Executive Summary

PHVA Workshop for the Namibian Cheetah and Lion

Originally, cheetah *(Acinonyx jubatus)* were found from the Cape of Good Hope to the Mediterranean, throughout the Arabian Peninsula to the southern part of the former Soviet Union. Population numbers have declined from more than 100,000 in 1900 to approximately 9,000 to 12,000 free-ranging cheetah in Africa. Two population strongholds remain: Kenya/Tanzania in East Africa and Namibia/Botswana in southern Africa. In Namibia, between 1980 and 1991, the population of cheetah was estimated to have declined by 50%, leaving a population of 2,500 animals. The decreasing numbers are a result of drought, human, livestock and predator conflict. As humans turn more and more of the cheetah's habitat into farmland for livestock production, cheetah are routinely indiscriminately killed as being possible livestock predators.

Namibia also is home to a unique and significant lion *(Panthera leo)* population which is seriously threatened by drought, human conflicts, range loss and potential disease threats. Historically, lion ranged over most of the northern half of the country and partly in the east, west, and south. Few historical quantitative population estimates are available, though total lion numbers were estimated at 500 in 1975 and 700 individuals in 1980. Since then, the lion population in Namibia has been declining and is now estimated at 300 animals. This trend represents up to a 50% decline in lion numbers over the past 15 years. About 85% of the lion in Namibia currently are restricted to two protected areas: the Etosha National Park (160 to 180 lion) and Kaudom Game Reserve (50 lion).

To address these and other problems, a PHVA Workshop for the Namibian cheetah and lion was held from 11-16 February 1996 in Otjiwarongo, Namibia. The workshop was a collaborative endeavor of the Namibian Ministry of Environment and Tourism, the Cheetah Conservation Fund, the AZA Felid Taxon Advisory Group, the AZA Cheetah and Lion Species Survival Plans, and the Conservation Breeding Specialist Group of the IUCN-World Conservation Union's Species Survival Commission. The meeting was hosted by the Cheetah Conservation Fund and generously sponsored by British Airways, White Oak Conservation Center, Columbus Zoo, NOAHS Center-Smithsonian Institution, Philadelphia Zoo, Fort Worth Zoo, Zoo Atlanta, Oklahoma City Zoo, Rio Grande Zoo, Houston Zoo, Caldwell Zoo, Franklin Park Zoo, Binder Park Zoo, and the Nashville Zoo.

Participants were welcomed and the meeting was officially opened by His Excellency Dr.

Sam Nujoma, President of the Republic of Namibia. Mr. Kavetuna, Mayor of Otjiwarongo, and Mr. Marshall McCallie, the U.S. Ambassador to Namibia, also welcomed the participants, followed by a welcoming presentation by Mr. Gert Hanekom, the Namibian Minister of Environment and Tourism (MET).

The first day's activities were attended by more than 100 participants from 10 countries, represented by stakeholders in the future of the two species: MET officials, farmers, conservationists, and scientists. Overview presentations concerning the status of both the cheetah and lion and the goals of the workshop process set the stage for the weeklong activities. The first afternoon was designed to address farmers' concerns; most farmers could not attend the workshop after the first day because of personal commitments to caring for their livestock. They expressed their primary dilemma as wanting to know how to maintain commercial livestock farms without being forced to kill cheetah and lion in order to protect their livelihoods.

Participants were divided into seven homogeneous stakeholder groups: farmers with lion problems, ministry personnel, farmers with cheetah problems, and two groups each of conservationists and scientists. Each group was asked to list three to five of their most urgent problems relating to the species, with instructions to state them using consensually-reached, issue-based statements (e.g., "The critical problems for us are . . ."). The second portion of the small group task centered on generating a discussion of needs, with each group asked to explicitly state their own needs, followed by a "why" statement. For example, rather than saying "We need more open communication" or "We need to retrieve carcasses of dead lion and cheetah", participants were asked to use statements such as "We need more open communication in order to understand in what way Ministry policies or initiatives help protect these species" or "We need to retrieve carcasses of dead lion/cheetah in order to analyze threats, such as disease, to our populations".

Each group presented a brief synopsis of its results. A group of four participants then presented commonalities and differences among the problems and needs expressed by each stakeholder group. Common themes clearly emerged:

1. Communication/education/cooperation
2. Basic research, including: identifying critical threats; long-term monitoring to detect population trends; range, habitat, and prey to ensure viable populations; and global management of captive populations;
3. Funding to implement 1. and 2.;
4. Economic considerations including impact, asset value of lion and cheetah, integrated wildlife and livestock management (land-use), restricting range of lion and cheetah, practical solutions to the needs of people, and evaluation of appropriate sustainable land-use systems.

