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Abstract: In 1995, the Republic of Namibia and Safari Club International petitioned the United States Fish and Wildlife Service (USFWS) to downlist the Namibian cheetah (*Acinonyx jubatus*) under the US Endangered Species Act (ESA). If this reclassification occurs, special regulations may be simultaneously promulgated allowing importation of cheetah trophies into the United States without permits. The cheetah is currently listed as an Appendix I species under the Convention on International Trade in Endangered Species (CITES) with an export quota of 150 animals per year from Namibia. Stuart Wells, Assistant Curator at the National Zoo, commissioned the Problem Solving Team at the University of Maryland to review the potential responses of USFWS to the downlisting petition. The Problem Solving Team approached this issue from a multidisciplinary background which integrated biological, economic, and political considerations.

# A New Conservation Strategy for the Namibian Cheetah (*Acinonyx jubatus*)

Developed for Stuart Wells, Assistant Curator at the National Zoo by:
The 1997 Problem Solving Team, Graduate Program in
Sustainable Development and Conservation Biology
University of Maryland, College Park
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## Table of Contents

## 1.0 Executive Summary

In 1995, the Republic of Namibia and Safari Club International petitioned the United States Fish and Wildlife Service (USFWS) to downlist the Namibian cheetah (*Acinonyx jubatus*) under the US Endangered Species Act (ESA). If this reclassification occurs, special regulations may be simultaneously promulgated allowing importation of cheetah trophies into

the United States without permits. The cheetah is currently listed as an Appendix I species under the Convention on International Trade in Endangered Species (CITES) with an export quota of 150 animals per year from Namibia.

Stuart Wells, Assistant Curator at the National Zoo, commissioned the Problem Solving Team at the University of Maryland to review the potential responses of USFWS to the downlisting petition. The Problem Solving Team approached this issue from a multidisciplinary background which integrated biological, economic, and political considerations. Three potential USFWS responses were examined in the framework of a cost-benefit analysis, and policy recommendations were suggested. The potential responses examined are as follows:

I. The current status of endangered is maintained and the US continues to prohibit the importation of cheetah trophies. This is a rejection of the petition.

II. The Namibian cheetah is downlisted from endangered to threatened and special regulations could allow US importation without permits. This means acceptance of the petition.

III. The current status of endangered is maintained and importation would be allowed under a strict quota. This is a compromise solution designed by our Team.

The Problem Solving Team concluded that Option III maximizes the benefits of the other two options while minimizing the costs. Given biological uncertainties, a low quota of approximately 20 individuals would minimize cheetah mortality but allow the exploration of trophy hunting as a conservation tool. One of the unique aspects of this option, as we have designed it, is the implementation of a system of auctioned, tradable import permits. This system capitalizes on the demand for import permits to generate funds for cheetah conservation and monitoring efforts in Namibia.

## 2.0 Introduction

In 1995, the US Fish and Wildlife Service (USFWS) was petitioned by the Republic of Namibia and Safari Club International to reclassify the Namibian cheetah (*Acinonyx jubatus*) from endangered to threatened under the US Endangered Species Act (ESA) (Federal Register 1996a). This downlisting would open US borders to importation of trophy-hunted cheetah. The petition has raised concerns about the impact US trophy hunting would have on the viability of the largest remaining wild population of cheetah. The cheetah is currently listed as an Appendix I species under the Convention on International Trade in Endangered Species (CITES). Under CITES, there is presently a quota of 150 cheetah that may be exported annually from the Republic of Namibia. The petition in question requests that only the cheetah population within the Namibian borders be reclassified as threatened. The biological population covers Namibia to Botswana, but in this document, population refers only to the cheetah living within the Namibian borders. This downlisting would not affect the ESA status of cheetah in other countries, nor would it change the CITES quota for Namibian exports.

In this report, three potential responses of USFWS to the petition are considered. The first option is to maintain the current endangered status, continuing to prohibit the importation of trophy-hunted cheetah into the US under ESA rules. The second option is to reclassify the Namibian cheetah as threatened, allowing the import of trophy-hunted cheetah into the US, potentially without requiring permits. The third option, which is the recommended option, would be an intermediate solution whereby the cheetah would retain endangered status, but a US import quota system would be implemented that responds to both biologic and economic

considerations. This last option presents a new and innovative approach to conservation and management of endangered species by the United States. Implementation of this option would align the ESA with practices currently in place under CITES.

