Kruger National Park, South Africa.

#### **ABSTRACT**

Lions became infected with *Mycobacterium bovis* predominantly through the eating of infected buffalo carcasses. A modified cervical intradermal tuberculin test indicated that a large proportion of lions are infected in areas where the prevalence of tuberculosis in buffaloes is high. This was confirmed through Restriction Fragment Length Polymorphism analysis. Oral infection was the most likely route with subsequent haematogenous spread of mycobacteria to distal sites. Primary pulmonary lesions were absent in early infections. Advanced cases had severe anaemia, hypoalbuminaemia and hyperglobulinaemia. The biochemical and haematological profiles of a subclinically infected sub-group, was compared to that of a non-infected sub-population and data available from healthy lions

elsewhere in the world. The subclinically infected group had significantly lower albumin, cholesterol, blood urea nitrogen and haemoglobin levels with reduced erythrocyte counts, but higher gamma globulin levels when compared to non-infected lions. The lesions seen in lions were proliferative and, with the exception of pulmonary lesions, difficult to identify macroscopically. A variety of organs were affected including deep and superficial lymph nodes, mammary lymph nodes, eyes, bones, joints and kidneys. Sociality, intraspecific aggression and their preference to hunt buffaloes (including diseased buffaloes) as well as a tendency to scavenge on carcasses increase their exposure to infection. Non- infected lions and lionesses lived longer than infected lions and lionesses. Reproduction was not influenced by infection but cub survival was lower in the infected population. Phylogenetic analysis of two areas of the mitochondrial d-loop indicated two distinctly different female subpopulations. Male lions from the south grouped with the northern females. The southern infected subpopulation had a greater genetic diversity than the non-infected northern population. Lions infected with Feline Immunodeficiency Virus were more likely to be infected with bovine tuberculosis.

---

***Multiple African Carnivore Species In-situ Research: the African Predator Conservation Research Organization is Created***

Michael B. Briggs, DVM, MS<sup>1</sup>, Beth A. Ament, CVT<sup>1</sup>

<sup>1</sup>African Predator Conservation Research Organization, 289 Butte View Drive, Bolingbrook, Illinois, USA

In August of 2004 the African Predator Conservation Research Organization (APCRO) was formed to perform high level veterinary and conservation research of multiple interrelated carnivores in Africa. The organization was conceived of and established by Dr. Michael Briggs and Beth Ament. They are the cofounders of this organization and serve to initiate research as well as facilitate others working on projects that fall under the general goals and vision of APCRO. This small organization is in association with another larger not-for-profit conservation organization called Global Communications for Conservation, Inc. or GCCI.

The mission statement of APCRO reads:

*The African Predator Conservation Research Organization's (APCRO) mission is to initiate and facilitate multidisciplinary conservation research on a number of African predator species throughout the continent. The organization will provide a vehicle for the gathering of scientific information and sponsor new projects that will increase the potential long-term survivability of native carnivores.*

Major Premises of APCRO:

- Where there is one carnivore, there are other carnivores.
- Either by actual physical interaction or by sharing resources, one carnivore's health may significantly affect another.
- Once performing an investigation in a biome, one should examine as much as possible in that region by recruiting experts in a variety of fields and allowing more information gathering, while maintaining your overall study goals.
- Professional education of local scientists is critical for these areas and select individuals will have the opportunity to be educated in several U.S. universities.

APCRO has several areas of intense investigation which include:

- Immediate health assessment through physical examination
- Genetic analysis
- Disease transfer/exposure...intra- and interspecies
- Pathology
- Clinical pathology
- Parasitology
- Nutrition
- GIS analysis (satellite tracking)

APCRO Projects are far ranging but generally will be investigating large carnivores including lion, cheetah, African wild dog, leopard, spotted hyena, and jackal. The projects vary as to the species involved and vary as to depth investigation based on local needs, species involved and the collaborators goals. This is a current list and it is dynamic. They are updated regularly at the website as well as more details to the specifics of investigations at [www.apcro.org](http://www.apcro.org)

Project List:

**Zambezi River Basin Transboundary Carnivore Project:** This project is the primary long-term study of the APCRO. It is an ongoing multidisciplinary investigation of carnivores in an area of approximately 610,000 hectares (1.5M acres) of the Transboundary area that includes the Kwando/Linyanti region of Botswana and Namibia and the Tamafupa region of Botswana and the adjacent Hwange border region of Zimbabwe.

**West African Lion/Hyena Genetic and Disease Assessment:** This project has been initiated by Dr. Sarel van der Merwe and Tehou Aristide of the African Lion Interest Group. This is an attempt to support and facilitate the group of West African Nations wildlife departments to gain a better understanding of numbers of lions and hyenas in this region, train personnel on capture technique, assess genetic, disease status, and current health of the populations. Currently includes work in Benin and Burkina Faso.

**Hluhluwe-Umfolozi Park Lion Reintroduction Reassessment:** The lion project concerning the reintroduction of Namibian origin lions into the HUP is to assess the developments of original work done by Flammand, Briggs and Dubach in the early 1990's. This is to assess how well the animals from Namibia were integrated into the park and the effects of the injection of new genetics into the genetics of the Umfolozi Reserve lions.

**Kunene Lion Genetic/Disease Evaluation:** The Kunene Lion Project is an ongoing study by P. Stander and L. Hanssen of the Predator Conservation Trust evaluating the populations of lions in the remote Kunene Region of Namibia. APCRO's involvement is the disease surveillance of the animals and the facilitation of the ongoing genetic evaluation.

**Atlas/Barbary Lion Genetic Evaluation:** This is a project initiated by Dr. Haddane Brahim and Dr. Dan York to evaluate the pureness of the last remaining Atlas lions in Morocco.

**Studying the Patterns and Mechanisms of Hair Loss Behind Tsavo's Distinctive Mane :** This project is an ongoing study involving a well established group of researchers from Chicago, New York, and Kenya. The purpose is to understand if the unique maneless nature of the infamous lions of Tsavo. APCRO's involvement will be to collect genetic and skin samples in Botswana and Namibia that will constitute "controls" for Kenyan samples.

There are often new ideas and opportunities which are presented to APCRO. Each one is evaluate on scientific merit, personnel involved, how it relates to APCRO's goals and mission statement, and what funding opportunities are available to the study or already secured.

Funding of the projects is always a hurdle and seriously considered as to the value of the research versus the effort to gain support.

**Funding:** APCRO's funding sources are from a variety of sources and include private donors, in-country support, granting agencies, and traditional "in-kind" support. These are generally forwarded to GCCI as they are the not-for-profit entity APCRO operates under.

**Summary:** The African Predator Conservation Organization is a fledgling organization as far as number of years in operation. The organization does however have a very strong history of conservation success and experience with its personnel and collaborators. The Organization already has 4 major projects it is working on and 2 which it is an integral player in. The Zambezi River Carnivore Project is the largest of its kind in Africa and likely the most holistic. Regular updates and progress are available by visiting [www.apcro.org](http://www.apcro.org)

---

### **African Issues Working Group**

Leader: Jack Grisham

Participants: Christine Breitenmoser, Doug Armstrong, Sarah Durant, Chris Pfefferkorn, Nadine Lamberski, Jason Herrick, Jennifer Frank, Lauren Montag, Alex Sliwa, Gerry Brady, Dewald Keet, Mike Briggs, Lee Simmons, Karen Tario, Farshid Mehrdadfar, Connie Phillipp, Karen Rice

The working group identified two primary themes in the issues affecting conservation of cats in Africa. The first is a substantial dichotomy between conservation efforts for different species. A number of felid species in Africa have both *in-situ* and *ex-situ* conservation programs and studies of multiple diverse aspects of the biology of the species underway. Some of these are extensive and include managed populations in captive breeding programs in Africa, Europe and the United States as well as support in varying degrees for *in-situ* conservation programs. However, the species with substantial conservation activities are in stark contrast to many of the other felid species where there is extremely limited investment in conservation programs *in-situ* or *ex-situ*. In some cases even the most fundamental biological information about the species is unknown and not currently being studied. Even species that do receive more attention and work in some parts of Africa need additional efforts developed in other parts of Africa. In addition, even well studied species often suffer from a lack of substantiated information on critical biological factors such as the role of disease in a species and its influence on conservation efforts or how poorly understood genetic factors are effecting wildlife populations on a meta as well as a fragmented population basis. As an extension of this issue, there is a substantial lack of understanding by many conservation organizations with regard to what really needs to be done and where resources could be invested to have the greatest conservation impact.

Secondly, conservation efforts of any kind in Africa are profoundly affected by overriding human population issues, which must be accounted for in any undertaking hoping to have a significant impact on conservation for any species. These issues are often not adequately considered in planning for a new program. Issues of particular concern include inadequate efforts to develop a true understanding of the socioeconomic, cultural and political factors of the specific region conservationists wish to work in, insufficient recognition of the impact of issues such as land redistribution and changes in land use, failure to address human-wildlife conflict issues in a realistic and pragmatic way and not incorporating long term capacity building as an intrinsic part of projects to be undertaken in any region.

#### **Actions**

The working group felt that the Felid TAG could begin to help with some of these issues by the following actions:

- 1. Increase the awareness of conservation projects and needs.** Link the Felid TAG project database, [apps.cols.zoo.org/felidtag](http://apps.cols.zoo.org/felidtag), and the Felid Tag Website with the Cat Specialist Group. Encourage institutions to consider the non-EEP, non-SSP species projects through the links to Felid TAG and Cat Specialist Group websites by making the

information widely available. Move toward linking other websites and information about regional programs with the Cat Specialist Group website. Also link in AAZV website and AAZK website with these. Clearly identify a special section on Cat Specialist Group website on Action Plans, which will help identify prioritized conservation needs for species.

**2. Provide guidance to project designers as well as information for zoo graphics design teams and others.** Write a narrative addressing each of the major broad influential factors identified below in order to encourage projects to incorporate consideration of those issues into project design as well as ways to incorporate these issues into other applications such as zoo graphics. This would include considerations of the countries socioeconomic issues, land use considerations, capacity building and human-wildlife conflict. This narrative could be put on the Felid TAG website as guidance for those developing projects and to be used to assess current projects to see what is currently being done in projects to address these issues as examples to be use as models in project design.

**3. Facilitate increasing the awareness of conservation needs.** A second narrative could be written addressing African felid species that don't get enough work and recommending that work be done with these species. The narrative may include what kind of work needs to be done with the species as well as other considerations discussed in the first narrative.

- *African Golden Cat*- support development of *in-situ* studies in the range countries.
- *African Wild Cat*- Study active in Kalahari. Support the *in-situ* conservation programs.
- *Black Footed Cat*- Active study needs financial support. Genetic and health studies underway. Support these projects and the *ex-situ* programs world wide.
- *Caracal*- Support in-situ projects in Northern Africa, Morocco and Tunisia. Genetic work, consideration of subspecies. Also studies underway in South Africa. Support *ex-situ* programs
- *Cheetah*- Support in-situ work, focusing in Northern Africa. Populations are declining throughout Africa. Support *ex-situ* projects.
- *Lions*- Declining in western Africa. Support projects to determine demographic status. Support *ex-situ* projects worldwide.
- *Leopards*- Some leopard projects are active in Africa. Support *in-situ* and *ex-situ* projects.
- *Sand Cat*- Occurs in North Africa. No current projects. Need to determine distribution, population and basic biology. Support *ex-situ* projects.

- *Serval*- Needs work in Northern Africa, little is known. Needs distribution information, consideration of release programs. Genetic studies to look at subspecies distribution. Support *ex-situ* programs.

Christine Breitenmoser	IUCN Cat Specialist Group	ch.breitenmoser@kora.ch
Doug Armstrong	Omaha	<a href="mailto:douga@omahazoo.com">douga@omahazoo.com</a>
Sarah Durant	ZSL/Tawiri	<a href="mailto:s.durant@ucl.ac.uk">s.durant@ucl.ac.uk</a>
Michael Briggs	African Predator Conservation Research Org.	<a href="mailto:mbriggs@APCRO.org">mbriggs@APCRO.org</a>
Lee Simmons	Omaha Zoo	<a href="mailto:lsimmons@omahazoo.com">lsimmons@omahazoo.com</a>
Farshid Mehrdadfar	San Diego WAP	<a href="mailto:fmehrdadfar@sandiegozoo.org">fmehrdadfar@sandiegozoo.org</a>
Jenny Frank	National Zoo	<a href="mailto:frankj@si.edu">frankj@si.edu</a>
Lauren Montag	National Zoo	<a href="mailto:montagl@si.edu">montagl@si.edu</a>
Alex Sliwa	Wuppertal Zoo	<a href="mailto:direction@zoo-wuppertal.de">direction@zoo-wuppertal.de</a>
Jason Herrick	Cincinnati Zoo	<a href="mailto:jason.herrick@cincinnati.org">jason.herrick@cincinnati.org</a>
Nadine Lamberski	San Diego WAP	<a href="mailto:nlamberski@sandiegozoo.org">nlamberski@sandiegozoo.org</a>
Karen Rice	Nashville Zoo	<a href="mailto:krice@nashvillezoo.org">krice@nashvillezoo.org</a>
Dewald Keet	Kruger National Park	<a href="mailto:dewaldk@nda.agric.za">dewaldk@nda.agric.za</a>
Connie Philipp	Nashville Zoo	<a href="mailto:cphilipp@nashvillezoo.org">cphilipp@nashvillezoo.org</a>
Chris Pfefferkorn	Oregon Zoo	<a href="mailto:pfefferkornc@metro.dst.or.us">pfefferkornc@metro.dst.or.us</a>
Karen Terio	UI Zoo Path	<a href="mailto:kterio@lumc.edu">kterio@lumc.edu</a>

---

## ***African Species SSP and PMP Reports:***

### **Cheetah SSP**

Jack Grisham, Species Coordinator, Smithsonian's National Zoological Park

The Cheetah SSP has had a productive and busy year. Management Group elections were held and two incumbents were reelected and one new member was elected. The Regional Breeding Center concept, approved by the Management Group in November 2003, had its first success at the Cincinnati Zoo's Mast Farm with the birth of four cubs born to a female on loan from Toledo Zoo and a male from Cincinnati Zoo. The female gave birth and when the cubs were old enough, was transferred back to the Toledo Zoo. Additional births took place at White Oak Conservation Center, Fossil Rim Wildlife Center, Wildlife Safari and Smithsonian's National Zoo (first time in their 115 year history).

Disease issues continue to raise their ugly head. Herpes virus has again manifested itself, along with other disease issues and surveillance programs. The Veterinary Advisors will hold a Disease Workshop in summer 2005.

The Cheetah SSP continued to develop its *Linking in situ and ex situ programs* through the efforts of Dusty Lombardi and the Columbus Zoo. The SSP, through the AZA CEF and St. Louis Zoo, help support the Cheetah Census Technique Workshop in Tanzania. Dusty Lombardi, et al. submitted a paper on cheetah hand-rearing to Zoo Biology.

The SSP is developing a Keeper Training Workshop to empower the next generation of cheetah managers and keepers. This two and one half day workshop will take place at White Oak Conservation Center in February/March 2006. The Cheetah SSP Husbandry Manual update is targeted to be completed by the end of the year. A Master Plan Workshop will be held in December 2005 at National Zoo's Conservation and Research Center in Front Royal, VA.

The Cheetah SSP is supporting the IUCN Cat Specialist Groups development of a Cheetah Conservation Compendium on the Cat Specialist Group website. We are looking for institutions to step forward to help support this important conservation tool.

---

### **Lion SSP**

Tarren Wagener, Species Coordinator, Fort Worth Zoo

The managed North American lion pedigreed population is 40.45 (85) animals. There are also an additional 0.6 sterilized or non-reproductive animals. All of these lions are in AZA institutions.

Historically, lion reproduction within the SSP population has been sporadic. This has been the result of both conservative breeding recommendations on the part of the SSP during the initial development phase, as well as an unexpected decline in the anticipated reproductive rate. In the latter case, there have been numerous institutions that have experienced repeated breedings with no conception as well as unexpected ayclicity in previously cycling cats.

The SSP has been working hard to increase the reproductive rate and meet the high institutional need for pedigreed cats. From 2001-2003, the SSP planned 15 pairs and 13 transfers. As a result of these recommendations, only 4 pairs successfully bred which resulted in only 4 cubs at three institutions. In 2004, the SSP planned 20 pairs and 13 transfers. For these master plans, the SSP adopted an aggressive strategy to increase reproduction.

Strategy I. In cases where compatible pairs had bred previously, those same cats were recommended for breeding again this year at the same institution. In some cases then, institutions will receive multiple breeding recommendations (one male breeding each of two females housed with them). Since we know that these cats have bred in the past, we are capitalizing on the likelihood that they will produce cubs again. In addition, some cats towards the bottom of the mean kinship list are also recommended for breeding. Or, in other cases, cats with relatively high mean kinships are recommended for breeding with cats with low mean kinships. These recommended pairings are not jeopardizing our genetic diversity significantly yet, but will hopefully allow us to meet the extremely high institutional need for animals in the short term.

Strategy II. Any cats that are available for placement are placed in the following order (from first priority to last priority):

- those institutions with an empty exhibit
- those institutions with a single animal (generic or pedigreed)
- those institutions anticipating a single animal situation in the immediate future (example: two very aged animals, one with known serious medical complications)
- those institutions wanting to breed or to increase the number of animals for social/exhibit purposes

Strategy III. If an institution is asked to move offspring produced from previous breeding recommendations, that institution will receive a breeding recommendation for the current year.