The following 4 days of the PHVAs for the two species focused primarily on distribution, status and threats to those species and existing and proposed management strategies. Six working groups were developed (Wild Management Goals and Strategies, Human/Livestock Interaction and Communication, Life History/VORTEX Modeling, Disease, Genetics and

Captive Populations); each group was comprised of international as well as Namibian participants. The tasks of the working groups for the next 4 days then were to:

1. Identify the main issues and problems.
2. Determine goals in terms of identified issues and problems.
3. Develop promising strategies and solutions to address (1) and (2) in light of available data, and then prioritize in light of the needs expressed by the various stakeholder groups.
4. Turn the highest priority strategy into realistic action steps in terms of particular time frames and when possible to identify available and potentially available resources.
5. Report daily (orally) on discussions to receive input from other participants.

The **Wild Management Goals and Strategies for Cheetah** working group determined that the greatest problems for cheetah are the general population decline, as well as killing of significant numbers annually (more than 8,000 in the past 20 years) by farmers on private lands. The highest priority identified was to stop population decline via strategies such as:

1. Improving and developing more accurate censusing and monitoring methods.
2. Monitoring population trends.
3. Conducting public education and outreach.
4. Developing a coordinated national strategy for dealing with problem cheetah.

For lion, the **Wild Management Goals and Strategies for Lion** working group identified the biggest problem to be accelerated decline of range available, causing population decrease (since 1980) from 700 individuals to approximately 300, presently. The highest priority action step was to maintain the lion's present habitat and prey base, particularly in Etosha and Kaudom, by communicating to the MET and the government about the importance of these habitats, especially improving park maintenance as specified in Park Management Plans.

The **Human/Livestock Interaction and Communication** working group identified general problem areas to be: stock loss from both lion and cheetah; farming practices and land use; communication; and education. The highest priority for action identified by this group was the reduction of stock losses by cheetah and lion. Priority strategies for resolving problems caused by cheetah included:

1. Protecting small stock with guard dogs, donkeys or herdsmen.
2. Synchronizing the livestock calving season with the game calving season.
3. Keeping calves less than 6 months old in protected camps and providing adequate prey base for cheetah to reduce the need to eat calves.
4. Removing bottom strands of cattle fence to allow free movement of certain small game species.
5. Free movement of small game species and managing other predators.

Priority action steps to address stock loss from lion included: upgrading and predator-proofing of fences along Etosha's boundaries; increasing the incentive to tolerate lion by promoting their positive value through trophy hunting and ecotourism; establishing a central coordinating office to facilitate communication among farmers with problem animals and hunting operators

or game farmers who may want the animal; and the capture of problem lion for relocation outside the country.

The **Life History/VORTEX Modeling** working group determined that if the cheetah population continues to decline at the 4 to 7% annual rate experienced over the past 15 years, there is a 50 to 100% probability of extinction in the next 100 years. The population appears to have a robust growth potential of 10 to 15% per year if it is subjected to only natural mortality. Under these conditions the population could double in size in 5 to 7 years if left undisturbed. This working group recommended that it would be necessary to:

1. Manage the cheetah population on the farmlands so that 10% or less of the adult females and 20% or less of males are removed annually. For a population size of approximately 2,500 animals this would be about 60 to 70 adult females per year. This would provide a margin of safety for uncertainties in estimates of density, uncertainties in knowledge of natural female mortality rates, in female reproductive rates, in directions and rates of migration, and in estimates of fluctuations in natural mortality.
2. Removal of males needs to continue to be given preference over the removal of females in the control of problem animals in the farmland population. Population viability and growth rates are not as sensitive to male mortality rates over a wide range. Total annual adult male mortality rates of 30-35% will have no effect on population growth rates. It will be useful to further evaluate the genetic consequences of such a strategy.
3. Improve the estimates of annual female natural and especially removal mortality rates as a guide to possible population growth rate impacts and to provide management guidance on the number of removals that can be allowed and sustain a viable population. Reporting by the farmers of removals by sex will provide a useful estimate.
4. Improve estimates of the proportion of females not producing a litter (that survives to the age of 3-4 months) each year. This estimate and estimates of cub survival (observed litter size) to the age of about 1 year can serve as an indicator of environmental variation effects on reproduction. Correlation with environmental or habitat (prey density) data may provide a useful management index.
5. Evaluate the impact of continued excess loss of adult females during the dry phase years on stability of population size and on the management target for the population.
6. Estimate the confidence limits of the methods used to estimate population density, available habitat, and calculated population size as a basis for estimating the magnitude of change and the number of years of change required to detect different rates of population change (decline or increase). For example, what effort, frequency of measurement, and measurement reliability would be required to detect the 4-7% annual decline in population size estimated to have occurred since 1980? Estimates of these parameters can be done with modeling and statistical methods using currently available data and theory. These estimates would provide a basis for the amount of effort required to monitor the status of the population, to detect changes in the population, and to allow adjustments of management.