This report begins with the presentation of background information on the life history and ecology of the cheetah. The economic, social and political situation in Namibia as it relates to the cheetah is examined. These factors are then integrated into an analysis of the costs and benefits of the aforementioned options. Finally, specific policy recommendations for USFWS are suggested. Please note that the recommendations have been formulated with the current Namibian land-allocation system in mind. Major shifts in land ownership may render these plans inappropriate or unfeasible.

## 2.1 Methodology

A multidisciplinary approach was used in the examination and treatment of this issue. The Problem Solving Team began by conducting a literature search to determine what is known about the Namibian cheetah. In the second step, the Team divided into groups that addressed specific issues such as ecology, sociology, economics, and policy. The work groups contacted cheetah authorities, consulted management plans, and reviewed the relevant literature. Based on this research as well as the judgment of Team members, we formulated management recommendations for the Fish and Wildlife response to the downlisting petition.

## 3.0 Cheetah Ecology

The cheetah (*Acinonyx jubatus*) inhabits the open plains, semi-desert and thicket bush of Africa, Southern Asia, and the Middle East. The primary native prey species of the cheetah are the springbok and the kudu (Nowell 1996). Other prey species include: impala, hares, wildebeests, zebras, young warthogs, gazelles (Lee 1992; Eaton 1974). The cheetah's gestation period lasts 90-95 days and 3-5 cubs are born in the average litter. The cheetah's average life expectancy in the wild is approximately 7.5-8 years (Lee 1992).

In Namibia, female cheetah are territorial with home ranges of about 1,500 square kilometers, whereas male's home ranges are approximately 800 square kilometers (Morsbach 1987). The abundance of cheetah in Namibia is correlated with the large amounts of open rangeland, the high density of prey species, and the absence of the cheetah's natural predators, including lions, leopards and hyenas.

## 3.1 Distribution and Abundance

Originally, the cheetah was found from the Cape of Good Hope to the Mediterranean and throughout the Arabian peninsula to the southern part of the former Soviet Union ("Population..." 1997). Population size has declined from an estimated 100,000 in 1900 to approximately 9,000-12,000 free-ranging cheetah in all of Africa today ("Population..." 1997). Currently, two free-ranging population "strongholds" exist, one in eastern Africa (Kenya and Tanzania) and the other in southern Africa (Namibia and Botswana) ("Population..." 1997). The world captive population of cheetah totals 1,015 cheetahs in 160 facilities in 36 countries, and consists primarily of wild-caught Namibian cheetah that have a low reproductive success of about 9-16% (Marker-Kraus 1994).

Ninety-five percent of the free-ranging cheetah population in Namibia are found on privately owned land (Marker-Kraus 1994). This is primarily commercial livestock farmland,

occupying about 275,000 square kilometers (Marker-Kraus 1994). There are probably fewer than 70 cheetah in the two Namibian game parks, Etosha National Park and Namib-Naukluft Park (Stuart et al. 1988).

There is much discrepancy among the census figures for the cheetah in Namibia. This is a result of differences in census methods, inaccuracies in farmer surveys, and discrepancies in reporting adults and cubs versus adults only. In 1975, the Namibian Department of Nature Conservation (DNC) estimated 5,000-6,252 free-ranging cheetah in the country, though with large margin of error (Nowell 1996). In addition, a 1982 population census reported 2,350 adult cheetah, a 1987 telemetry study estimated 2,000-3,000 cheetah, and a 1996 extrapolation estimated 2,905 cheetah in Namibia.

Although farmer surveys indicate a decrease in cheetah population size by 10% in Namibia, a more widely quoted figure is "a 50% decrease in population size from 1982 to 1992" (Nowell 1996). Severe drought during the 1980s, which reduced game populations by 50%, is cited as a major contributor to this decline. In addition, a rabies epidemic during that time may have killed 80% of the Namibian kudu population ("Population..." 1997) -- a major food source for the cheetah. Importantly, it is unclear whether the current cheetah population is increasing or decreasing (Nowell 1996).