Strategy IV. For all institutions currently experiencing problems with conception despite repeated breeding, please contact the SSP Coordinator and the Reproductive Advisor as soon as the problem is identified. For institutions currently attempting breeding introductions, please be aware that some institutions have experienced problems with conception, and the SSP is examining this challenge as a potential emerging health issue.

As a result of these aggressive strategies, the SSP had its most productive year to date with 23 births, and 7.12 cats to place. For the 2005 recommendations, the SSP Coordinator worked with the SPMAG advisor and survey responses from all Institutional Representatives to compile a working document that was circulated for comment in mid-March. The resulting draft document will be posted for the 30-day comment period, and should be finalized by May 30. The current recommendations include 17 breeding recommendations and 26 transfers. Transfers include placing cats at 9 additional institutions for future breeding as the cats mature, and at an additional 2 institutions for future pairing. The institutional need remains high and there are an additional 21 institutions seeking cats over the next 2 years.

Dr. Suzan Murray (Co-Vet Advisor; National Zoo) discussed an upcoming project to conduct a 20-year retrospective on the causes of mortality in the lion population. The

Animal Health advisors (veterinary, infectious disease and pathology) will work together to complete this work and institutions should anticipate requests for information to conduct this study.

Annabel Ross (Registrar, Fort Worth Zoo), is collecting information on the historical generic population for collating accurate demographic data upon which the SSP can better predict cage space needs. Seventy-five institutions have responded to date, and there are currently more than 3,500 cats in the database.

Kristen Lewis (Education Advisor, Philadelphia Zoo) has drafted an educational survey to determine how the SSP can best meet institutional needs regarding lion education, and the possibility of developing a website for the SSP. Once reviewed by the Management Group, the survey will be distributed to both institutional representatives and educational liaisons at all SSP institutions.

Ingrid Russell (Management Group Member, Santa Barbara Zoo) has begun the development of a temperament profile for lions that may be used as a tool for managing introductions and developing social groups at member institutions.

Ann Ward (Nutrition Advisor, Fort Worth Zoo) continues to look for institutions who can participate in a research study examining the nutritional status of lions in both captivity and the wild.

The group also continued work on the development of the husbandry resource manual. Of the 7 chapters that will be included (natural history and conservation status, management and behavior, design, enrichment and training, health, reproduction and nutrition), the only one completed in draft format is animal health. Dominic Calderisi (Lincoln Park) and Ingrid Russell (Santa Barbara) led working groups on the design and management/behavior chapters, respectively. A working draft of the entire manual will be completed by the national AZA conference in September and circulated for comment.

The SSP has received two CEF proposals for endorsement to 1) gather baseline data on the reproductive status of the population and target specific individuals for genome banking as needed; and 2) to characterize lentiviruses from southern African lions through molecular analyses. The Management Group is reviewing these for endorsement prior to submission to the CEF.

---

---

### **Black-footed Cat SSP**

*Steven M. Wing, Species Coordinator, Louisville Zoo, [steven.wing@loukymetro.org](mailto:steven.wing@loukymetro.org)*

Henry Kacprzyk, Vice-chair

Amy Roberts, Secretary

Liz Harmon, Regional Studbook Keeper

### **History of Program**

International Studbook Keeper: Dr. Ulrich Schurer, Wuppertal Zoo

Data compiled by Dr. Alex Sliwa, Wuppertal Zoo

The black-footed cat (*Felis nigripes*) was elevated to SSP status by the AZA Felid TAG in November 2000. This is a small, endangered species native to South Africa, Botswana and Namibia. This species is of the domestic cat lineage, which diverged about 8 million years ago, and phylogenetic studies have shown that its nearest relative is the sand cat (*Felis margarita*).

Longevity in the wild is not well documented, but black-footed cats do not fare well in captivity. Breeding is intermittent and many cats die by their 5<sup>th</sup> year, well below what could be expected for this species. The majority of these deaths have been attributed to renal failure as a result of systemic amyloidosis. The cause of the amyloidosis is under investigation. Enlarged adrenal glands have also been a common finding and baseline cortisol levels in some individuals are elevated, providing evidence of stress under current management conditions in captivity.

### **Advisors**

Nadine Lamberski, San Diego Wild Animal Park, Veterinary Medicine  
(nlamberski@sandiegozoo.org)

Karen Terio, University of Illinois, Pathology

### **North American Population**

The North American population consists of 14.10.2 (26) cats in 12 institutions. Of these 24 cats, 10 are offspring from the pair at Riverbanks and 7 are grandkids. A pair of cats that are full siblings to the breeding pair from Riverbanks currently reside at Memphis and Cincinnati. The remaining 4.2 (6) cats were all imported directly from South Africa.

There have been 5 births (2 litters) in the past 12 months.

There has been 1 death (0.1) in the past 12 months.

### **Masterplan Session**

A masterplanning session was held at the Population Management Center at the Lincoln Park Zoo on August 25, 2003. Final breeding and transfer recommendations were made on October 17, 2003. The recommendations can be found on the AZA website.

The population founder genome equivalent is 4.01 with 87.5% gene diversity retained. Population mean kinship stands at 0.1247.

There were 3 transfers recommended (Utah's Hogle Zoo and Cincinnati) and 7 pairs recommended to breed (Omaha, Riverbanks, Oklahoma City, Memphis/Cincinnati,

Audubon Institute). Subsequent recommendations were made for kittens born just prior to the 2003 masterplan session, and 3 kittens were born in 2004.

**There are 2 pairs of cats currently available for new institutions. Please see Steve Wing if you are interested in this species. There are also 2 males currently available.**

### **Importations**

The SSP needs to import new cats from Africa and a list of contact persons and institutions in South Africa, Botswana and Namibia has been created. If anybody knows of any contacts in Africa we may use, we would be most grateful for that information. Riverbanks can facilitate the importation process.

Preliminary discussions have occurred with the DeWildt Cheetah and Wildlife Centre on the possibility of setting up a black-footed cat breeding and release center. Institutions will be needed to aid with this project.

### **New Institutions**

The San Antonio and Cincinnati Zoos have rejoined the SSP and both received cats in 2004. Five institutions have unpaired cats, of which four are at or near reproductive senescence.

### **Conservation and Research Programs**

**Distribution, Habitat Characteristics and Sub-Specific and Disease Status of the Black-footed Cat *Felis nigripes* in the Northern Cape Province, South Africa.**  
**Corne Anderson (PhD), Beryl Wilson (Btech), Alex Sliwa (PhD)**

There is very limited knowledge of the distribution and numbers of smaller cat species. The distribution of each species and the habitat available to it needs to be established in detail to the level of discrete populations. Research to increase understanding of these factors is essential in planning and implementation of effective conservation measures. While the basic work on the natural history of the black-footed cat has been done through a 6-year field study by Dr. Sliwa, with 17 individual cats radio-marked, this will be a start for the survey work to verify the existence of this elusive cat species in areas that have been worked out by GIS models. The collection of a larger number of blood samples for determination of sub-specific status of several populations, their health and genetic makeup is of great value. These samples will be stored and made available to other research institutions.

Funding for this research has been received by:

- Chicago Zoological Society
- Cincinnati Zoo
- Columbus Zoo
- The Living Desert
- Riverbanks Zoo

- Zoological Society of San Diego

**Investigating Amyloidosis in Black-footed Cats (*Felis nigripes*)**

**Karen Terio (DVM, PhD), Nadine Lamberski (DVM)**

The aim of this study is to determine the pathogenesis of systemic amyloidosis in black-footed cats. The objectives are:

1. To determine the prevalence and tissue distribution of amyloid deposition in black-footed cats;
2. To determine if amyloidosis is associated with concurrent disease conditions or familial lines;
3. To determine the type of amyloid deposited in tissues of black-footed cats.

**Analysis and Interpretation of Vaccine Serology in Black-footed Cats**

**Nadine Lamberski (DVM)**

A partnership has been set up between the San Diego Wild Animal Park and Cornell University to analyze serum from young black-footed cats. Riverbanks Zoo has provided samples and funding for this project.

**Reproductive Biology of the Black-footed Cat (*Felis nigripes*) and Sand Cat (*Felis margarita*)**

**Jason Herrick (PhD) and Bill Swanson (DVM, PhD)**

**Reproductive and Health Assessment of Black-footed Cats (*Felis nigripes*) on Benfontein**

**Jason Herrick (PhD), Nadine Lamberski (DVM), Beryl Wilson (Btech), Paul Bartels (DVM), Corne Anderson (PhD), Bill Swanson (DVM, PhD), Alex Sliwa (PhD)**

To characterize reproductive and health parameters in free-ranging animals that can be used to assess the health of captive individuals.

**Publications**

- **Distribution, Habitat Characteristics, Sub-Specific- and Disease Status of the Black-footed Cat (*Felis nigripes*) in the Northern Cape Province, South Africa.** Corne Anderson (PhD), Beryl Wilson (Btech), Alexander Sliwa (PhD)\*. McGregor Museum, PO Box 316, 8300 Kimberley, Northern Cape Province, South Africa.  
\*Wuppertal Zoological Garden, Hubertusallee 30, 42117 Wuppertal, Germany.
- **Amyloidosis in Black-footed Cats (*Felis nigripes*).** Karen Terio (DVM, PhD), Nadine Lamberski (DVM), Timothy D. O'Brien (DVM, PhD), Linda Munson (DVM, PhD).
- **Olfactory Enrichment for the Black-footed Cat, *Felis nigripes*.** Deborah Wells, Justin Egli.

## Action Plan

The main focuses for the coming year include:

- Update the breeding and transfer masterplan through the AZA Population Management Center;
  - Encourage breeding in all unrelated black-footed cats in North America;
  - Import new founders from Africa;
  - Continue research into stress-related amyloidosis;
  - Identify conservation partners in South Africa, Botswana and Namibia;
  - Initiate *in situ* conservation partnerships in range countries.
- 

### Serval (*Leptailurus serval*) PMP

Bonnie Breitbeil, Serval Population Manager, Central Florida Zoological Park  
[bonnieb@centralfloridazoo.org](mailto:bonnieb@centralfloridazoo.org)

The draft for the Serval PMP was distributed by the Population Management Center in Chicago, IL on November 2, 2004. After the 30 day comment period and several changes the final PMP was distributed on March 2, 2005.

Recommendations were made for 5 breeding pairs and 4 transfers.

**Genetics:** Current gene diversity is below 84%; given the current population parameters it is expected that gene diversity in 100 years will be approximately 27%. The population is descended from 11 founders (4 hypothetical) with 0 potential founders remaining. Adding founders at the rate of 2 every 10 years results in 80% gene diversity in 100 years. Adding 4 founders every 10 years results in 85% gene diversity in 100 years.

**Special concerns:** The number one concern to this population is the high degree of unknown pedigree. No single animal in the population has a completely known pedigree. The overall population pedigree is less than 9% known. Captive births are occurring, but the rate is low. A high rate of recruitment occurs through the acquisition of unknown pedigree specimens from the private sector. Since 1999 only 52 of the 130 captive born specimens to enter the population were born at AZA facilities!

We excluded individuals with pedigrees of less than 25% known; this left 31 specimens to be considered for breeding. Including many of these cats lead to questionable genetic management, however, excluding individuals with anything more than 25% known pedigree would likely result in a demographic crisis for the population.

Another factor with the serval population could be the inclusion of “savannah cats” (i.e., serval x domestic hybrids) in the population. At least one known savannah cat breeder has been known to sell servals to zoos.

Since September of 2004 the only change in the population has been 1 death.

The current population is: 34.38.0 (72) in 36 AZA facilities. The AZA Felid TAG has set a target population of 80 servals in member institutions.

---

### Sand Cat SSP

Kim Clark, Species Coordinator/International Studbook Keeper, The Living Desert Zoo

The Sand Cat International Studbook was updated last week and is current as of Dec 31, 2004.

There are 84.90 specimens being held in 44 Institutions worldwide. Interest in this species is growing in Europe, but remaining stagnant in North America.

The SSP population consists of 13.14 pure *Felis margarita harrisoni* and 3.4 sub-specific crosses in 9 institutions.

Importation of 4.4 cats from Al Wabra Wildlife Preserve in Qatar occurred in May 2004. These cats represent 4 new bloodlines for the SSP. The cats were split into 4 breeding pairs and 2 of the 4 pairs have been sent to their new institutions where they have been set up for breeding. One pair is awaiting shipment in the spring. The fourth pair was introduced in the fall and produced 4 female offspring of which 3 are still surviving.

One female from the U.S. was sent to Israel to become part of their captive breeding and release program.

Dr. Bill Peake from MIT continued his ear research on sand cats in the summer of 2004.

Dr. Bill Swanson and Jason Herrick from CREW have begun a reproductive physiology study on sand cats. Fecal samples from males and females have been collected since July, 2004 in two institutions and will be analyzed for hormone levels. In the fall of 2004, semen samples were collected from three participating institutions and banked. In 2005 oocytes will be collected from females for IVF and embryo banking.

Personal Note :

It has been a pleasure working with the Felid TAG, IR's and the researchers involved with this wonderful species. I encourage all institutions to consider exhibiting small felids. They really do make wonderful exhibit animals and you can't beat the "AWWW" factor.

Respectfully submitted,

Kim Clark

**Editor's note: The new Sand Cat SSP Coordinator is Kara Akers, The Living Desert Zoo**

---

## ***Plenary Session-Felid Conservation and Management***

### ***The IUCN/SSC Cat Specialist Group – who we are and what we do***

Christine Breitenmoser-Würsten and Urs Breitenmoser, co-chairs

KORA, Thunstrasse 31, CH-3074 Muri b. Bern, Switzerland  
[ch.breitenmoser@kora.ch](mailto:ch.breitenmoser@kora.ch) and [urs.breitenmoser@ivv.unibe.ch](mailto:urs.breitenmoser@ivv.unibe.ch)

The IUCN/SSC Cat Specialist Group is a network of 206 of the world's leading cat experts, including scientists, wildlife managers and conservationists from 50 countries who are dedicated to advancing the understanding and conservation of the world's 36 wild cat species. It is one of over 120 similar international specialist groups that together form the Species Survival Commission (SSC) of the World Conservation Union (IUCN), a conservation organization where not individuals are members, but governments, governmental agencies and non-governmental agencies. The Specialist Groups have to raise their own funds for their activities which often restricts their possibilities for action.

The Cat Specialist Group is very active in many of its own initiatives as well, focusing on the development of communication tools to enhance the work of its members and promote dialogue among scientists and practitioners throughout the world. The Cat Specialist Group believes that cooperation and knowledge sharing are critical for the conservation of wild cat species. Such collaboration prevents the duplication of efforts and therefore avoids any waste of resources or time, both of which are extremely valuable and scarce.

### ***Structure***

The following outlines the structure of the Cat Specialist Group and its partners:

- Urs Breitenmoser and Christine Breitenmoser-Würsten, Co-chairs.
- Peter Jackson, Advisor to the Chair and Co-editor of Cat News.
- Manuela von Arx, Assistant to the Chair.
- Kristin Nowell, Red List Authority.
- Cat Specialist Core Group - Strategic body of the Cat Specialist Group. Members during 2001 - 2004 were Sarah Christie, Peter Crawshaw, Peter Jackson, A.J.T. Johnsingh, Ullas Karanth, Tom McCarthy, Laurie Marker, Gus Mills, Dale Miquelle, Kristin Nowell, Stephen O'Brien, James Sanderson, Melvin Sunquist and Alan Rabinowitz
- Cat Specialist Group Members - 206 international cat experts from 50 countries
- Working groups - Subunits made of Cat Specialist Group members
- Partner groups - Group of people working in a specific area in cat conservation, but not all people qualify for Cat SG membership.

### ***Tasks***

IUCN/SSC Specialist Groups produce species assessments for the IUCN Red List of Threatened Species<sup>TM</sup>, as well as species Action Plans and policy guidelines. These groups

also provide data for the World Conservation Monitoring Centre, which is hosted by the United Nations Environment Programme (UNEP) and advise governments that are Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Along with the species assessments, the Specialist Groups review the conservation needs, identify the conservation priorities and propose conservation actions. The groups serve as centers of information.

As co-chairs we have to administer the group, secure the functioning of the network, provide services to our members to enhance their effectiveness in the field, secure the funding for the group activities and assure the sharing of information and knowledge. The core group, our strategic body, identifies the priorities of the group's activities, supervises the permanent tasks and develops concepts for cat conservation. We meet in different places around the world to discuss with the members of the region the cat conservation problems in their area. Members have to review draft SSC policies, guidelines, and other species-conservation related advice (including CITES). They have to maintain contact with their Specialist Group Chair, responding promptly to requests that help SSC to pursue its objectives, provide information for the species' assessments, and be ready to share their experience and knowledge.

### ***Tools***

To fulfill all these tasks, we are developing a series of tools that will also facilitate the work of our members and partners:

### ***Project database***

The IUCN/SSC Cat Specialist Group unites over 200 experts in cat conservation from all over the world. An enormous number of projects on the 36 cat species are carried out, and a wealth of experience is gathered worldwide. Only a fraction of this experience is finally published in form of scientific papers. Practical know-how and solutions for a lot of hands-on conservation problems are never communicated. For an interested public or for potential sponsors, it is almost impossible to gain a quick overview on proposed or on-going cat conservation projects. The Cat SG therefore in the process of developing a Cat Project Database summarising all ongoing, planned or recently completed cat conservation projects, in order to facilitate the exchange of information between field workers and the contact with an interested public. This database will eventually be accessible on the Cat SG website.