For lion, the **Life History/VORTEX Modeling** working group recommended that it was necessary to:

1. Estimate the confidence limits of the census methods as a basis for estimating the number of years required to detect different rates of population change (decline or increase) and as a basis for monitoring the population and adjusting management.
2. Analyze available data on litter size and cub survival on an annual basis to match with rainfall and provide an estimate of environmental variation to use in the models. These measures also may provide an index of changes in prey availability and nutritional status of the population. Consider using these two parameters as a basis for monitoring the status of the population and as useful indices of the effects of management interventions.
3. Evaluate the impact of continued excess loss of adult females during the dry phase years on stability of the population size and on the management target for the population. Develop estimates of the excess losses that can be sustained by the population during the dry-phase years.
4. Evaluate possible inbreeding depression effects and the impact of the excess loss of subadult males and breeding structure on the rate of inbreeding. Modeling different mortality and breeding scenarios can start this.

The **Disease** working group agreed that disease is a potential threat to the viability of both lion and cheetah populations in Namibia. Three general needs were identified:

1. Defining the diseases that are threats to both the wild and captive populations.
2. Setting standards for disease surveillance and preventive measures.
3. Creating models of disease threats as catastrophes that could be modeled for both the Namibian lion and cheetah populations using VORTEX.

The highest priority identified by this group was defining the diseases that are real or potential threats to both lion and cheetah populations. For lion these included Feline Immunodeficiency Virus (FIV), canine distemper virus (CDV), and rabies. Infectious diseases in cheetah included anthrax (especially in Etosha) and, potentially, feline coronavirus, CDV, FIV, and rabies. Suggested ways of implementing this strategy included:

1. Determining the prevalence of infectious diseases in Namibia.
2. Determining the pathogenicity of strains of infectious diseases in Namibia, such as FIV and CDV.
3. Training Namibian veterinarians and laboratory personnel in the procedures to diagnose diseases in and conduct clinical pathology for lion and cheetah.
4. Training farmers and field personnel to collect biomaterials.
5. Defining the applied research projects to identify effective preventive measures.
6. Creating a captive management plan to minimize diseases.
7. Identifying funding to meet the needs for surveillance, *in situ* training, and applied research.

The working group then developed action steps, which, if approved by the MET, could be used to define disease threats.

The **Genetics** working group identified the main problem being the genetic and demographic security for the extant but small, isolated free-ranging populations of both cheetah and lion in Namibia. Of special concern for the cheetah was the lack of understanding of management consequences of having small founder populations on game farms/reserves. Two suggested solutions included:

1. The use of molecular genetic indices, including DNA analysis with mini- and micro-satellite probes when appropriate.
2. Consideration of facilitated genetic exchange and developing practical guidelines for selecting founders of known origin and for managing small populations based on demographic simulation models.

The **Captive Populations** working group noted that there are two types of captive-held animals in Namibia: (a) Those permanently held in captivity (i.e., pets, tourism); or (b) those animals held temporarily before translocation. There are about six facilities holding lion, primarily for tourism, and 50 to 80 cheetah held in permanent captivity, the majority as pets. The Captive Populations working group suggested that the Namibian Government should consider appointing a commission comprised of representative parties (MET, farmers, hunters, veterinarians, NGOs, and others) to examine existing regulations for keeping captive animals (in light of PHVA recommendations) within the next 6 months, and then to promulgate appropriate legislation. It also was suggested that the Namibian government consider implementing a Cheetah Policy, with the information in this PHVA document used as a starting point in the development and elaboration of a cheetah management plan. Currently there is a lion policy that equally might be re-examined in light of the synthesized information resulting from the PHVA workshop. It is recommended that both these options be examined during the next 12 months.

The **Management Goals and Strategies, Disease** and **Captive Populations** working groups identified developing and expanding a Genome Resource Bank (GRB) for both lion and cheetah as a priority strategy. The cryopreservation in liquid nitrogen of biomaterials (e.g., eggs, embryos, blood, sperm) in a GRB is an emerging "tool" that has enormous implications for the assessment, conservation, and sustainable use of natural resources. A GRB is not established for the purpose of replacing living animals in nature or in zoos, but to support existing efforts to preserve a species with all its currently available genetic diversity. General considerations in establishing a Cheetah and Lion GRB were that these repositories be developed in accordance with guidelines established by the IUCN/SSC/CBSG.

On the last day of the workshop, the comprehensive set of problems, priorities, suggested strategies/solutions, and action steps for the conservation and management of Namibian cheetah and lion were reviewed, intensively discussed, and consensus reached on all, forming the basis of this document. We conclude that this is a first step for developing a systematic, regional conservation program for two of Namibia's most precious species.