## 3.2 Population Viability

A Population and Habitat Viability Assessment (PHVA) workshop was conducted for the Namibian cheetah in 1996. Exact population figures and trends were not available. However, the worst case scenario presented in the PHVA shows a current decline of 4-7% annually. At this rate, the population has a 50-100% chance of becoming extinct in 100 years ("Population..." 1997).

The VORTEX models that were developed at the workshop estimated cheetah generation lengths of 5-7 years ("Population..." 1997) and a potential population growth rate of 10-15% annually if cheetahs are only subjected to natural mortality levels ("Population..." 1997). Natural mortality was estimated at 10% annually, and simulations indicated that the population could withstand the additional removal of 10% of the adult females (but not to exceed 70 individuals), and about 20% of the adult males ("Population..." 1997) per year.

The VORTEX models on which the PHVA predictions were based were somewhat incomplete. Workshop attendees felt that better information was needed on: the genetic consequences of hunting more males, sex of animals removed by farmers, the confidence limits of population density of cheetah, and what monitoring methods would be needed to detect an annual decrease of 4-7% per year ("Population..." 1997).

Estimates of a minimum viable population size for the Namibian cheetah vary between 160 and 3,360 cheetah, based on the need to maintain an effective population size of 50 (Nowell 1996). The variation is a result of differing assumptions about the genetic variability of the population (Nowell 1996). There is also a question as to whether the adjacent population in Botswana should be included in the count (Nowell 1996). The Cheetah Conservation Strategy suggested using 2,500 adult and subadult cheetah as a target population size in Namibia (Nowell 1996). The plan allows removal of fewer than 200 cheetah per year barring a serious threat of increased conflict with livestock, in which case the limit would be set at 300 (Nowell 1996). These figures represent totals of both safari-hunted and farmer-removed animals.

## 3.3 Genetics and Disease

There exists a distinct lack of genetic variability within the cheetah species as a whole. Electrophoretic studies have shown that cheetah are monomorphic and homozygous at many loci, lacking the 10-60% polymorphism found in other species (O'Brien et al. 1986). In addition, comparative studies of skull asymmetry have indicated that there is less genetic variability in cheetah than in leopards, margays, and ocelots (O'Brien et al. 1986). Furthermore, skin graft experiments in cheetah indicate a significant lack of variability at the major histocompatability complex (MHC) (O'Brien et al. 1986).

Research suggests that the lack of genetic variability among cheetah puts the species at a greater risk of inbreeding depression. However, wild populations have not shown the common symptoms of this phenomenon, such as reduced litter size. Sperm morphology is under genetic control and cheetah sperm shows up to 70% structural abnormality. Nevertheless, wild cheetahs with sperm abnormalities can successfully impregnate females, indicating that their fertility is often unimpaired by the abnormalities (Merola 1994). And though inbreeding is also thought to be responsible for small litter sizes in captive cheetah, litter sizes in the wild are significantly higher than those observed in captivity (Merola 1994). Therefore, although inbreeding depression is a threat when dealing with limited genetic diversity and small population size, some of the problems associated with breeding in captivity may be the result of management, as opposed to cheetah genetics.

The impact of newly emerging diseases, such as viral epidemics, on a population depends on the interaction of various factors. One of the most important is the genetic makeup of a species population, with "specific emphasis on MHC genes" (Truyen et al. 1995). MHC genes are particularly important because they are a major component of immune response. Despite reduced genetic diversity, molecular-clone studies have shown some level of heterozygosity still exists at the MHC (Heeney et al. 1990). The preservation of MHC heterozygosity, no matter how limited, could be critical to the survival of the population in the future in the event of an emerging disease epidemic.

An outbreak of feline infectious peritonitis (FIP) that occurred in a captive population of cheetah in 1982 illustrates how low genetic diversity increases vulnerability to disease. In a period of 8 months after the introduction of a cheetah infected with FIP, all of the cheetah at this facility had become seropositive. After 4 years, 60% of the animals had died of FIP, which is significantly higher than the 5% mortality expected in domestic cats infected with the disease (Brown et al. 1993). Although genetic homogeneity increased the population's susceptibility, the transmission rate exhibited by the cheetah population can be partially attributed to the unnaturally close proximity of the captive animals (Merola 1994).