Investment in cat conservation by GOs and NGOs has grown considerably worldwide over the past decade. But until now, nobody could answer the simple questions: Who is studying what species where and with what focus? For both, potential sponsors and people looking for practical advice on how to organize a cat conservation project, it is nearly impossible to gain an overview on cat projects. Overlaps are frequent in certain fields, whereas other areas or species are sparsely covered by projects. The cat species can only be saved if all work together, share information, combine different skills and experience, and use the limited funding as efficiently as possible. Conservation activities need to be coordinated to be effective. They often reach across international borders and cultures. To facilitate the co-operation between conservationists in the field and at the desk and their

sponsors, we propose to set up the cat conservation project database as an easy tool to gather and distribute information.

Sarah Christie from the Zoological Society of London has developed together with Rossel Rose the ZSL/WWF Global Tiger Project Database. The Cat SG is in the fortunate situation that we can build from there. In a first step, the existing tiger project database structure needed to be adapted to be used for any cat conservation project worldwide. The next step is the development of a user-friendly interface. The database will be tested first within the core group, and then built up with our members and partner. The database will support the exchange of information (concepts, methods, results) within the cat community and the sponsoring of new projects. The cat project database will be closely linked to the species database.

### ***Digital Cat Library***

Peter Jackson, long-term chairman of the IUCN/SSC Cat Specialist Group and a professional conservation journalist for over 30 years, has donated his unique private collection of several thousand documents and publications to the Cat Specialist Group. This was the fundament of a reference library for cat conservation. This library allows all Cat Specialist Group members and other people and institutions working in favour of cat conservation to have access to relevant publications and documents. The Cat SG Library does not only include scientific papers, but more important unpublished reports and documents not easily available through libraries. To ensure easy worldwide accessibility, scans of the documents and a reference database are available through the Cat SG website, but also as a DVD for people who have not yet easy access to the web. Currently, already more than 5000 documents are included in the Digital Cat Library.

The rationale to create a specific cat conservation library under the guidance of the Cat Specialist Group, in addition to all existing scientific libraries, was twofold: (1) The documents important for conservation work often belong to the “gray literature” (unpublished reports, local publications, theses, etc.) that are not readily available from libraries, and (2) many of the members of the Cat Specialist Group (and other people working in conservation) do not have easy access to libraries in universities or other scientific institutions. The problem with the gray literature is not only the limited accessibility, but even more the lack of propagation. Many important reports never gain more than local awareness at best. For copy right reasons, the Digital Cat Library will in the future only be accessible for members and the *Friends of the Cat Group* through individual passwords.

### ***Cat-SIS (Cat Species Information Service)***

In 1996, the cat conservation action plan of the Cat Specialist Group was published (Nowell & Jackson: *Wild Cats: Status Survey and Conservation Action Plan*. IUCN, Gland, 1996). Since then, a wealth of information has been gathered for many of the 36 cat species from many different projects. The Cat Specialist Group must now put emphasis on the follow-up of the 1996 survey. We have initiated a program to update the species' status in a more flexible way that will allow for a constant update in the future. The network of the Cat

Specialist Group members, research projects and ongoing monitoring programmes will be used to create a series of databases compiling the distribution, status, trend and threats of all cat species and populations, respectively. The CAT-SIS system will be linked to a map centre, where new information on presence or absence of cats will be incorporated as information becomes available. This constantly updated information will allow us to identify conservation needs, to design effective actions plans and to control their success. The databases and the map centre will be incorporated into the Cat Specialist Group website and will be closely linked to the *Cat Project Database* and the *Cat Specialist Group Library*

To assess the species status we have to ask three questions: (1) What is our present knowledge? (2) What do we need to know to identify conservation needs? and (3) What are the possible tools for a continued assessment?

(1) Today we often do not have more than outline polygon maps with no or little differentiation. The distribution maps are based on a mixture of published data and expert knowledge and a combination of confirmed occurrence and suitable habitat (expert model) without being able to differentiate the source. They contain a muddle of recent, sub historic and even historic data.

(2) To identify the conservation needs of a species we need to have precise and up-to date distribution maps allowing us to know the area of distribution of the taxon, to differentiate the abundance of the species within its range, and to monitor the changes of distribution and abundance over time. We also need an information system that allows us to combine data of different kind and quality, to differentiate confirmed observations and expert information, to differentiate between recent, sub historic and historic data, and to assess the reliability of the data sets through cross-validation.

(3) To compile and analyse the information we need a series of databases and GIS-projects that can be continuously updated. In a first step, we have been digitizing all available information on presence/absence of the 36 cat species throughout their entire range, which allows us now to update the distribution maps and identify gaps. Each observation that can be geo-referenced is entered into a Geographic Information System GIS, where also the date and type of observation, as well as the method and source are recorded. All references can be found in the Digital Cat Library. The distribution maps and species status information will also be integrated into the Global Mammal Assessment project of IUCN/SSC and CI/CABS.

To fill the identified gaps after the mapping exercise, information can be gathered through a questionnaire sent out to experts, collected during an expert workshop or through specific field surveys. For an update of the status of the Eurasian lynx in Europe we developed a questionnaire that was sent out to lynx experts in all 29 range countries. The information was compiled into an online information system (ELOIS, <http://www.kora.unibe.ch/en/proj/elois/online/index.html>). This system now can easily be updated if new data become available.

For the assessment of the Arabian leopard, the Breeding Centre for Endangered Arabian Wildlife organised together with the Conservation Breeding Specialist Group a series of workshops in form of a CAMP process. This workshop was then later on turned into yearly meetings and results now in the publication of the country status reports.

All the gathered information needs to be managed. We have developed a knowledge and information management system KIMS, so called Conservation Compendia. The first compendium we have developed was for the Iberian lynx, where in the meantime all relevant governmental agencies, non-governmental agencies and science institutions as well as the zoos are partners. The Iberian Lynx Conservation Compendium will go online in summer 2005. Access will be through the Cat Specialist Group website ([www.catsg.org](http://www.catsg.org)). A compendium on the Balkan lynx is under work and one for the cheetah is planned and can be started as soon as funding is secured.

### ***Communication***

Besides communicating directly with members and partners we have two main tools of communication and outreach: the group's newsletter *Cat News* and the Cat Specialist Group website.

*Cat News* was first published in 1984, and since then there have been 41 bi-annual issues, providing a wide-ranging collection of scientific papers, articles, and news items on wild cats around the world. Each issue of *Cat News* currently runs to 40 pages, which are printed (since issue 41) now in full colour. Each issue of the newsletter has a cover photograph of one of the 36 species of wild cats, and many articles are illustrated with attractive colour photos. Peter Jackson, a professional conservation journalist for over 30 years and initiator of the newsletter, is still helping to produce *Cat News*. It is distributed to the members of the Cat Specialist group and the *Friends of the Cat Group*. *Cat News* articles are referenced by major international organisations – e.g. Zoological Record (UK), Wildlife Information Service (Switzerland), and the National Information Services Corporation (USA). Besides the bi-annual regular issues, we also plan special issues on specific topics or to publish conference proceedings.

The website ([www.catsg.org](http://www.catsg.org)) was started by a volunteer back in the 1990s and has remained static ever since. We are in the process of changing the website to make it a real tool of communication. On the new website portal, besides access to the different databases (members, projects, library, cat-sis), a project of the months will be added, where members and partners can present their cat conservation projects in a standardized way. The information on the species contained in the old website will still be available and accessible through the portal.

### ***Funding***

The IUCN specialist groups have to secure their own funding also for core functions. The Cat Specialist Group gets supported by the *Friends of the Cat Group*, where members

receive the newsletter and have access to the various databases. For special projects, we also search for funding from conservation organizations and foundations. We hope very much that we can welcome in the near future many zoos among the institutional members of the *Friends of the Cat Group*, as we are convinced that zoos and the Cat Specialist Group can build a very fruitful partnership for cat conservation.

---

---

**Endangered Species Issues to Remember**

Alan Shoemaker, Advisor to the Felid TAG, Columbia, SC. [sshoe@mindspring.com](mailto:sshoe@mindspring.com)

Since 2001, AZA members have largely accepted the fact that *in situ* enhancement must be a part of all Endangered and Threatened Species USFWS permit applications. In fact, the level of *in situ* support being provided by some of our member institutions, often without asking, has been extremely heartening at times, and even some of our small institutions have significant budgets ear-marked for enhancement projects involving species within their collection. A few salient points involving permits that have been identified are as follows:

1. By mid-2004, the Division of Management Authority, i.e. the “permit office”, has lost five members of its ten-person office, a loss of personnel that because of federal budget cuts has not been replaced. As a result, members should expect each application to take at least four months from the time of submission until the date at which it is physically mailed to the applicant. Members only allowing 1-2 months for application processing are likely to be disappointed.
2. All zoos, regardless of their budgets, should review their Institutional Collection Plans (ICP) in order to target species they feel may be the subject of importation or exportation activities within the next five years. Then they should budget funds or identify sources for such funds that can be used to support enhancement projects that impact those species involved with projected or potential international transactions. If no project is obvious, staff members may contact SSP/PMP/TAG chairs and advisors for enhancement ideas. Most chairs and advisors have a veritable shopping list of such projects that need financial support.
3. To the best of my knowledge, all enhancement projects have been accepted by FWS when submitted in conjunction with an endangered species application. To qualify, however, members should remember that only *in situ* funding counts for enhancement. *Ex situ* support such as foreign zoo vet and keeper training, the funding of SPARKS workshops in range countries, etc., while laudable, cannot be used for purposes of meeting enhancements under recent interpretation of the Endangered Species Act.

Members having questions about permit issues may contact Alan Shoemaker at [sshoe@mindspring.com](mailto:sshoe@mindspring.com) for further information.

---

---

**Contraception in Felids**

Dr. Cheryl Asa, St. Louis Zoo

No written report submitted

For information regarding contraception of felid species see: [www.stlzoo.org/contraception](http://www.stlzoo.org/contraception)

---

**Feline Herpes Virus-1 Issues in Non-Domestic Felids**

Suzanne Kennedy-Stoskopf, DVM, PhD, Diplomate ACZM

North Carolina State University, College of Veterinary Medicine, Department of Population Health and Pathobiology, Raleigh, NC 27606

Feline herpesvirus-1 (FHV-1) is a common cause of upper respiratory disease in domestic cats. Clinical signs include sneezing, nasal discharge, conjunctivitis and corneal ulcers. Cats housed in high density, such as would occur in shelters, catteries and lab animal facilities, are more likely to exhibit clinical signs. Non-domestic felids housed in zoological collections are at potential risk but upper respiratory signs are seldom observed. Two issues have arisen recently that require examination to put the relative risk of FHV-1 to non-domestic felids in proper perspective. These are the perception that certain species are more prone to clinical disease from FHV-1 and the commercial availability of PCR tests for FHV-1.

Clinical disease associated with FHV-1 infection has been recognized as a problem for cheetahs (*Acinonyx jubatus*) and Pallas' cats (*Otocolobus manul*). The issue of FHV-1 clinical disease in cheetahs is complex and will not be addressed here. All clinical cases of FHV-1 in Pallas' cats, however, since the start of the SSP, have been linked to recent vaccinations with a modified live virus (MLV) product. It is important to remember that neither killed nor MLV vaccines for FHV-1 prevent infection. They are considered prophylactic vaccines designed to minimize expression of clinical signs. Individual animals react to vaccines differently. While most domestic cats and even some non-domestic felids experience no adverse effects to MLV FHV-1 vaccines, others, like the Pallas' cat, develop clinical disease. For this reason, it is recommended that only killed virus vaccines be used in non-domestic felids to eliminate the risk of undesirable consequences from a MLV product.

Feline herpesvirus-1 causes a latent infection in an estimated 80% of the cats infected. Reactivation of virus replication and subsequent shedding can occur during stressful events such as changes in housing, pregnancy/lactation, post-surgery and other illnesses. Less virus is probably shed during reactivation than during the primary infection, but it is important to remember that cats can shed virus without any clinical signs. It is estimated

that 50% of infected cats never exhibit clinical signs. Conversely, upper respiratory disease in cats is not always caused by FHV-1.

The prevalence of FHV-1 infection in non-domestic felids is not known. The recent commercial availability of PCR assays for FHV-1 allows screening, but interpretation of results is problematic. Asymptomatic cats are PCR positive and cats with clinical signs are negative. Feline herpesvirus -1 PCR assays detect DNA, but this does not necessarily mean that a cat is infectious. There may not be enough competent viral particles to constitute an infectious dose for effective transmission. These are all variables that are not actually known for FHV-1 and which current PCR assays will not distinguish. Consequently, making decisions based on one positive FHV-1 PCR about translocation of a healthy non-domestic cat with no previous history of upper respiratory disease is probably ill-advised based on our current understanding of FHV-1 in domestic cats. While PCR is a much more sensitive assay than virus isolation for FHV-1 to diagnose primary clinical disease, in an asymptomatic animal a positive PCR reaction should be interpreted as exposure to the virus. To further complicate the issue, it is not known whether animals actually vaccinated with MLV products might be PCR positive from the vaccination. A study to determine the prevalence of positive PCR reactions in randomly sampled, healthy, non-domestic felids would be beneficial to approximate exposure rates in zoological settings. Approximation must be emphasized as rates of FVV-1 reactivation are not known so a latently infected cat could test negative even with repeat sampling. Recently, a collection of 10 healthy animals, representing four different species, was tested and 2 cats of different species were PCR positive. This would suggest that FHV-1 is probably common in zoo collections and not causing a major health problem in most settings. More work, however, needs to be done.

Good husbandry is essential to minimize FHV-1 transmission in a zoological setting. Fortunately, FHV-1 can be readily inactivated by detergents and disinfectants, but the virus can remain infectious for a month at 25°C. This means that virus can potentially travel on keepers' shoes, clothes and work implements between cleanings. Anecdotal stories implicate keepers bringing FHV-1 into zoo collections when they have sick cats at home. Standard operating procedures should be implemented to instruct keepers of precautions that need to be implemented when they have sick animals at home to minimize risk of inadvertent disease introduction.

### **Take Home Messages**

1. Do not use MLV vaccines. The consequences of causing clinical disease and enhanced virus shedding pose an increased risk to other felids in a collection.
2. A positive PCR for FHV-1 does not necessarily mean an animal is infectious. It should be interpreted that the animal has been exposed.
3. Include instructions for animal caretakers with sick animals at home in SSP husbandry manuals to minimize the risk of introducing an infectious disease like FHV-1 into the collection.

## **Recommendations**

1. Pallas' cat SSP – Only use FHV-1 PCR for testing cats with clinical signs of upper respiratory disease.
2. Felid TAG – Consider screening cats from 5-6 institutions with large, diverse collections over 2 years to determine rate of positive PCR assays in asymptomatic animals.

---

---

### **Thailand Clouded Leopard Ex Situ and In Situ Conservation Programs**

Katey Pelican DVM, PhD, Smithsonian's National Zoological Park, Washington, DC  
JoGayle Howard DVM, PhD, Smithsonian's National Zoological Park, Washington, DC  
Rick Schwartz, Nashville Zoo, Nashville, Tennessee  
Peter Leimgruber, PhD, Smithsonian's National Zoo, Washington, DC  
Wanchai Tunwattana, DVM, Khao Kheow Open Zoo, Chonburi, Thailand

Thailand has many of the most charismatic cat species in the world, including the tiger, clouded leopard, golden cat, fishing cat and marbled cat. Habitat loss continues to be rampant throughout Southeast Asia, and these felid species are vulnerable to population pressures and habitat fragmentation. In 2002, the Smithsonian's National Zoological Park in collaboration with the Nashville Zoo and the Clouded Leopard Species Survival Plan initiated a clouded leopard conservation project in Thailand. The goal of the program is to create a multi-faceted clouded leopard program in Thailand that includes improving husbandry and breeding success in the *ex situ* (captive) population in Thai zoos and to determine the status of the *in situ* (wild) population, as well as significant in-country capacity building. Thailand is an ideal site to initiate a clouded leopard conservation program. The Zoological Park Organization of Thailand (an umbrella agency for Thai zoos) and the Thailand Department of National Parks, Wildlife and Plant Conservation (formerly the Thailand Royal Forestry Department) have the infrastructure and interest necessary to form an international consortium of institutions and researchers to focus on conserving endangered species.

### ***Ex Situ* Clouded Leopard Breeding Project**

In 2002, the *ex situ* component was established through a three-year Memorandum of Understanding between the Zoological Park Organization of Thailand, Smithsonian's National Zoological Park, Nashville Zoo, Clouded Leopard Species Survival Plan (SSP) and Asian Wildlife Consultancy Co., Ltd. Dr. JoGayle Howard (Smithsonian's National Zoo) and Rick Schwartz (Nashville Zoo) were instrumental in developing the consortium. This coalition of international partners is working together to develop improved nutrition, husbandry and breeding programs for felids in zoos in Thailand. The majority of the Asian cat species in Thailand zoos are genetically valuable, wild-born animals that have been confiscated and/or donated to the zoos. Health and reproduction, however, frequently are compromised due to poor husbandry, imbalanced diets and inadequate enclosures. In 2002,

an improved clouded leopard breeding program was established at the Khao Kheow Open Zoo in Chonburi, Thailand.

Ken Lang (expert in clouded leopard breeding from the National Zoo's Conservation & Research Center in Front Royal, VA) has served as the primary Project Manager for the Thailand Breeding program since its inception. For the first two years of the program, experienced clouded leopard keepers from North American zoos alternated with Ken at three to four month intervals. These on-site Project Managers have included Peter Riger (Nashville Zoo), Juan Rodriguez (National Zoo) and Andy Goldfarb (Point Defiance Zoo, Tacoma, WA). Also, Point Defiance Zoo sent animal keepers to the National Zoo's Conservation & Research Center to assist in animal care while Ken Lang is in Thailand. In 2004, a full time on-site Project Manager was hired. Rick Passaro (previous employee of National Zoo's Conservation & Research Center) agreed to manage the program full-time in Thailand for 2 years. In addition, Nashville Zoo, Brookfield Zoo (Chicago, IL) and Bergen County Zoo (Paramus, NJ) have sent animal keepers to Thailand to assist in handraising clouded leopard cubs.

Currently, there are 21 clouded leopards in the project in Thailand. Since May 2002, animals have been moved from enclosures in Thailand zoos known to induce stress (small size, lack of hiding places, adjacent to large carnivores such as tigers and bears) to large, vegetation-rich enclosures with nest boxes. Nutritionally poor diets were altered to include whole prey and vitamin/mineral supplementation. Since May 2002, a total of 12 clouded leopard cubs have been born and 10 have been raised successfully. The recent births of clouded leopard cubs (born on Feb 25, 2004, April 26, 2004 and Sept 13, 2004) continue to demonstrate that the changes in husbandry have been effective for the successful propagation of the clouded leopard. Unfortunately, in October 2004, contaminated meat from a dead banteng was fed to all KKOZ carnivores by KKOZ staff. Four clouded leopards died including animals from two of the three breeding pairs in the breeding program. To help rectify this situation, Ken Lang joined Rick Passaro in January and February 2005 to begin introductions of four new pairs.

To document the impact of management changes on stress and reproduction, detailed data collected on animal behavior, enclosure size, carnivore proximity and enclosure enrichment are being analyzed. Daily fecal samples were collected from all animals before and after the improvements in diet and enclosure, and then samples were shipped to the U.S.A. for assessment of fecal reproductive and stress hormones by Dr. Katey Pelican and Dr. JoGayle Howard, reproductive physiologists at the National Zoo. More than 10,000 fecal samples currently are being analyzed for hormones. Behavioral data also are being analyzed by Dr. Nadja Wielebnowski, behavioral endocrinologist at the Brookfield Zoo. The endocrine technician for the project, Katherine MacKinnon, recently was accepted into a Masters Degree program at Washington State University to analyze these data for publication with the assistance of Dr. Wielebnowski. Never before have such dramatic changes in management been so thoroughly evaluated. These results will provide a unique database for developing appropriate management strategies and breeding projects that may eventually have application to conserving diverse carnivores throughout the world.

In September 2004, an AZA Conservation Endowment Fund was awarded to Dr. Katey Pelican, Dr. JoGayle Howard and geneticist Dr. Lori Eggert to fund three studies aimed at validating field research techniques using zoo animal populations. Specifically, research studies will: 1) determine the impact of radio-collaring on clouded leopard physiology and behavior using fecal stress and reproductive hormone monitoring; 2) develop a fecal DNA species identification reference library and sexing marker; and 3) establish the timing of fecal hormone and DNA degradation under field conditions in Thailand. For the radiocollar study, fecal samples were collected for pre-collar hormone analyses (controls), then from Sept 2003 to Sept 2004, radio collars were placed on six adult clouded leopards (3 males and 3 females) maintained at the Khao Kheow Open Zoo, and daily fecal samples collected for six months following collar removal. All samples are now in the U.S.A. and are being processed for analysis. For the fecal DNA species identification study, fecal samples have been collected from 15 carnivore species at the Khao Kheow Zoo and shipped to the National Zoo. Dr. Eggert is in the process of developing species-specific markers using these samples. Finally, for the fecal degradation study, fecal samples were placed under field conditions at the KKOZ and sub-sampled over 6 weeks to determine the timing of fecal steroid and DNA degradation over time. These samples have been collected and are awaiting analysis.

This project also focuses on building capacity for conservation in Thailand. A major goal is to train zoo personnel in husbandry, management and animal behavior. Two Thai animal care staff and a Thai curatorial intern are being supported and trained at the Khao Kheow Open Zoo during the project. Collaborations also have been initiated with local universities for advanced training of Thai scientists. Two veterinarians interested in wildlife, Dr. Khongsak Thiangtum and Dr. Nikorn Tongtip, from Kasetsart University Faculty of Veterinary Medicine, came to the U.S.A. for further training in reproductive physiology, fertility assessment and sperm cryopreservation. Khongsak recently completed reproductive studies for a Masters degree at Kasetsart University, with Dr. Bill Swanson (Cincinnati Zoo and Botanical Garden) and Dr. JoGayle Howard (Smithsonian's National Zoo) serving as advisors. In addition, the head veterinarian from the Khao Kheow Open Zoo, Dr. Dao Thongthainan, currently is at the National Zoo for three months for advanced training in semen collection and veterinary medicine.

### ***In Situ* Field Survey Project**

Conservation plans for saving endangered cats *in situ* are hampered by a lack of information on their status and distribution across remaining habitats. Multiple national parks and nature reserves already exist in Thailand, but an assessment of clouded leopard status, distribution and density across remaining habitat is needed. To initiate the *in situ* component of the Thailand cat project, Dr. JoGayle Howard was joined by Dr. Peter Leimgruber, an ecologist and GIS (Geographic Information System) specialist from the National Zoo's Conservation & Research Center. Drs. Leimgruber and Howard traveled to Thailand in January 2003 to meet with representatives of the Thailand Department of National Parks and the international conservation organization, Wild Aid. During the visit, Steve Galster (Executive Director of Wild Aid) and the Thailand Department of National Parks invited the Smithsonian's National Zoo to become a partner in a collaborative

conservation project at Khao Yai National Park (northeast of Bangkok), an excellent site for the *in situ* cat project.

Khao Yai is Thailand's oldest and most famous National Park, an ASEAN Heritage Park and a popular park for both Thai and foreign tourism. This was the first park to be established in Thailand in 1962, and it remains one of the largest of all national parks in Thailand (2,176 sq km). Despite intensive long-term scientific studies of primates, hornbills and plants, the status and distribution of other wildlife at Khao Yai remains largely unknown, along with quantitative estimates of the effects of human impacts on wildlife. The situation is especially critical given that poaching and encroachment by people living in communities surrounding the park has been going on since the park was first established and appears to have recently intensified with the development of a krisana wood (*Aquilaria spp.*) industry.

The paucity of information available on wildlife and the specific impacts of humans on wildlife populations at Khao Yai are attributable to a number of historical factors. These include a lack of knowledge on species distributions and densities; a lack of park personnel trained in ecological monitoring techniques, a lack of understanding of the concept that healthy wildlife populations mean normal ecosystem function and increased tourism value. Traditionally, tourism has been a priority for National Park management with research relegated to a minor role. To rectify these deficiencies, the Thailand Department of National Parks is working with Wild Aid, and other Thai and foreign government agencies, to implement a new wildlife protection program focusing on training Thai forestry staff as specialists in three conservation-focused fields: 1) anti-poaching; 2) community development and education; and 3) wildlife monitoring. Smithsonian's National Zoo (Dr. Peter Leimgruber and Dr. JoGayle Howard) were invited to focus on the wildlife monitoring aspect of the project. As a result, the Khao Yai Carnivore Conservation Project was initiated to begin a carnivore survey (with a focus on tigers and clouded leopards), in addition to extensive capacity building and training forest rangers in field monitoring and survey techniques.

The Khao Yai Carnivore Conservation Project will conduct long-term wildlife monitoring to detect trends in wildlife densities. This will focus on large species that are targets for poaching in Khao Yai, such as large carnivores and their prey species, primates and elephants. The larger species are sensitive to hunting because they are slow reproducers and therefore slow to recover their populations after hunting. Human activity associated with poaching also will be monitored. A number of indicators will be used to determine poaching trends in the park. Wildlife monitoring will involve systematic surveys in representative habitats and disturbance conditions where the results of the surveys are compared against a baseline and deviations from the baseline conditions are examined. For example, the capture rates of a species via camera-trapping compared to pre-monitoring conditions are examples of baselines for a species. The Carnivore Conservation Project also seeks to reduce poaching in the park by training park rangers in patrolling and anti-poaching methods, conducting outreach and public awareness in communities surrounding the park, and finding alternative employment for users of forest resources.

Overall, there are three main components to the *in situ* cat project: 1) a regional habitat analysis of Thailand using satellite imagery and GIS to identify areas with the greatest potential for felid and carnivore conservation; 2) training the Thailand forestry rangers in field techniques for monitoring wildlife; and 3) a field survey of cat populations using motion-detection cameras to identify species and animal densities and GPS (global positioning system) units to identify exact location of each field camera. One major advantage of the *in situ* cat project at Khao Yai National Park is that information will be obtained on all cat species, as well as all carnivore species in this large nature reserve. Cameras also will photograph poachers and document the presence of illegal wildlife activity in the park.

The first training workshop was conducted at Khao Yai National Park in October 2003 to continue training the Thailand Department of National Park's staff in basic wildlife monitoring techniques for carnivores (including all cat species). Infrared motion-detection cameras were purchased for workshop demonstrations and for use in the field survey project. The GIS map of Thailand currently is being developed to assess various habitats in Thailand. At the workshop, a team of forestry staff was selected as the 'carnivore monitoring team' who will work with the management of the Khao Yai Carnivore Conservation Project. The survey design was developed, and the monitoring locations and sampling plots were established. Plots will cover all aspects of the nature reserve including areas of high, medium or low human traffic. This project currently maintains two fulltime field biologists and project managers: Kate Jenks and Kanda Chandongchainarong. Camera trap photos collected to date include 484 photos of 31 species including 77 photos of 13 carnivores. Three photos have captured clouded leopards. Overall, this program will provide a unique database for developing appropriate management strategies for carnivores. Also, Khao Yai National Park serves as a vital site of the Thailand Department of National Parks for conservation training and wildlife monitoring in Southeast Asia.

Funding is critical to continue these integrated *ex situ* and *in situ* conservation projects.

Please make tax-deductible donations to: Friends of the National Zoo (FONZ)

Please mail donations to: Dr. JoGayle Howard, Smithsonian's National Zoological Park, Dept of Reproductive Sciences; 3001 Connecticut Ave. NW, Washington, DC 20008; 202/633-4043; [howardjg@si.edu](mailto:howardjg@si.edu)

---

### **Using the Domestic Cat to Develop Improved Hormone Protocols for Artificial Insemination in Ex Situ Felid Populations**

Rose Bauer, Katey Pelican, Buddha Pukazhenthhi and JoGayle Howard  
Smithsonian's National Zoological Park

The domestic cat is an important model for understanding wild felid reproductive physiology. In the 1990s, artificial insemination (AI) emerged as a valuable tool for genetic management of *ex situ* felid populations. Specifically, assisted reproduction enables cross-institutional pairings, combats behavioral incompatibility and promotes increased genetic

diversity in the population through representation of animals that may not reproduce. A minimally-invasive, laparoscopic intrauterine insemination technique was developed first in the domestic cat and then applied to wild felids, producing offspring in eight species (cheetah, clouded leopard, tiger, leopard cat, puma, snow leopard, ocelot and tigrina). In three of these species (cheetah, ocelot, leopard cat), insemination with previously frozen sperm also has resulted in offspring. However, overall AI pregnancy rates remain low in some felid species, and ovarian response to ovulation induction can be highly variable. This is due, in part, to the discovery that some species (such as the fishing cat and clouded leopard) exhibit spontaneous ovulation with no discernable pattern of predictability.

Over the past several years, our laboratory has been investigating whether short-term ovarian suppression prior to ovulation induction can improve AI success in felids. This approach is utilized in livestock and humans to synchronize estrous activity and enable a more uniform ovarian response at the time of insemination. A comprehensive study was conducted to compare the use of levonorgestrel (a progestogen, Norplant®), antide (a GnRH antagonist) and lupron (a GnRH agonist) in domestic cats. Results indicated that levonorgestrel (an implant) was most successful for providing short-term ovarian suppression with no negative effects on oocyte quality. Further studies using levonorgestrel in clouded leopards and fishing cats confirmed the effectiveness of progestogens for inducing a consistent ovarian response; however, no pregnancies resulted. We hypothesize that decreased uterine receptivity to implantation may be a cause for the low incidence of pregnancy observed following progestogen pre-treatment and AI.

In a recently completed study, we assessed the oral progestogen altrenogest (Regu-Mate®) to determine an effective dosage for short-term ovarian suppression in the domestic cat. This switch to an oral progestogen was made primarily to eliminate the two anesthesia events necessary to insert and remove Norplant® implants. Using non-invasive fecal hormone monitoring, we assessed three dosages (0.044 mg/kg; 0.088 mg/kg and 0.352 mg/kg) of altrenogest administered daily for 38 days. Results indicated that the mid-range dosage (0.088 mg/kg; dog dosage) was most effective for providing rapid, reversible inhibition of ovarian activity with a synchronized return to estrus (10-16 d) following cessation of the drug. With this information, we have begun to investigate the effect of progestogen pre-treatment on uterine status near the time of implantation in naturally-bred versus artificially inseminated domestic cats. Cats will be spayed on Day 10 or Day 17 (Day 0 = first day of natural breeding or day of hCG; implantation occurs on Days 13-14) and reproductive tissues will be recovered and assessed to investigate differences between treatment groups and determine potential markers for implantation success. This study aims to increase basic knowledge of the feline uterine environment near the time of implantation and could serve as a valuable tool for the development of improved AI hormone protocols in felids.

---

**Development of In Vitro Fertilization and Embryo Transfer in Fishing Cats for Improved Genetic Management**

Genevieve Magarey, Center for Conservation and Research of Endangered Wildlife,  
Cincinnati Zoo & Botanical Garden

Fishing cat (*Prionailurus viverrinus*) populations are declining in the wild, primarily due to habitat loss in Southeast Asia. However, there is little information about the population status of animals remaining in the wild. The captive population of fishing cats in North American zoos is reasonably small (n=69 cats) with relatively low genetic variation (GD=86%) making importation of new genetic material from Asia a priority. As an alternative to transporting live cats, the importation of cryopreserved semen combined with *in vitro* fertilization (IVF) and embryo transfer may be particularly beneficial for introduction of new founder genes to the North American fishing cat population. These technologies could also contribute to the production of offspring from SSP selected pairings where natural matings are unsuccessful.

After initial development in the domestic cat, research has begun to optimize these technologies for the fishing cat by collaborating with a number of U.S. zoos and Khao Kheow Open Zoo, Thailand. During 2004, sperm was collected by electroejaculation from a total of 8 male fishing cats. Initial studies showed that the longevity of fresh and frozen-thawed fishing cat sperm was similar using a newly defined feline optimized culture media to that using the traditional Hams F10 media, and subsequent studies adopted the new medium. Ovarian follicles of 9 female fishing cats were aspirated laparoscopically after hormonal stimulation with eCG and hCG. Follicular response to hormones varied between cats, and an average of 10 grade 1 oocytes were obtained from 5 of the treated cats. Using the cryopreservation protocol found most effective by Thai veterinarian Khongsak Thiangtum during research conducted for his Master's degree, the IVF success of fresh versus frozen-thawed sperm was compared. Although the fertilization rate was slightly lower during these initial studies, we were encouraged that 39% (7/18) of grade 1 oocytes were fertilized by frozen-thawed sperm, compared to 61% (11/18) for fresh sperm. The developmental potential of embryos from each group was similar with 43% (3/7) of embryos fertilized by frozen-thawed sperm developing to the blastocyst stage compared to 33% (2/6) for fresh sperm. Further research including optimization of recipient synchronization, embryo transfer and embryo cryopreservation protocols are underway.

Meanwhile, scientists at Cincinnati Zoo & Botanical Garden and Smithsonian's National Zoo continue collaborations with Thai zoos to enhance the genetic management and natural breeding efficiency of captive fishing cats in Thailand. The Cincinnati Zoo and the Fishing Cat SSP also continues to sponsor field surveys aimed at identifying a viable population of wild fishing cats in southern Thailand.

---

**Getting Serious About Small Felids: The Necessity for Broader Zoo Involvement**

Bill Swanson, Cincinnati Zoo & Botanical Garden

Of the world's 36 felid species, 28 are classified as small cats, with average body mass of less than 20 kg. Many of these species face grave threats to their survival in the wild but, historically, have been relatively neglected in conservation and science circles. In 2001, the Felid Taxon Advisory Group established its first Species Survival Plans (SSPs) for small-sized felids, specifically for the ocelot, Pallas' cat, fishing cat, sand cat and black-footed cat. Three other species, the caracal, serval and Canada lynx, were selected for inclusion in Population Management Plans (PMPs), and may eventually be managed as SSPs. Over the past four years, substantial progress has been made in developing effective captive breeding programs for the five SSP species. New founders for each population either have been imported in recent years or are currently being identified for future importation. For some species, such as fishing cats and ocelots, captive breeding programs are being managed in range countries to produce potential founders for the SSP populations. For all of these SSP species, offspring now are being produced on an annual basis, based on SSP breeding recommendations, and typically are available for placement at any interested AZA institution.