There have not been any major cheetah epidemics in Namibia in recent history apart from the current mortalities in Etosha from anthrax (Nowell 1996). In Etosha National Park, 5 of 7 collared cheetah have died of anthrax since 1993 ("Population..." 1997). In addition to anthrax and FIP, other diseases that could infect the Namibian cheetah population include canine distemper virus (CDV) and feline immunodeficiency virus (FIV) ("Population..." 1997). Future decreases in genetic variability subsequent to reductions in population size could increase the risk of significant mortality associated with disease epidemics.

## 3.4 Social Structure

The social organization of the cheetah is somewhat unique among mammals (Caro et al. 1986; Caro et al. 1989). Their social structure varies geographically, with the Namibian cheetah apparently more social than the East African subspecies (Marker-Kraus et al. 1996). This fact has important implications for the potential impact of trophy hunting on the Namibian population because hunting can disrupt the social structure and reproductive success of the population.

Apart from lions, cheetah appear to be the only felids in which males form coalitions. In contrast to males, female cheetah are solitary and utilize large home ranges which overlap extensively. By monopolizing a relatively small area, the male cheetah may encounter many transient females whose ranges overlap. Competition over key portions of these females' ranges may be intense. In East Africa, territorial competitions among males to gain access to females are often fatal. Mortality incurred through competition over territories results in an adult sex ratio skewed in favor of females in many cheetah populations (Caro et al. 1989). Intense fighting between males results in only about half the males that reach adolescence surviving to old age (Caro et al. 1989). Thus, male territoriality restricts the density of cheetahs. When the cheetah population increases, more of the available habitat is claimed by territorial males, leading to increased conflict and more deaths. At low cheetah densities, where competition between males is weaker, a greater proportion of males have the chance to contribute to the next generation (Caro et al. 1989). Importantly, when territorial males that are part of a coalition are lost from the population, it disrupts the group and can negatively impact the reproductive success of the remaining males.

Caro and Collins (1987) have shown that male cheetahs that join other males have a greater chance of obtaining and maintaining exclusive access to females, although solitary males in Namibia have been known to maintain home ranges for long periods (Marker-Kraus et al. 1996). Large and old males are the most likely to be successful territory holders as are those who join large groups or other large males (Caro et al. 1986). Solitary males typically weigh less and are in poorer health than territorial males, probably due to behavioral and physiological stress (Caro et al. 1986; Caro et al. 1989).

## 4.0 Human Ecology

Namibia, previously known as South West Africa, is the driest country in southern Africa; the only permanent rivers are on the borders to the north and to the south. There are watercourses which flood after a heavy rain; however, Namibia is considered to have "an almost rainless climate" ("Namibia" 1995). Water from shallow boreholes and wells on the central plateau supports not only livestock on large farms but also wild game and cheetah (Marker-Kraus et al. 1996).

The current population of Namibia is approximately 1.6 million people, composed primarily of rural Ovambo, Kavango, Herero herdsmen, and Damara (Fraenkel et al. 1985). Seven percent of the population is comprised of people of European descent, mostly Afrikaans-speaking, who live in and around the capital. While 28 percent of the people are urban and 72 percent live in rural settings, a strong trend is for young men to move to the cities for employment (Spark 1995).

### 4.1 Political History and Land Allocation

Before the first European settlers arrived in the mid-19th century, the earliest peoples of Namibia lived by hunting the wild game that was readily available. Herding of cattle and

goats was introduced when the Nama arrived, so both raising livestock and hunting game are long-term traditions in the area. Although the first settlers arrived in the mid-19th century, large scale settlement did not start until the early 1900's. By 1975, the colonists' farms were, on average, substantially larger and of higher quality than native people's farms (Fraenkel et al. 1985).

Between World War I and 1990, the colony was ruled by South Africa in a system of apartheid. In 1990, when Namibia gained independence from South Africa, a program of reconciliation was imposed, resulting in very little strife between the rival groups (Kawola, personal communication). Currently, a statewide, multi-party democracy is controlled by South West African Peoples' Organization (SWAPO), the Ovambo-supported group primarily responsible for fighting the war that won independence. One contentious issue currently is that of land reform. Opposition groups have stated that land reform is necessary to redistribute wealth in the country ("Namibia" 1995).