Reproductive research, using fecal hormone analysis and semen collection to characterize basal reproductive parameters, either has been completed or is ongoing with each SSP species. This basic reproductive knowledge is invaluable for improving captive breeding success as well as facilitating development of assisted reproductive technology, including artificial insemination and embryo transfer, for improved population management. Similarly, disease issues that affect some of these species, such as toxoplasmosis in Pallas' cats and transitional cell carcinoma in fishing cats, are being actively investigated to understand disease etiology and develop strategies to mitigate disease effects on population viability. Finally, *in situ* research and conservation programs have been established for four of the five SSP species, including camera trap surveys, radiotelemetry, disease surveillance and habitat restoration.

Each of the small felid SSP populations currently is comprised of 16 – 71 cats, with founder sizes ranging from 5 to 26 individuals and genetic diversity from 0.85 to 0.94. Based on available cage space for small cats (i.e., 80-150 spaces per species), each SSP population theoretically has ample room for expansion. However, population modeling suggests, that even with these more optimal population sizes, genetic variation will be lost dramatically over the next 50 years as a consequence of genetic drift. For most SSP species, genetic variation is projected to decrease to 0.75 or lower in this time period unless 1) population sizes are increased substantially, 2) generation intervals are prolonged, or 3) new founders are introduced periodically. The best management strategy would be to use each of these options in combination to their maximal advantage. To achieve this goal, it is critically important that more AZA institutions become actively involved with small felid conservation efforts.

At present, there are ~231 AZA accredited zoos, aquaria and related facilities. Of these institutions, only 72 or 31% maintain at least one of the small cat SSP species within their collections. Excluding those 32 institutions housing ocelots only, just 40 AZA institutions exhibit any of the other four SSP species. In total, only 199 cage spaces (of the projected 500 available for small cats) actually contain the targeted SSP populations. To support small felid conservation, each AZA institution is requested to take four actions: 1) commit to maintaining one or more small cat SSP/PMP species within its collection, 2) become involved in SSP/PMP programs and the activities of the Felid TAG's Small Cat Subcommittee, 3) participate in TAG/SSP endorsed research projects, and 4) provide financial support for in situ conservation programs focused on small felids.

---

### **Husbandry Training of Felids at Disney's Animal Kingdom**

Jennifer Hylton Metzler, Animal Keeper, Disney's Animal Kingdom

Disney's Animal Kingdom has made a significant commitment to establishing and maintaining a husbandry training program. The husbandry training for felids, as a part of this program, focuses on daily management and enhancing animal care. One of the central goals of our training curriculum includes expanding the range of health care procedures within a protected contact environment, while maintaining consistency and continuity with multiple trainers and the challenge of staff turnover. The potential benefits of this program focus on reducing stress through an increase in the animals' willing participation in husbandry care, thus decreasing the need for more physically invasive procedures. The specific goals for Disney's Animal Kingdom's collection of felids, 0.6 tigers, 2.2 lions, and 5.2 cheetahs began with a base list of body positioning behaviors that became the foundation for more extensive husbandry training, in order to facilitate veterinary care. The husbandry training resulted in the cats' voluntary acceptance, of intra-muscular, intravenous and subcutaneous injections. With the training of these specific behaviors, it is now possible to administer vaccinations, medications or immobilization drugs without the need for tranquilizer darts, in most of our felids. Additionally, we have collected blood from a tail vein on a regular basis, without mechanical or chemical restraint. Along with the maintenance training for these husbandry and medical procedures, it is sometimes necessary to address the regression of behaviors. Training these behaviors has significantly improved our animal management program, in both routine and more urgent healthcare, while maintaining a safe environment for cats and staff.

Along with the healthcare behaviors our cats have also learned some behaviors that are not husbandry related. These may encourage the expression of natural behaviors and provide an enriching environment while creating unique opportunities for guest viewing and education.

---

**Playa de Oro Reserva de Tigrillos, Ecuador, South America**

Lynn Culver/Director Feline Conservation Federation

The 25,000-acre Playa de Oro reserve is the only one of its kind dedicated to protecting the wild felines native to the Ecuadorian coastal rainforest and the prey species they depend upon. There are six species of feline native to Playa de Oro; ocelot, margay, oncilla, jaguarundi, puma, jaguar. This past year FCF has raised over \$13,000 for the reserve. These funds have improved the Eco-tourism services at the reserve by replacing the lodge roof, and purchasing a new boat motor to provide more reliable transportation for tourists.

FCF members also purchased and installed a commercial gas stove for the lodge kitchen, and initiated a village chicken coop building project to protect their chickens from wild predators. This past year FCF individuals also donated some much needed items; a satellite phone to provide a way to communicate with the outside world in case of an emergency, solar panels to supply a source of electricity to the lodge, and a laptop computer for bookkeeping and for downloading camera trap photos.

In late 2003, the reserve acquired 2 adult ocelots that were confiscated by authorities from a nearby area close to the reserve boundaries. FCF funded their rehabilitation and their release in early 2004 into two different areas of the reserve. In 2004 three digital cameras provided by a grant from Cincinnati Zoo keepers captured photos of several ocelots and a tayra, and an agouti, as well as other small prey species.

The digital cameras have fared much better than the previously used 35mm Camera traps, but have still developed problems. However FCF and the reserve staff have been working through each problem to get the cameras functioning again. FCF has enlisted the assistance of a professional outdoor photographer, Terri Nash, to help maintain and troubleshoot our camera traps. Terri will be spending most of the month of April 2005 at the reserve to provide some more intensive camera training to the reserve staff.

There are many species of wildlife and flora native to the Playa de Oro reserve that should be researched and studied. Multitudes of mammals and birds, amphibians, reptiles, insects and flora have never been researched or catalogued in this untouched area. The September 2004 tour group had the unique experience of sighting 3 extremely rare bush dogs while boating down the river. These are one of rarest of wild canids in the world.

Well-known international birders such as Olaf Jahn of Germany and Robert Jonsson conducted a bird survey at the Playa de Oro Reserve. According to Olaf Jahn, "330+ bird species were recorded in the entire community of Playa de Oro". Among those Jahn identified were: "23 species of diurnal raptors, 15 species of hummingbirds, 19 species of antbirds, 49 species of tyrant flycatchers, and 36 species of tanagers and their allies." Jahn will soon be publishing a comprehensive list. In the meantime, interested birders can contact him personally at: [O.Jahn@andinanet.net](mailto:O.Jahn@andinanet.net)

In September 2005, a retired zoologist will be traveling to the reserve with FCF to conduct a study on aquatic invertebrates found in the reserve area. FCF would like to encourage the

AZA zoos to help provide research in all the various possibilities that abound in this remote area of the El Choco rainforest region. Playa de Oro Tour dates are: April 9-18, 2005, spaces are still available; September 16-25, 2005; 2005 November 11-20, 2005

FCF has been providing 3 to 4 tours per year to the reserve since 2002. Anyone can go on these tours, and we also want to encourage other organizations or zoos to provide their own tours to the reserve. Contact Tracy Wilson at 501-368-0399 or e-mail at [tracy@touchthejungle.org](mailto:tracy@touchthejungle.org) to set up your own tours.

---

### **Felid Pathology Update**

Dr. Karen A. Terio, Univ. of Illinois, Zoological Pathology Program, [kterio@lumc.edu](mailto:kterio@lumc.edu)

#### **Amyloidosis in Black-Footed Cats**

Disease has been a limiting factor in the viability of captive black-footed cat populations. Based on previous necropsy surveys, the vast majority of these deaths have been determined to be due to amyloidosis resulting in renal failure. In order to better characterize amyloidosis in black-footed cats, necropsy tissues and slides from black-footed cats representing the North-American, European, and Southern African captive populations were reviewed. Amyloid was most commonly present in the kidneys (91% of total amyloid cases). Other affected sites included the gastrointestinal tract, spleen, lymph nodes, adrenal and thyroid glands. Amyloid was confirmed to be of the AA type based on immunohistochemistry performed by Dr. Timothy O'Brien's laboratory at the University of Minnesota. All facilities had at least one affected animal and tissues from a free-ranging animal were also affected. There was no apparent sex predilection. Known risk factors for amyloidosis in other species including chronic inflammatory conditions, stress, and genetics were evaluated. Although chronic inflammatory conditions were present in affected animals, they were also present in unaffected animals. Adrenal hyperplasia, a morphologic indicator of stress, was present in 77% of affected animals. Analysis of the pedigree of study animals by Dr. Thomas Famula at the University of California suggested that black-footed cats may have a genetic predisposition for amyloidosis. The roles of genetics, stress and other risk factors as well as the development of ante-mortem diagnostics needs further investigation.

#### **Transitional Cell Carcinomas in Fishing Cats**

##### **Studies underway by Dr. Jennifer (Jaime) Landolfi**

Transitional cell carcinomas (bladder cancer) have been noted to be a significant disease concern within the captive population representing 9% of the deaths between 1995-2004. Mean age of affected animals was 10.9 years with no evidence of a sex predilection. Hematuria (blood in the urine) is the most common clinical sign in affected animals. Our current studies are focused on determining specific markers expressed by these tumors that will provide us information about why they develop and potential targets for chemotherapy treatments. These studies are first focusing on those markers known to be associated with these tumors in other species. One of these markers is cyclooxygenase an enzyme involved

in the inflammatory process that has two isoenzymes (COX) 1 & 2. Preliminary results indicate that these tumors are not expressing COX-1, which is consistent with our knowledge of this tumor in other species. However, portions of the tumors are expressing the COX-2 isoenzyme, particularly those portions of the tumors that invade into the wall. This provides important information on potential treatments as the drug Piroxicam, a non-steroidal anti-inflammatory drug that inhibits this enzyme, may be effective in slowing the progression of disease.

---

## ***Felid TAG Working Group Reports***

### **Linking In-Situ/Ex-Situ Conservation Committee**

Co-Chairs: Dusty Lombardi, Columbus Zoo & Aquarium; Gerry Brady, Potter Park Zoo

#### **History of the Committee**

At the 2000 Felid TAG Meeting in Riverbanks, South Carolina, Dr. Ulie Seal facilitated a mini workshop in WCMC fashion. After the main issues were identified, attendees broke up into working groups. Six groups were formed, one of which was the Linking In Situ/Ex Situ Conservation Group. Three goals were identified at this first meeting:

#### **GOAL #1**

- Define linking in situ/ex situ conservation

Linking *in situ/ex situ* conservation is a program intended to develop & maintain links with wildlife authorities in member countries and international conservation organizations, in order to promote the re-introduction of captive-bred species in the wild and support *in situ* programs of relevant species to AZA animal collections. *Dr. Ulie Seal from the SEAZA meeting in Vietnam*

#### **GOAL #2**

- Create a list of felid conservation projects from all AZA institutions

In August 2000, a survey was sent out to all 134 Felid TAG institutions requesting the following information:

- *In situ/ex situ* project involvement
- Species involved
- Geographic location of project
- Description of project
- Field contact
- Institutional contact
- Institutional support

98 institutions responded and a document was compiled and disseminated at the 2000 National AZA Conference Felid TAG Meeting.

#### **GOAL #3**

- Create a contact person for each felid species that will interact and foster relationships between in situ/ex situ conservation activities
  - SSP Coordinators and PMP Managers were asked to take on this role

**2001 FELID TAG MEETING:** Three issues were identified at the working group meeting:

•**ISSUE #1**

*SSP Coordinators & PMP Managers are charged with determining specific projects that support both in situ/ex situ projects for each species*

**Solution:** The 2000 document was reorganized by species instead of institution and sent to SSP coordinators and PMP managers. A condensed list of activities became available for Cheetah, Jaguar, Jaguarundi, Leopard, Clouded leopard, Snow leopard, Lion, Lynx, Ocelot, Puma, Amur/Sumatran/South China tigers, Black-footed cat, Jungle cat, Pallas cat.

•**ISSUE #2**

*Redefine Linking In Situ/Ex Situ*

**Solution:** The purpose of the Felid TAG Linking *In Situ/Ex Situ* Conservation committee is to develop and maintain links with wildlife authorities in member countries and international conservation organizations in order to promote the support of *in situ/ex situ* programs of relevant species to the AZA zoo collections. The Felid TAG recommends that all institutions that participate in managed programs become engaged in linking *in situ/ex situ* conservation efforts.

•**ISSUE #3**

*Interface with the education and research working group*

**Solution:** Met with the education working group at the 2002 Felid TAG meeting

**2002 FELID TAG MEETING:** Five issues were identified at the Felid TAG meeting.

•**ISSUE #1**

*Get clarification of criteria from USFWS on permit applications, on enhancing wild populations*

**Solution:** AZA Legislative Conference was held in Washington, D.C. May 14-17 to discuss this and other issues. Steve Olson from AZA and Mike Carpenter, USFWS attended this conference. Division of Management Authority gave a talk on permits on September 10.

•**ISSUE #2**

Identify models for collaborative financial agreements at the SSP & TAG level

**Solution:** Gather information from the IEF, IRF, IIF and Brazilian Ocelot Consortium (In progress)

•**ISSUE #3**

Develop a mechanism for identification of field researchers and projects

**Solution:** Contact chairs of the cat specialist support groups and place the information on the Felid TAG website (In progress)

•**ISSUE #4**

Challenge all Felid SSP & PMP Coordinators to develop contacts and projects

**Solution:** Completed

•**ISSUE #5**

Work with Education Working Group to assist each SSP to come up with an education program

**Solution:** In Progress

**2004-2005**

•New survey was conducted

•The Felid TAG Survey request was sent out to 137 Institutions on October 25th, 2004 with a deadline of Dec 1st, 2004. We received 82 responses.

•*Website*

•A database has been developed by the IT department of the Columbus Zoo  
<http://apps.colszoo.org/felidtag/>

•The following information was collected from the database:

*Large Cats*

•13 Zoos are supporting programs with the Snow Leopard

•32 Zoos are supporting programs with the Cheetah

•4 Zoos are supporting programs with the Sumatran Tiger

•5 Zoos are supporting programs with the Amur Tiger

•15 Zoos are supporting projects with the Jaguar

•2 Zoos are supporting projects for the African Lion

- 11 Zoos are supporting projects with the Clouded leopard
- 4 Zoos are supporting projects with the Amur leopard

*Small Cats*

- 9 Zoos are involved in projects with the Ocelot
- 8 Zoos are supporting projects with the Fishing Cat
- 2 Zoos are supporting projects concerning the Pallas' Cats
- There is 1 zoo supporting a project concerning the Sand Cat at this time
- 6 Zoos are supporting projects with the Puma
- 2 Zoos are supporting Black-Footed Cat projects
- 2 Zoos are supporting Canadian Lynx projects
- 1 Zoo supporting a Caracal project at this time
- There are no zoos supporting Serval projects at this time

All surveys were compiled and placed on a website accessible to everyone.

Remember for any Updates, New Projects, Support, or Questions Contact:

Jennifer Compston  
Columbus Zoo  
P.O. Box 400  
9990 Riverside Dr.  
Powell, OH 43065  
614- 724-3449  
[Jennifer.compston@columbuszoo.org](mailto:Jennifer.compston@columbuszoo.org)

---

***Felid Husbandry Course Working Group***

Tarren Wagener, Fort Worth Zoo

The Felid TAG is proposing the development of a Felid Husbandry Course. After much discussion in a working group dedicated to the topic during the mid-year meeting, the group decided that such a course should be managed by the Felid TAG rather than integrated into the Board of Regent offerings. This alternative was proposed in an effort to significantly decrease costs to participants, and increase access to instructors since the majority of potential instructors will already be present at the mid-year meeting. It was proposed that the course would be 2.5 days long and offered in conjunction with the mid-year Felid TAG meeting beginning in Spring 2007. The objective of the course will be to expose students to best practices associated with managing both small and large felid species in captivity. The target audience includes all keepers, supervisors and curators working with felids, and class size will be limited to no more than 30 students to allow for as much small group discussion and activity as possible. Major topics will include felid natural history and

taxonomy, formal felid conservation programs (Felid TAG, SSPs etc.), federal regulations, exhibit design, safety, behavioral and reproductive management, transport, animal health and interpretation.

The course will be divided into three broad sections over the 2.5 days. The first half-day section of the course will consist of an overview of felid natural history, taxonomy and behavior. The second full day section will consist of classroom lectures and discussions of topics that cover both small and large felid taxa. And, the last full day section will cover taxon specific information (small or large felid) by splitting students into two groups, or by alternating course offerings yearly so that small felids are covered one year, and large felids the next. This last section will be designed to be more of a “wet lab” and will incorporate the host zoo facilities and collection as much as possible to provide an interactive learning experience for the students. The working group discussed course organization, topics, potential instructors and resources. Curriculum development is on-going.

**Education Working Group**

Participants: Dan Marsh (dan.marsh@cincinnati-zoo.org), Karen Povey (karenp@pdza.org), Allyson Atkins (allyson.atkins@disney.com), Rose Bauer (bauerr@si.edu), Rebecca Spindler (spindler@uoguelph.ca), Rain Westgard (rainand Reid@aol.com)

Participants of the small cat workshop identified a need to market the five small cat SSP species to the zoo community in order to increase program participation. The education group was charged with the development of a marketing package to create positive “buzz” for these species.

*Benchmarks for Success:*

\*\*\*Need to obtain information from SSP program managers to determine the long-range plan for new placements of these species. In particular, gather numbers from SSP managers to complete the space goal table below- Dan

Species	Population goal 2003 RCP	Current Population	Spaces added w/in 1 year (prefer new institutions)	Spaces added within 5 years	Spaces added within 10 years
Black-footed cats	80	25	5		
Sand cats	80	25	10		
Pallas' cats	100	67	10		
Fishing cats	100	68	5		
Ocelot (Brazilian)	150	19 (100 generic)	5		

**Goal: Within 10 years, have the actual population equal the population goals from the 2003 Regional Collection Plan.**

**Action 1: Create small cat promotional package by September 2005 – Dan and small cat education team.**

*Audience:*

People who influence and make collection decisions at and for North American zoos including: animal managers, curators, directors, and master planners.

*Venues for marketing to this audience:*

1. AZA Communique
2. Direct marketing piece to master planning consultants
3. Direct marketing piece distributed at AZA National/Regional Conferences (ideally in coordination with a presentation).
4. Direct marketing piece to IRs, curators, program managers at all AZA facilities – people who can be advocates to present the materials to decision makers.

*Media for marketing package*

Brochure: need to investigate format – 8 page? 1000 copies? Or spiral bound/color copy, produce as many as needed in house? This will be driven by budget.

CD ROM – as needed

*Content of marketing package:*

**1. Tag Lines**

What's the Big Deal About Small Cats? (Other tagline ideas: The Fab Five, They Have Catitude! Size doesn't matter!)

**2. Selling Points.**

***They make great exhibits because...***

- a. The species cover a broad zoogeographic range
- b. Babies! These animals have charismatic offspring, a short gestation, and more breeding recommendations than big cats.
- c. Each species has unique and compelling physical and behavioral characteristics.
- d. Each species is threatened with extinction in the wild: all populations are declining. There is a real opportunity to make a contribution to the conservation of these species. These species are a conservation priority for AZA – the only SSP species for small cats.
- e. There are many opportunities for *in situ* linkages and great conservation messages.

**3. List of current participating institutions in the SSPs.**

**4. Resource materials**

- a. Education: graphic examples, list of curriculum materials available (or links to other sources)

- b. Husbandry: distillation of husbandry guidelines, contacts for other information (SSP contacts, husbandry manuals as produced, cat husbandry course).
- c. Exhibit design: features of successful exhibits, drawings of successful exhibits, photos of successful exhibits, ways to modify existing exhibits for small cats (with examples).
- d. Research and Conservation opportunities – *in* and *ex situ* project descriptions, SSP approved/supported projects, possibilities for staff involvement, web links, etc.

**Action 2: Request the following information for resource materials from each SSP manager and send to Dan by April 15 - Dan.**

1. Fun facts: see 2c above
2. Specific range countries
3. Why they make effective exhibits
  - a. Testimonials from successfully exhibiting institutions
  - b. WOW! photos of animals/exhibits (with public and/or action)
4. How to make an effective exhibit
  - a. Bullet points for exhibit design
  - b. Architectural renderings of exhibits
  - c. Photos/drawings of successful graphics
  - d. Ideas for modifying existing exhibits for the species
5. Conservation (*in* and *ex situ*) programs for that species
6. Research projects for the species
7. Verify institutions housing the species from 2005 ISIS report

**Action 3: Compile list of names and addresses of contacts (Excel format) for distribution of these materials and provide to Dan by August 1.**

Karen will do #1-3

Allyson will do #4

**Action 4: Request updated standardized animal welfare guidelines for small cats from Norah. Dan**

**Action 5: Compile all the above info and produce document including budget estimate for production and distribution. Dan (and assistance from team as needed)**

### **Production Timeline:**

**June 1:** Evaluate needs for further information and make assignments to rest of team.  
Distribute draft to team members.  
Develop budget for project and identify funding sources.

**June 18:** Team members return draft with comments to Dan.

**July 1:** Second draft distributed to team.

**July 7:** Team members return second draft with comments to Dan.

**August 1:** Final version to printers

**September 1:** Ready for distribution!

**Action: Distribute at AZA National Conference – Dan, Karen, Allyson  
Distribute by mail to contact list – Dan and Cincy Zoo crew  
Follow up on distribution – Felid TAG Steering Committee**

---

### **Felid Standardized Guidelines Working Groups**

Two separate working groups were formed to review the existing Small Cat Husbandry Standards and Large Cat Husbandry Standards. The purpose of this review is to update both sets of guidelines and re-format the guides to meet the standardized format as required by the AZA's Animal Welfare Committee. Both groups met and began working their way through the documents. As this process is quite involved and several questions were raised regarding audience, wording and the fact that felid species vary in their requirements, the Co-Chairs of the TAG will continue to work with representatives of the Animal Welfare Committee to answer these questions and move forward with the documents.

---

### **Small Cat Priorities Working Group**

At the 2004 Mid-year Felid TAG meeting in Albuquerque, an all-day Small Cat Workshop was held to update the TAG membership on the status of small-sized felids and identify priority issues common to the eight small cat management programs (5 SSPs: ocelot, fishing cat, sand cat, black-footed cat, Pallas' cat; 3 PMPs: serval, caracal, Canada lynx) overseen by the TAG. Danny Morris and Michelle Claud were selected by the Felid TAG steering committee to co-chair a small cat sub-group within the TAG and lead development of collaborative efforts to address conservation needs that impact across small cat populations, such as founder acquisition, public education and marketing. At the 2005 Mid-year meeting, a working group was convened to revisit small cat priority issues, assess progress and plan for additional collaborative initiatives with small felids.

After a brief review of the status of each small cat population from population managers (see SSP/PMP reports, this volume), Dr. Karen Terio discussed some of the specific health problems encountered in certain small cat species, including transitional cell carcinoma in fishing cats, amyloidosis in black-footed cats and toxoplasmosis in Pallas' cats. Dr. Terio also reiterated that, as the Pathology Advisor to the five small cat SSPs, she is monitoring diseases issues in these species and providing, free of charge, histopathology services for all

small cat SSP species maintained in SSP-participant institutions (information on tissue sampling and shipping is available on the TAG website: [www.felidtag.org](http://www.felidtag.org)). Importation needs for each of the small cat species also was discussed, including efforts to develop captive breeding programs for some species, such as ocelots and fishing cats, in range countries. For the five SSP species, importations of new founders from range countries has either recently occurred (Pallas' cat, sand cat, fishing cat), is ongoing (ocelot) or is planned for the near future (black-footed cat). For all species, offspring are being produced on an annual basis and are available for placement at AZA institutions.

The Working Group also addressed the need to increase participation of AZA institutions in small cat management programs. One key component to increasing SSP/PMP participation is raising the awareness of the conservation status, appeal and availability of small cats among zoos. The Working Group recommended several steps to achieve this goal:

1) request to present a speaker session at the national AZA Conference focused on small cats to amplify zoo interest in small felid conservation. Individual talks would 1) provide an overview of their conservation status, 2) discuss ongoing reproductive research that is contributing to population management, 3) focus on overcoming exhibit design challenges and 4) incorporating behavioral sciences to improve their exhibitry of small cats, and 5) explore methods to integrate small cat conservation into the visitor experience. Michelle and Danny will submit the session request to AZA, with Alan Shoemaker, Bill Swanson, Jill Mellen, Dan Marsh, and Michelle and Danny as potential speakers. Michelle will moderate the session. **Editors' note:** The proposal for a small cat session was accepted by AZA and has been scheduled for 1:00 pm - 2:30 pm on September 17<sup>th</sup> at the AZA Conference.

2) develop an education packet that focuses on small cats to use for marketing the species to AZA institutions. Ideally, the education packet would be completed in time for distribution at the AZA Conference in conjunction with the small cat session. Dan Marsh and the Education Working Group will take the lead on these efforts (see their report, this volume).

3) publish a dedicated issue of the AZA Communique with its central theme focused on small cat conservation programs. Bill will contact the AZA executive office to check on the feasibility and timeline for producing such an issue.

---

## ***SSP/PMP and Studbook Updates***

### **Lion SSP**

The African Lion SSP report can be found in the African Felids section of these proceedings.

**Cheetah SSP**

The Cheetah SSP report can be found in the African Felids section of these proceedings.

**Black-Footed Cat SSP**

The Black-Footed Cat SSP report can be found in the African Felids section of these proceedings.

**Sand Cat SSP**

The Sand Cat SSP report can be found in the African Felids section of these proceedings.

**Serval PMP**

The Serval PMP report can be found in the African Felids section of these proceedings.

**Tiger SSP**

Ronald Tilson, Species Coordinator, Minnesota Zoo

The 2004 AZA Tiger SSP Master Plan meeting was held August 7-9 in the River Camp Banquet Facility of the Louis Zoo, MO. Special thanks to the staff and director of St. Louis Zoo, and particularly to Steve Bircher, for extending the invitation to host the SSP master plan meeting, and for taking care of all of us so graciously.

The Tiger SSP ARKS reports for 2004 (Amur, Sumatran and Indochinese), prepared by Kathy Holzer, was submitted to the AZA Office of Science and Conservation for posting on the organization's website.

The Sumatran Tiger Regional Studbook was transferred from Gerry Brady to Kathy Traylor-Holzer this year. She currently maintains the regional studbooks for the other two Tiger SSP subspecies - the Amur tiger and the Indochinese tiger - and as the SPMAG advisor to the Tiger SSP, was quite familiar with the Sumatran tiger regional studbook. Her application was approved by her employer (CBSG), by her official AZA sponsor of the other tiger studbooks (the Minnesota Zoo), and subsequently, by the Felid TAG.

*The Status of the Tiger SSP*

**Background**

The Tiger Species Survival Plan currently manages three tiger subspecies as recommended by the 1992 Tiger Global Conservation Strategy – Amur (*Panthera tigris altaica*), Sumatran (*P.t. sumatrae*), and Indochinese (*P.t. corbetti*) tigers – with 150 spaces currently allotted to each. The AZA Felid TAG Regional Collection Plan specifies 450 spaces for tigers to be divided among the three managed subspecies.

The Amur Tiger SSP was one of the first established SSP populations. Since management began in 1982 the population has been slowly reduced to provide space for the expansion of the Sumatran and Indochinese tiger SSP populations. Breeding has been controlled such that the population has been managed at close to its target size of 150 animals for the past ten years. Master plans outlining breeding and transfer recommendations were held in June 1998 (Apple Valley, MN), October 2000 (St. Louis, MO), April 2002 (Portland, OR), September 2003 (Columbus) and August 2004 (St. Louis).

Currently there are 116 SSP member institutions holding 292 tigers: 155 Amur tigers (53%); 67 Sumatran tigers (23%); 45 Indochinese tigers (15%); and about 25 generic tigers (9%). For the present, the Tiger SSP plans to expand the captive tiger population to a total of 450 spaces suggested by the AZA Felid Taxon Advisory Group, allotting 150 spaces to each subspecies. The Amur tiger population will be held stable at 150 tigers, while the Sumatran and Indochinese tiger populations will be expanded

#### Tiger Demographic Summary

	Amur	Sumatran	Indochinese
Current size of managed population	155 (77.78)	67 (38.29)	45 (23.22)
# excluded from management	0	0	0
Mean generation time	8.1 years	8.4 years	7.7 years
Potential population growth rate	1.05	1.05	1.16
# Births in past year	12	9	3
# Deaths in past year	13	1	2

#### Tiger Genetic Summary Table

	Amur	Sumatran	Indochinese 1
Founders	57	16	7
Founder genome equivalents	14.99	5.45	3.22
Founder genome surviving	22.22	8.16	5.25
Gene diversity retained	0.967	0.9082	0.845
Population mean kinship	0.033	0.0918	0.155
Mean inbreeding	0.007	0.0293	0.077
Ne / N	0.27	0.30	0.20
% of pedigree known	100	100	100

#### **Tiger SSP - Management Group Recommendations, Discussion Points and Issues**

##### Canada

This discussion was initiated by Alan Shoemaker at the request of the SSP and the CAZA, represented by its Chairman, Bruce Dougan, Magnetic Hill Zoo; Maria Franke, Toronto Zoo, and Serge Lussier, Park Safari.

To ease the permit issues facing zoos in USA and Canada, and regardless of the zoos' AZA or CAZA affiliation, the following considerations are offered. These are necessary because

of the changes in the interpretation of the USA Endangered Species Act that were made by the US Fish and Wildlife Service's Division of Management Authority (DMA). This document is not intended to debate the whys and wherefores of DMA or AZA policy changes but only to help zoos on both sides of the border deal with them.

### Tigers to Canada

1. CAZA needs to develop a coordinated, SSP-type Amur tiger program that is *independent* of the AZA Amur tiger SSP. This program would ideally include:

- Identify a Canadian Amur tiger SSP Coordinator who will be the counterpart of the US based SSP;
- Use SPARKS to assist in SSP management decision-making;
- Develop an *in situ* component supported by one or more of its participating zoos;
- Survey member zoos and identify the number of tiger spaces presently available. After identifying existing Amur and generic tigers in CAZA zoos, enlarge this spatial number by encouraging CAZA members to phase out generic tigers and not accept new ones;
- Develop a target population for the CAZA Amur tiger SSP that is based on sound genetics and demographics, realizing that additional animals can be obtained from USA and EEP zoos;
- Prepare a written management plan based on the above that can be shared when tigers are needed from USA zoos

2. Individual USA zoos will, if the above is accomplished, be able to transfer tigers to Canada without having to include an enhancement aspect of their applications.

3. As SSP Chair, Ron Tilson will declare any tigers going to a Canadian, non-AZA member zoo as surplus to the SSP. This declaration does not mean that such an animal is necessarily genetically or demographically less valuable than any other tiger but rather, will have to be done in order to comply with recent AZA policy changes involving the movement of SSP animals to non-member zoos. This particular action would not impact transfers of tigers from USA zoos to Canadian AZA members such as Calgary and Toronto. Because tigers usually have multiple offspring per litter, it may well be that additional breedings are recommended in USA zoos just to supply sound stock to CAZA members

4. All USA zoos must have Felidae included on the CBW permits to the above to occur.

5. If no CAZA Amur tiger SSP is developed, all USA zoos wanting to transfer tigers to Canada will have to prepare applications that include *in situ* programs, a situation that will greatly decrease the number of zoos available in the USA to export tigers to Canada.

Tigers to USA

1. All USA zoos will have to prepare a complete application that includes *in situ* enhancement by the receiving zoo. Unlike the export situation described above, an USA-wide or SSP-wide enhancement project participated by various AZA Amur tiger participants does not count.
2. No single USA zoo can act as an importing zoo from which tigers will be sent to another location shortly after importation.
3. USA zoos planning to become involved in importation activities should start funding *in situ* projects NOW. These projects do not have to be costly but they do need to be multi-year and on-going. Projects involving numerous species such as Tigris Foundations are good ones because they impact more than one species and can be used in permit preparation for numerous applications involving regulated wildlife (i.e. Amur leopard, cranes).
4. After individual USA zoos have developed approved enhancement projects leading to successful application for the importation of tigers from Canada or any other country, or have developed approved enhancement projects leading to the exportation of tigers to regions other than Canada, the level of continued enhancement will decline significantly or even disappear (as is the case for Omaha Zoo).

After much discussion the Canadians prepared a position statement for the CAZA, presented below.

Canadian Association of Zoological Parks and Aquariums (CAZA)  
Position Statement for Amur Tigers (2004)

- CAZA would appoint an individual(s) that would manage a Canadian sub-population of the AZA Amur Tiger SSP North American population recognizing that the Canadian sub population was part of the larger North American population and reporting to the AZA Amur tiger coordinator.
- CAZA would strive to increase tiger space by involving accredited CAZA institutions in the AZA Amur tiger SSP.
- CAZA sub population coordinator would attend Amur tiger SSP meetings on an annual basis.
- Only one studbook would be maintained for the entire North American population of Amur Tigers.

In conclusion, the Canadian population would be part of the North American population as a whole and we would do all that we could to facilitate the cross border transport of these animals for genetic exchange.

CAZA will appoint coordinator(s) to represent CAZA institutions that are participating in the SSP programs, increase tiger space by increasing CAZA participation in SSP and insure a representative at National AZA with regard to the SSP. Maria will represent English speaking institutions / Serge will represent French speaking zoos.

There was a recommendation from the floor to have the Tiger SSP endorse the document, which was unanimously endorsed with no objections. The Tiger SSP thanked Alan Shoemaker who pushed this effort forward.

### Breeding Recommendation Space Requirements

There was considerable discussion concerning the need to increase the spaces required to hold tigers from the current three (male, female and cubs) to four. The reason is to circumvent the number of “log jams” that occurs in breeding recommendations approved to either smaller zoos or zoos with few “tiger spaces”. There was a general consensus that the increase was needed but the ruling needs to be vetted with all the zoos in the Tiger SSP before it is enacted. Thus, this requirement will not effect the 2005 recommendations, but in subsequent years it will be a desirable requirement for obtaining a breeding recommendation. A letter regarding breeding recommendations that lists the criteria will be drafted and sent to the management group for comment. Then the letter will be sent to every institution for the director’s signature.