## 4.2 Farming and Livestock-Predator Conflict

Livestock have been part of the Namibian landscape since European settlers colonized the country in 1884. Today, nearly 6,000 commercial livestock farms, ranging from 5,000 to 20,000 hectares in size, use 44% of the available agricultural lands (Marker-Kraus et al. 1996). The Namibian cheetah has benefited from living on farms because of the relative absence of competitive predators, the abundance of natural and domestic prey, and the accessibility of drinking water. Livestock farmers who have turned to game farming also encounter the cheetah, who is attracted to the concentration of game animals. Approximately 90-95% of the cheetah's habitat and range are on private, commercial farms (Morsbach 1987) making the cheetah-farmer interaction a significant feature of farm life.

The relationship between farmer and cheetah has traditionally been one of conflict. Commercial farmers and ranchers have seen the cheetah primarily as a threat to livestock, especially to calves (Zimmerman 1996). While livestock losses result from many factors -- including drought, reproductive failure, disease, injury, theft, and natural causes -- farmers cite predation by jackal, caracal, leopard, and cheetah as significant. Elimination of predators became the accepted practice in Namibia's early farming years, when close monitoring and protection of livestock was impractical. Currently, when the cause of death of livestock is unknown, predators are often assumed to be responsible (Marker-Kraus et al. 1996). However, a survey of Namibian farmers conducted by the Directorate of Nature Conservation and Tourism (DNCT) from 1991-1993 indicates that ranchers' negative attitudes toward the cheetah do not necessarily correlate with actual cheetah predation of livestock (Morsbach 1986). Other predators, such as hyenas, leopards, and jackals may be responsible for taking down more livestock than the cheetah (Zimmerman 1996).

Many farmers shoot cheetah as a preventative measure against livestock losses, especially during livestock calving season (Marker-Kraus et al. 1996). Cheetah removals may be under-reported to the Ministry of Agriculture, and the Ministry may be somewhat tolerant of the farmers' actions (Wycoff-Baird, personal communication). If under-reporting is taken into consideration, some estimates suggest that 10,000 cheetahs have been removed from farms in the last 20 years (Marker-Kraus et al. 1996). According to the Directorate of Veterinary Services (DVS), from 1986 to 1994, 100,066 predators, of which 1,094 were cheetahs, were killed by farmers to protect livestock (Marker-Kraus et al. 1996). (DVS also reports that during that time, 2% of the country's farms reported cattle loss and 11% reported small stock loss to predators, with 29% of cattle and 3% of small stock loss blamed on the cheetah.)

CITES figures for cheetah kills differ, with 1,624 cheetahs reportedly killed on farms during that same period (Marker-Kraus et al. 1996). Such discrepancies support the suggestion that reporting by farmers is incomplete and that such numbers represent minimal removals at best (Marker-Kraus et al. 1996). Inaccurate statistics make it difficult to assess the extent to which farmers are reducing the cheetah population.

More recently, however, farmers have been causing fewer cheetah deaths. This change may be a result of fewer cheetahs in the area, more wild prey available (a critical condition to reducing livestock predation) (Marker-Kraus et al. 1996), or farmers' using more effective livestock-management techniques which help reduce the threat of big cats. In fact, the 1991-1993 DNCT study revealed that 75% of farmers surveyed did not consider the cheetah to be a problem, an increase from 57% reported in a similar survey in the 1980s (Marker-Kraus et al. 1996).

The outreach work of the Cheetah Conservation Fund (CCF), stationed in Windhoek, has made strides in altering the negative image of the cheetah. CCF's environmental education and the promotion of management techniques, such as coordinating calving seasons and the use of guard dogs to minimize predator attack, are changing the attitudes of many farmers about the value of the cheetah and about whether its demise is the best solution to what is in some cases a perceived threat (Marker-Kraus et al. 1996). Further discussion of education strategies appears later in this report.

## 5.0 Political And Economic Considerations

The status of southern Africa's cheetah population became a matter of controversy in 1992 when the newly independent Namibia joined CITES. At that time, the cheetah was listed in CITES Appendix I as an endangered species; no international trade in live animals, trophies, or skins was permitted. Namibia, Botswana, and Zimbabwe argued that this complete restriction on international trade limited conservation policies and interfered with appropriate management practices. As Namibia had the world's largest wild population, and as its representatives were able to present evidence that limited hunting would not threaten the species' survival and would aid in management and conservation efforts, CITES member nations agreed to a compromise. Under this agreement, the cheetah remained listed on Appendix I, and limited export quotas were granted to those southern African nations with relatively large populations of the felid. Namibia became a CITES signatory nation in 1992 and was allowed to export 150 animals (Nowell 1996).