---

### *Pallas Cat SSP*

Martha Caron, Species Coordinator, Minnesota Zoo

A meeting of the Pallas Cat SSP was held in conjunction with the mid-year Felid TAG meeting in Saint Louis, MO on March 17, 2005. The current demographic and genetic status of the SSP population was reviewed. As of March 2004, the SSP population consisted of 65 cats (32.33.0) in 17 (soon to be 18) institutions. A list of seven potential new holding institutions willing to accept cats in 2006 has been compiled to date. In the past year there were 18 (4.6.8) kittens born in 4 litters, with only nine of those kittens surviving to date. 2004 included the deaths of 13 (4.1.8) cats including the previously mentioned neonatal deaths for a net gain of five cats. The current population is based on 26 founders. Genetic diversity currently retained is .9368 with the potential to increase to .9731 without further importation. We believe that mean inbreeding remains at 0 but comparative genetic studies of the original founder population is currently underway at the National Cancer Institute to confirm this. Founder genome equivalents currently represented in the population are relatively low at 7.91 but have the potential to increase to 18.56 with careful genetic management and breeding to more equally represent our present founder base. We have several minimally represented founder females that are reaching their age limit for breeding over the next two years and every effort will be made to breed these females and capture their genes prior to their pending reproductive senescence.

Breeding recommendations for 2004 were limited to only the most genetically valuable animals, especially those nearing reproductive senescence, due to our extreme space constraints for the placement of kittens at the current time. A total of seven breeding recommendations were made this year, two of which are experimental involving *in vitro* fertilization and embryo transfer. We are currently hopeful of at least two pregnancies from these recommendations.

An update on the Pallas Cat Conservation Project which is an *in situ* research project conducting study on the wild Pallas cat population in Mongolia was provided by Dr. Meredith Brown and presented by Dr. Bill Swanson. This is an exciting and continually expanding project. Current aspects are continuing to study the disease susceptibility of the wild population, continued radio telemetry tracking of 6-8 individual wild specimens, a study being conducted on the broad use of rodenticide by the Mongolian government to control the rodent population and its effects on carnivores and scavengers of these rodents including Pallas cats, and a 3-year natural history study of the species looking at population status, behavior, range use, breeding and the potential for extinction in this wild population. Drs. Brown and Swanson will be traveling to Mongolia in May to collect semen and blood samples from wild cats for nutritional and reproductive studies. A T-shirt supporting the *in situ* program has been produced and is for sale with proceeds going to support this vital research.

Bill Swanson gave a brief overview of reproductive, disease and nutrition research in Pallas cats. Three studies investigating puberty, nutritional requirements and herpes virus presence in semen have been recently completed and a new study was started in March to assess the physiological basis of reproductive senescence (by 8 years of age) in female Pallas' cats. As part of the latter study (funded by a Morris Animal Foundation grant to Dr. Kennedy-Stoskopf), oocytes collected from female Pallas' cats in different age classes are being assessed for energy metabolism, fertilizability, and developmental competence *in vitro* and *in vivo* after embryo transfer. Toxoplasmosis remains the primary disease concern with the captive population. Diclazuril, the anti-coccidial drug being tested as a preventative in pregnant females and neonates, is available to institutions with breeding pairs by contacting Dr. Swanson ([william.swanson@cincinnati.org](mailto:william.swanson@cincinnati.org)).

Dr. Suzanne Kennedy-Stoskopf shared an update on herpes prevalence in this species and the significance of positive herpes PCR tests (see report this volume). After her presentation and some discussion among the management group members, the Pallas Cat SSP issued the following position statement: **PCR testing for feline herpes virus is recommended only for Pallas' cats showing clinical signs of herpes virus infection.** The significance of a positive test in an otherwise healthy animal is unknown, other than indicating that the cat, at one time, has been exposed to the virus.

The meeting was wrapped up with a presentation by Dr. Connie Ketz, the SSP veterinary advisor, on a husbandry and management survey that was conducted of current and past Pallas cat holding institutions. The results of this survey as well as the standard animal welfare guidelines are being combined and fleshed out to be included in a final draft of a

husbandry manual for this species. Connie presented a draft version at the SSP meeting and sections were and will be assigned to management group members for further expansion and revision. It is hoped to have the manual finished by the AZA meeting in September.

---

### **Ocelot SSP**

Ken Kaemmerer, Species Coordinator, Dallas Zoo

#### **Captive Population Status**

Based on the latest studbook update by studbook keeper Nanette Bragin of the Denver Zoo, the population of generic ocelots (*Leopardus pardalis*) has shown a slight decline, as planned by previous PMP's, in order to make room for the increasing Brazilian ocelot (*Leopardus pardalis mitis*) population. We will continue to manage generics for a negative 3-5% growth of generics annually with the 2005 masterplan, but that will still allow some breeding to occur. Statistics for the managed generic ocelots show a total population of 98 (42.50.6) at 46 institutions with 3.4 births and 8.6 deaths in the past year. There are 28 founders with a current Founder Genome Equivalent of 10.38 (17.18-potential), Gene Diversity Retained of 0.952 current (0.971 potential), and 95% pedigree known. Statistics for the Brazilian ocelots show a total population of 19 (11.6.2) at 8 institutions with 1.1.2 births and 0 deaths in the past year. There are 9 founders with a current Founder Genome Equivalent of 5.13 (6.51-potential), Gene Diversity Retained of 0.902 current (.923-potential), and 100% pedigree known.

#### **Brazilian Ocelot Consortium (BOC)**

The 2004 BOC Report was put together by Dr. Bill Swanson of the Cincinnati Zoo and Brazilian BOC representatives and is available from Ken or Bill. The BOC has not been able to complete the initial import of four animals for Cleveland Metroparks Zoo and Oklahoma City Zoo due to Brazilian governmental issues. The Brazilian counterpart to USFWS is IBAMA and this agency is working under a new political administration. This has slowed down the export process as they change staffs, policies, etc., and due to politics, current officials seem reluctant to make any decision on the export permit. The permit for the export of frozen embryos to the Cincinnati Zoo is also being held up, and we are asking that they be treated separately from the live animals so that BOC process can proceed. There is an important meeting in Brazil in March which hopefully will resolve the permitting issues.

#### **Research**

Bill Swanson reported that embryo transfer research is still on hold waiting on the import of frozen embryos from Brazil. Ocelot sperm freezing protocols, particularly useful for field work, are being worked on at Cincinnati Zoo and a publication is forthcoming.

This past year Anna Fleischman from Michigan State University completed a captive ocelot introduction survey in cooperation with SSP institutions for her Master's thesis. She mailed out a 40 question survey to 60 ocelot holding institutions asking about the success of first introductions of male and female ocelots; whether they became compatible or not; whether they successfully mated, and what factors, including animal history, keeper interaction,

enclosure design, and introduction techniques, were thought to contribute to the outcome. She had a return rate of 65% and 18 surveys were utilized in the analysis. Seventy-eight percent of introductions were successful either with or without offspring; 22% (4/18) showed an unsuccessful introduction. While this is only a preliminary study, results indicated that rearing history (mother vs. hand-reared) and housing strategy (separate exhibits/holding vs. same but rotated) were influential factors on introduction success. Hand reared females, and to a lesser extent hand reared males, may have compatibility and/or successful mating difficulties. Rotating male and female ocelots through the same exhibit was shown to have a negative effect on introduction success. In addition, the number of keepers that cared for the ocelots may have an adverse impact on introduction success, with too many keepers being detrimental. Again, although the survey results are based on small numbers, they are suggestive of notable trends and further research.

Field research in Northern Mexico continues with Arturo Caso. Arturo is currently surveying for the presence of ocelots, utilizing live traps and cameras, on several cooperative private ranches close to the US/Mexico border. On two ranches he documented only bobcats (*Felis rufus*), but on the third he caught images of ocelots with cameras. At least one of the ranches without ocelots has ocelot-type habitat similar to S. Texas. Historically ocelots were extirpated from these areas by hunting for pelts, but the habitat is suitable to support a reintroduced ocelot population. We are looking at a potential translocation study from known ocelot range areas in the state of Tamaulipas to one of these ranches with support of some Mexican NGO's, the Mexican government, the Dallas Zoo, Texas A&M University and others.

The Deslorelin contraception study proposed by Dr. Cheri Asa of St. Louis Zoo did not start due to lack of available funding, but we still hope to pursue this at a future date.

### **Education**

Allyson Atkins, Ocelot SSP Education Advisor, reported that the long-time-in-the works ocelot education CD developed by the Dallas Zoo was changed to a more accessible web-based product; it will be distributed on a CD at a later date. This is an educational tool for middle school children, is high tech. and fun. It will be in English as well as Spanish. After 5 April 2005 you can view it at [www.dallaszoo.org](http://www.dallaszoo.org) and go to the education link. It is entitled the "Ocelot Experience". There will eventually also be a link to the Felid TAG website.

There was significant discussion about the next education goals for ocelots. We need to identify the most crucial audiences at this time: teachers, landowners, policy makers, etc., as well as what resources are available for small cat education so we don't re-invent the wheel. These same questions are noted for all small cat species. The Small Cat Working Group will be addressing this so that each small cat SSP species can share resources without duplicating efforts, but still focus on their species.

### **U. S. Fish and Wildlife Service Ocelot Recovery Team and Plan**

The USFWS Ocelot Recovery Team became active again in 2003 with a technical subcommittee (scientists, state and federal governmental biologists and representatives,

SSP Chair, etc.) and an implementation subcommittee (also including NGO's, educators, etc.) This is one of only two active recovery teams working on a recovery plan at this time due to federal budget restraints, yet this underscores the importance felt about recovery of the ocelot relative to other species. The Plan/Team covers the Texas/Tamaulipan and the Arizona/Sonoran ocelot populations on both sides of the border with Co-Leaders representing both countries. Co-Leaders are Dr. David Maehr (US) and Arturo Caso (MX). The Team is looking at four sub-populations, two on each side of the border. There are believed to be 100 +/- 20 ocelots in the US. Genetic sampling shows that this population is increasingly becoming less genetically diverse. Dr. Phil Miller of the Conservation Breeding Specialist Group facilitated a Population Viability Assessment with the Team in Dallas in April 2004. Vehicular mortality and female reproductive success were identified as significant threatening factors. Some recovery strategies being discussed include Mexico to U.S. translocations. Assisted reproduction techniques and captive breeding may eventually play roles as well. The Recovery Plan will be finished and available in late 2005.

### **SSP Issues**

The Ocelot SSP list serve has not been working which Ken is trying to get resolved. We are behind in having elections and need to do that once the list serve is back up and running. We also need to verify the accuracy of the IR list.

### **Master Planning**

After the reporting session a masterplanning session was held for both generic and Brazilian ocelot populations utilizing preliminary PMP information by studbook keeper Nanette Bragin. Despite good growth of the Brazilian population, the SPARKS PM 2000 program indicated that it was time to move animals around and form new pairings in order to maintain acceptable genetic diversity. The draft plan will show seven transfers to form new breeding pairs and an additional three transfers to holding institutions.

The generic population needs to be kept genetically and demographically healthy and viable until we are more confident of the importations of Brazilian ocelots through the BOC. Even so we will deliberately manage them at a 3% - 5% population decline to allow for future growth of the Brazilian population; this still necessitates selected breeding. Again utilizing preliminary PMP information with SPARKS PM 2000 program, we identified eight breeding pair recommendations and ten transfers overall. Both plans will be sent out for review.

---

### **Clouded Leopard SSP**

Norah Fletchall, Species Coordinator, John Ball Zoo

The 2004 Clouded Leopard Master Plan was approved in late 2004 by the management group and institutional representatives following the prescribed 30 day comment period. Copies of the approved plan were forwarded via the clouded leopard list serve to all

institutional representatives and can also be found on the AZA website in the Members Only C&S section under SSPs.

Highlights of that master plan include:

**SSP Population Status**

- current living SSP population is 51.61 (112) living at 35 Institutions
- 24 births (11.12.1) at 9 institutions since January 2002 with 18 animals surviving
- 30 deaths (15.14.1) at 21 institutions
- Slightly negative growth rate

**Population Parameters**

- RCP has allocated 120 spaces for the Clouded Leopard SSP
- SSP plans to import a total of 6 new founders in 2004 and 2005 through the Thailand Consortium

**Goals of the Clouded Leopard SSP**

- stabilize the demographics of the North American population
- Improve genetics via the introduction of 5-10 founders over the next 5-6 years.
- Explore establishment of programs similar to the Thailand Consortium in other clouded leopard range countries.
- Continue to conduct systematic research programs to establish management of clouded leopards in SSP participating facilities such that the animals well being is maximized as measured by metrics to be established in conjunction with the AZA Animal Welfare Committee.
- Expand education and awareness programs regarding clouded leopards throughout SSP participating facilities.

**Criteria for Pairing/Placement of Animals**

- Males in the population are ideally paired before they reach the age of two years.
- Females can be paired at a later age if needed as long as they are paired with younger males.
- Every attempt is made to pair animals whose mean kinships are similar whilst minimizing the deleterious effects of inbreeding.
- Institutions who express a desire to move or acquire clouded leopards must express this interest in writing either via an annual questionnaire or correspondence with the SSP Coordinator. Breeding pairs will be placed at facilities that have prior experience with pairing/breeding clouded leopards or at those facilities where exhibit, holding and staff are appropriate (as determined by the management group).

Karen Povey (Clouded Leopard SSP Education Advisor) presented an update on ongoing education activities including an overview of a CEF proposal regarding a new education initiative regarding carnivores in Thailand. Subsequently the Felid TAG endorsed Karen's

proposal. Karen and the Pt. Defiance Zoo AAZK continue to maintain [www.cloudedleopard.org](http://www.cloudedleopard.org) as the official SSP website and the headquarters for all things clouded leopard.

Karen also indicated the clouded leopard brochure that was produced through a donation a few years ago needs to be reprinted. Karen is seeking funding for that reprint. If any facility would be interested in supporting this effort please contact Karen at [karenp@pdza.org](mailto:karenp@pdza.org)

Dr. Karen Terio (Clouded Leopard SSP Pathology Advisor) updated the group on changes to the clouded leopard necropsy protocol which can be found at the end of this document. All institution representatives are asked to forward this protocol to their veterinarians. Dr. Terio's lab at the University of Illinois is willing to run samples from clouded leopards at their lab. The SSP requests that all tissues be sent to Dr. Terio's lab. If that is not feasible please forward copies of all pathology reports and completed necropsy reports to Dr. Terio.

Dr. Terio also requested necropsy results from clouded leopards that have died at SSP facilities in the past. These results will be utilized to see if there is any correlation between behavior and health issues.

Further revision of "what makes a good clouded leopard exhibit and how best to manage clouded leopards" took place. Some components include:

- Vertical "piano wire" type barriers are acceptable for clouded leopard exhibits if horizontal ties are placed at four foot intervals, wire is not allowed to stretch and width between the vertical wires is kept to a minimum (1 to 1.5 inches maximum).
- Hand raising vs. mother raising: Facilities can try to leave the kittens with the mother provided steps have been taken as outlined in husbandry guidelines (multiple nest boxes, ability to monitor kittens, etc.). If it is decided to leave the kittens with the mother you should have either a video camera on the nest box or minimally a microphone to detect kitten noise.
- Introductions: There are a variety of ways to do introductions. All introductions should be videotaped. A key component is determining if and when the female feels comfortable and not fearful. The female should have the opportunity to get away from the male in such a way that he cannot pursue her. Could be done through excluder doors. Males should exhibit behaviors that indicate they are less likely to be aggressive. Let female into introduction area first then remove her and put male in-monitor scent marking.
- Intros. During estrus only? Not advised for novice females.
- Separating pairs at night: Some advocate separating at night as it gives the animals a chance to get away from each other. Other managers advocate leaving together at night.
- Best way to analyze background of animals as it relates to hand raising vs. mother raising and aggressive males?
  - Bonnie Breitbeil will look at the last 10-15 years worth of records to see if any trends or clues as to male aggression can be determined.

- Suggestion was made that a group of people work on this as it might be best to visit clouded leopard facilities by region and talk to managers/keepers involved.
- Do we need to update husbandry guidelines?
  - Guidelines were last done in 2000. It is time to update. Connie Philipp from Nashville Zoo will oversee this effort.

A discussion took place regarding the establishment of programs similar to the Thailand Consortium in other range countries. The Thailand Clouded Leopard Consortium continues to make significant progress in both *ex-situ* and *in-situ* efforts. An overview of the project can be found elsewhere in these proceedings.

These types of programs hinge on the development and maintenance of relationships. Programs require large amounts of money both to get started and to maintain. The Thailand program requires large amounts of money and time on the part of National Zoo staff. To date only a handful of clouded leopard participating institutions have made contributions to this program therefore making expansion unrealistic. In addition, every country is unique.

Erin Sarrat of the Audubon Species Survival Center volunteered to put together a twice yearly newsletter regarding the Thailand Program to raise awareness and keep all institutions up to date on the *ex-situ* and *in-situ* project. Look for the inaugural issue in Summer 2005.

---

### **Fishing Cat SSP**

Bill Swanson, Species Coordinator, Cincinnati Zoo

The Fishing Cat Species Survival Plan held a SSP meeting on March 16, 2005 in St. Louis, MO in conjunction with the mid-year Felid TAG meeting. The SSP meeting was attended by 26 individuals representing 17 AZA member institutions and 3 non-AZA institutions (i.e., two private cat facilities and one university). The current demographic and genetic status of the SSP population was reviewed. As of March 2005, the SSP population consisted of 69 cats (24.45.0) in 23 institutions. In the past year, there were 7 kittens born in 3 litters and the death of 8 cats for a net loss of one individual. Of the 11 SSP recommended pairings in 2004, three pairs (Minnesota, Exotic Feline Breeding Compound) reproduced, with each of these pairs comprised of at least one new founder for the SSP population. One kitten from each litter survived and each will be a priority for future pairings. The current SSP founder population is 11 individuals with a potential for 4 additional founders. Genetic diversity (GD) has improved to 0.858 with a potential GD of 0.88 if all recommended pairings reproduce this year and a theoretical GD of 0.95 over time. Mean inbreeding has decreased slightly ( $F = 0.17$ ) and is expected to decline further with improved management and founder incorporation.

Breeding recommendations for 2005 were revisited and discussed. Transfer of some of the newborn kittens between institutions for pairing would be beneficial genetically and several institutions (National Zoological Park, Memphis Zoo, Audubon Zoo) have space available for either breeding pairs or exhibit animals. After further consultation with the involved institutions, the SSP will plan to issue revised breeding and transfer recommendations by May 1st, 2005.

In 2004, no new founders were imported into North America as part of the SSP population. The SSP continues to assist the Thai Zoological Parks Organization in managing fishing cats in Thai zoos, working in collaboration with Dusit Zoo veterinarian Dr. Karn Lekagul, Rick Passaro, the Smithsonian National Zoological Park and the Clouded Leopard SSP. The immediate goal is to manage four breeding pairs at the Khao Kheow Open Zoo and the Dusit Zoo; however, no offspring have been produced yet and recent deaths have required the movement of some cats among zoos. Importation of additional founders in the near and distant future will be required for the SSP to reach its management goals (i.e., 100 cats in 30-40 zoos; GD of 90% over 50 years). AZA institutions are encouraged to provide financial support for the Thai captive breeding program and/or import additional founders (preferably captive-born) from other range countries.

Reproductive research with fishing cats is continuing in both the U.S. and Thailand. Rose Bauer, a PhD candidate at the Smithsonian's National Zoological Park, is refining protocols for artificial insemination, with a focus on different methods of ovarian down-regulation prior to gonadotropin treatment to improve AI success (see her report, this volume). Dr. Genevieve Magarey, a post-doctoral fellow at the Cincinnati Zoo, is investigating *in vitro* fertilization using frozen-thawed fishing cat spermatozoa and embryo transfer as a means to infuse genetic variation into the SSP population. In collaboration with the Oklahoma City Zoo and Exotic Feline Breeding Compound, Dr. Magarey has been able to produce and freeze multiple fishing cat embryos for future transfer procedures. In collaborative studies at the Khao Kheow Open Zoo, Dr. Magarey and Thai veterinarian Dr. Khongsak Thiangtum compared fertilization success using freshly-collected versus frozen-thawed spermatozoa and produced fishing cat IVF embryos that developed to the blastocyst stage during culture (see her report, this volume). A research manuscript, describing the results of Dr. Thiangtum's earlier studies of fishing cat sperm collection and cryopreservation, has been submitted for publication.

*In situ* research with wild fishing cats in Sri Lanka and Thailand also was conducted in 2004. Dr. John Seidensticker of the Smithsonian's National Zoological Park continues to assess the status of wild fishing cat populations in Sri Lanka. More information is available at [www.nationalzoo.si.edu/conservationandscience/tropical ecosystems](http://www.nationalzoo.si.edu/conservationandscience/tropical_ecosystems). In southern Thailand, a camera trapping study was completed in early 2004 by Thai field biologists Passanan Boontua and Budsabong Kanchanasaka, in collaboration with the National Zoo with funding provided by the Fishing Cat SSP and the Cincinnati Zoo. Four months of camera trapping failed to find any fishing cats in the targeted reserve area, the Klong Saeng Wildlife Sanctuary, a part of the Klong Saeng - Khao Sok Forest Complex. A new camera survey is being initiated in April of 2005, focusing on the Western Forest Complex along the border with Myanmar. Recent observations by another

research group suggest that a fishing cat population exists in this area. More detailed information about this project is available on the project website ([www.conservationasia.org](http://www.conservationasia.org)). Additional funding is needed to support the field studies in both Sri Lanka and Thailand. Institutions interested in helping to support this critical research should contact the SSP coordinator.

The Fishing Cat Husbandry Manual has been under development for several years but has been difficult to complete due to time constraints. Dana Wooster from the Woodland Park Zoo has agreed to assume primary responsibility for contacting authors for each chapter and compiling the necessary information for the husbandry manual. Completion of the husbandry manual is now targeted by the end of 2006.

Monitoring of health problems in the Fishing Cat SSP population is ongoing. The primary veterinary concern is related to the high prevalence of transitional cell carcinoma (TCC) in older fishing cats, with 12-14 cases observed in the last 10 years. Dr. Jennifer Landolfi, a veterinary pathology resident in Dr. Karen Terio's program at the University of Illinois, has initiated a comprehensive study of TCC in this species to attempt to determine the underlying etiology (see her report, this volume). Dr. Landolfi presented her initial findings at the SSP meeting and plans to present these data at the upcoming Annual Meeting of the American Association of Zoo Veterinarians. Note that Dr. Terio ([kterio@lumc.edu](mailto:kterio@lumc.edu)) and Dr. Michael Kinsel ([mkinsel@lumc.edu](mailto:mkinsel@lumc.edu)) also continue to provide (**free of charge**) full histopathological evaluations of deceased individuals managed in all five of the small cat SSPs, including the fishing cat. More information about tissue requirements and shipping procedures is available on the Felid TAG website ([www.felidtag.org](http://www.felidtag.org)). The SSP encourages all fishing cat holding institutions to submit tissue samples for these pathological assessments.

Fishing Cat SSP institutions are reminded that fishing cat limited edition prints and note cards are still available to sell on consignment to support the Fishing Cat SSP In Situ Fund. In the past 4 years, a total of \$4500 has been raised, with all funding going to support the fishing cat camera trap surveys conducted in Thailand. Interested institutions should contact the SSP coordinator for more information. Lastly, the membership of the Fishing Cat SSP steering committee, established in 2001, needs to be re-visited. The SSP coordinator will be contacting all Institutional Representatives by May 1<sup>st</sup> to gauge interest in serving on the steering committee and, if necessary, will conduct an election to fill those positions.

---

### **Amur Leopard PMP**

Chris Pfefferkorn, PMP Coordinator, Oregon Zoo

A meeting of the North American Amur Leopard holding institutions was held March 16, 2005 at the mid-year Felid TAG meeting in St. Louis Missouri. The following topics were presented.

Amur Leopard Conservation Support Program -

Tigris Foundation; [www.tigrisfoundation.nl](http://www.tigrisfoundation.nl)

- Create awareness of the threats to Amur leopards
- Create awareness of the role of Zoo's in Amur Leopard Conservation
- Raise funds for wild Amur leopard conservation projects in the Russian Far East
- Raised \$7,650.00 in 02-04 from 10 institutions:  
 Central Florida Zoo   Denver Zoo   Erie Zoo   Folsom's Children Zoo   Granby Zoo  
 Oregon Zoo   Cheyenne Mountain Zoo   Sierra Endangered Cat Haven  
 Fort Wayne Children's Zoo   Minnesota Zoo
- Participation in the Conservation Support Program helps to satisfy USFWS permit requirements

First Year Projects Supported by the Amur Leopard Conservation Support Program

1. Anti-poaching teams in the leopards range- \$33,530 USD
2. Firefighting and awareness in leopard habitat- \$39,200 USD
3. Ecological monitoring of the leopard population- \$30,600 USD

Russian Oil Pipeline Project

- Russia is proposing to build a pipeline through the UNESCO Biosphere Reserve Kedrovaya Pad
- The Kedrovaya Pad is home to the remaining 30 wild Amur Leopards
- The pipeline is estimated to cause the extinction of the remaining Amur Leopards and other endangered species
- The PMP and the EEP are working with other global agencies to stop the pipeline construction

Status of N.American Population

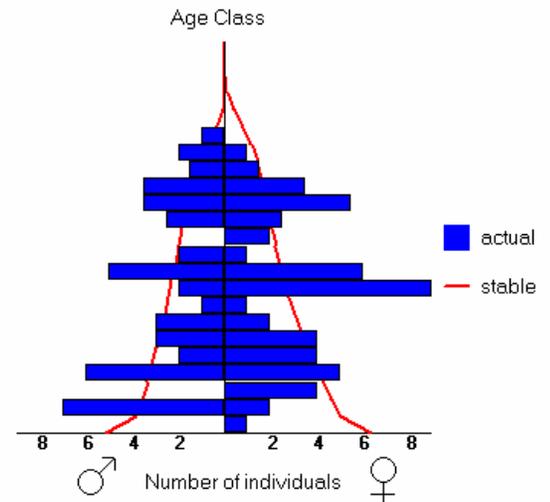
- 48.49.0 (97) Individuals at 38 Institutions
- Genetic Diversity retained = 0.847
- Mean Inbreeding = 0.114
- 100% pedigree known

2005-2006 PMP

- Goal is to retain 86% genetic diversity for 50 years
  - Recommended 5 pairings and 8 transfers
  - Felid TAG RCP set the target population at 150
- The trend for 2002-2004 was a steady increase in the population with births exceeding deaths; 6.2.0 Births and 0.2.0 Deaths

New Institutions – The following are institutions that have committed to holding Amur leopards. New institutions are still needed. Institutions holding generic leopards are encouraged to replace the generic leopards with Amur leopards.

- Prospect Park Zoo – 2006
- Fort Worth Zoo – 2006
- Utah's Hogle Zoo – 2006



- Red River Zoo – 2006
- Minnesota Zoological Garden – 2008

#### Amur Leopard Population Goals

- Work with the EEP Coordinator to identify suitable animals for import from Europe and Asia
- Continue monitoring current population to reduce the loss of genetic diversity
- Encourage more N. American facilities to acquire Amur leopards for their collections
- Continue assisting conservation efforts
  1. Solicit N. American Institutions for funds to support the Tigris Foundation's projects
  2. Work with Tigris and the EEP to develop reintroduction strategies
  3. Work with the EEP to identify individuals for release

Introduction of the Amur Leopard Coordinator for Canada – This position is to represent the North American Amur leopard population in Canadian institutions.

Jill Marvin  
General Curator  
Jardin Zoologique du Quebec/SPSNQ  
9530 rue de la Faune  
Charlesbourg, Quebec Canada  
Office: 418-622-0313 x247  
Fax: 418-644-9004  
[conservateur@spsnq.qc.ca](mailto:conservateur@spsnq.qc.ca)

For more information contact:

Chris Pfefferkorn  
N. American Studbook Keeper Amur Leopard  
Oregon Zoo  
4001 SW Canyon Rd  
Portland, OR 97221  
Ph: 503-625-8547  
Fax: 503-226-0074  
e-mail: [pfefferkornc@metro.dst.or.us](mailto:pfefferkornc@metro.dst.or.us)

---

#### **Puma Studbook/DERP**

Michelle Schireman, Studbook Keeper, Oregon Zoo

Status Report for 1 July 2003-1 July 2004

- Target Population : 120
- Present Population: 51.73 (124) in 62 Institutions
- Deaths: 3.6 (9) Two zoos lost their last cougar this year and did not replace them.

- One zoo opened a new cougar exhibit.
- Births: ZERO
- Transfers: 1.3 Out of the AZA Population to Berlin Tier Park and Munich
- 0 cats came in from the Public
- 0.1 came in from the WILD
- Founders: 22.25 (47) with 5.8 Neutered and ~12 Post-Reproductive

We have one exhibit opening in Spring 2005 at Seneca Park Zoo and two in Spring 2006 (Philadelphia Zoo and the Oregon Zoo) as well as one so far planned for Spring 2007 at Cheyenne Mountain Zoo.

We will have a need for at least 10 cubs in the next 2 years with these four new exhibits. So far since 1 July 2004 we have placed 1.2 orphaned cubs at the Memphis Zoo from WA State Game & Fish.

---

## 2005 Felid TAG Mid-Year Meeting Participants

<u>Participant</u>	<u>Institution</u>
Heather Adkesson	Scovill Zoo
Wes Allen	Oklahoma City Zoological Park
Beth Ament	APCRO
J.B. Anderson	Feline Conservation Federation
Doug Armstrong	Omaha's Henry Doorly Zoo
Cheryl Asa	St. Louis Zoo
Allyson Atkins	Disney's Animal Kingdom
Jenny Barnett	Binder Park Zoo
Thomas Barry	
Jennifer Bond	Cincinnati Zoo & Botanical Garden
Sue Booth-Binczik	
Duncan Bourne	
Gerald Brady	Potter Park Zoological Gardens
Dan Brands	Great Plains Zoo
Bonnie Breitbeil	Central Florida Zoological Park
Cristine Breitenmoser	IUCN/SSC Cat Specialist Group
Michael Briggs	APCRO
Renee Bumpus	Mountain View Conservation/Breeding Center
Dominic Calderisi	Lincoln Park Zoo
Martha Caron	Minnesota Zoological Garden
Kevin Chambers	Zoo ARC
Michelle Claud	Santa Ana Zoo
Hollie Colahan	Disney's Animal Kingdom
Lynn Culver	Feline Conservation Federation
Pat Currie	Columbus Zoo and Aquarium
Kim Davidson	Utah's Hogle Zoo
Brent Day	
Erin Dowgwilo	
Sarah Durant	Zoological Society of London
Kristi Fisher	Exotic Feline Breeding Compound
Norah Fletchall	John Ball Zoological Garden
Jennifer Frank	Smithsonian National Zoological Park
Don Goff	Connecticut's Beardsley Zoo
Jack Grisham	Smithsonian's National Zoo
Amanda Hansen	
Liz Harmon	Kansas City Zoo
Joni Hartman	Kansas City Zoo
Amanda Haug	
Jason Herrick	Cincinnati Zoo & Botanical Garden
David Hodge	
Daryl Hood	
Becky Howard	
Jennifer Hylton Metzler	Disney's Animal Kingdom

Josh Jones  
Ken Kaemmerer  
Gail Karr  
Dewald Keet  
Suzanne Kennedy-Stoskopf  
Connie Ketz  
Cynthia Kreider  
Nadine Lamberski  
Mike Land  
Jennifer Landolfi  
Vanessa Larkin  
Dusty Lombardi  
Keith Lovett  
Genevieve Magarey  
Dan Marsh  
Jill Marvin  
Farshid Mehrdadsar  
Jennifer Metzler  
Robert Miller  
Lauren Montag  
Leann Montgomery  
Danny Morris  
Gary Noble  
Barbara Palmer  
Tricia Parker  
Katey Pelican  
Chris Pfefferkorn  
Connie Philipp  
Karen Povey  
Amy Rasmussen  
Stephanie Rhodes  
Karen Rice  
Marcia Riedmiller  
Amy Roberts  
Ingrid Russell  
Craig Saffoe  
Erin Sarrat  
Frank Scheithauer  
Michelle Schireman  
Beth Schoeberl  
Alan Shoemaker  
Steve Shurter  
Lee Simmons  
Alex Sliwa  
Arlene Smith  
Rebecca Spindler

Dallas Zoo  
Memphis Zoo  
Kruger National Park  
North Carolina State University  
Topeka Zoo  
Erie Zoo  
San Diego Zoo  
Cincinnati Zoo & Botanical Garden  
University of Illinois  
  
Columbus Zoo  
  
Cincinnati Zoo & Botanical Garden  
Cincinnati Zoo & Botanical Garden  
Quebec Zoological Garden  
San Diego Wild Animal Park  
  
Smithsonian National Zoological Park  
Feline Conservation Federation  
Omaha's Henry Doorly Zoo  
Disney's Animal Kingdom  
San Francisco Zoological Gardens  
Audubon Zoo  
Smithsonian National Zoological Park  
Oregon Zoo  
Nashville Zoo  
Port Defiance Zoo  
  
Brookfield Zoo  
Nashville Zoo  
Birmingham Zoo  
Audubon Zoo  
Santa Barbara Zoological Gardens  
  
Audubon SSC  
  
Oregon zoo  
Denver Zoological Gardens  
Felid TAG  
The Wilds  
Omaha's Henry Doorly Zoo  
Wuppertal Zoological Garden  
  
Toronto Zoo

Adam Stone  
Bill Swanson  
Karen Terio  
Patrick Thomas  
Ron Tilson  
Robert Turner  
Kevin Van der Molen  
Jessica Vanazkeren  
Rhonda Votino  
Tarren Wagener  
Kimberly Wanders  
Rain Westgard  
David Wildt  
Steve Wing  
Michael Wodrich  
Dana Wooster  
Karen Ziegler-Meeks

Zoo Atlanta  
Cincinnati Zoo & Botanical Garden  
University of Illinois  
Bronx Zoo  
Minnesota Zoological Garden  
Feline Conservation Federation  
Sacramento Zoo

Amarillo Zoo  
Fort Worth Zoo

Smithsonian National Zoological Park  
Louisville Zoological Garden  
Wildlife Safari  
Woodland Park Zoo  
White Oak Conservation Center