The government maintains that this quota aids conservation efforts by giving ranchers economic incentives to preserve rather than reduce the cheetah population. This policy is based on the premise that rural landowners will only have an incentive to preserve the cheetah if the damage these predators cause to livestock is balanced by some economic value. The behavior of landowners is critical because their property constitutes approximately 90-95% of cheetah habitat in Namibia, and, by Namibian law, landowners have property rights to all game animals on their land (Hanekom 1996; Nowell 1996). In the early 1980s, approximately 1,000 cheetah per year were being killed by farmers who considered the animals to be pests and a threat to livestock (Nowell 1996). By 1995, the last year for which data are available, documented annual removals had fallen to below 200. Exports under the CITES convention accounted for approximately 50 removals out of this 1995 total (Nowell 1996).

As mentioned earlier, the cheetah is currently listed as an endangered species by the United States government and as such, the importation of cheetah and cheetah products into the US is

prohibited without an import permit from USFWS. Anyone who wishes to import cheetah or cheetah products into the US must illustrate that the activity enhances the survival of the species overall. Historically, permits have only been issued when an activity has been shown to have conservation value to the species (i.e. scientific research, education or the enhancement of propagation or survival). To date, the US government has not issued any permits for the import of cheetah trophies (Teer 1995).

If the petition to downlist the Namibian cheetah under ESA were implemented, officials at the Ministry of Environment and Tourism (MET) estimate that US hunters would use an additional 20 export permits a year, bringing the total to approximately 75 requested by all countries, still well below the CITES quota limit (Teer 1995). The Ministry notes that as part of the trophy hunting protocol presently in place, N$1000 (approximately US$215) of the income generated from each hunt goes directly to cheetah conservation efforts. This is in addition to the economic benefits accrued to farmers and game reserve owners that also encourage cheetah conservation. It is estimated that a hunter may spend N$5000 to N$6000 while in country on activities related to each cheetah hunt (Teer 1995).

The Namibian government has developed an integrated strategy with several components designed to enhance the long-term viability of the Namibian cheetah population. First, as mentioned earlier, efforts are being made to change attitudes through education. MET, in cooperation with CCF and other organizations, is carrying out a program to inform private land owners, and the population at large, about the cheetah, with particular emphasis on presenting the following information: (1) this animal is severely endangered worldwide; (2) the level of livestock loss from cheetah predation is lower than generally believed; (3) improved farm management techniques can substantially reduce these losses; (4) if properly managed, wild cheetah may be a potential source of income resulting from a carefully managed trophy hunting program.

The government asserts that this integrated strategy has already shown positive results. Over the last ten years, the number of cheetah reportedly killed by farmers protecting livestock has been reduced dramatically. In addition, the government is allocating resources to develop a better understanding of cheetah ecology, information that will aid conservation experts in population management. The government of Namibia has demonstrated a commitment to biodiversity conservation and has urged the international community to grant it greater sovereignty over the wildlife within its borders.

## 5.1 Economics Relating to the Utilization of Cheetah in Namibia

### 5.1.1 The Sport Hunting Component of the Namibian Economy

Currently, cheetah hunting primarily benefits ranchers and national cheetah conservation organizations. In particular, the Namibian Professional Hunting Association (NAPHA) developed a contract that spells out the allocation of income from cheetah hunting to farmers -- in part as retribution for lost livestock -- and cheetah conservation organizations; to date, one hundred fifty farmers have signed the NAPHA Cheetah Compact. This contract pairs trophy hunters with farmers who have problem animals they would like removed from their land. Farmers who have signed this contract stand to earn on average N$2500 from each successful hunt (Nowell 1996). In addition, under the present contract, the Namibia Wildlife Federation for Cheetah Conservation receives N$1000 from each trophy hunter (Jackson 1995).

While sport hunting is a small component of the country's economy on the whole, trophy hunting for game animals is one of the most profitable wildlife related industries in Namibia, with gross receipts of N$13 million in 1991 (Barnes 1996). Cheetah hunting, however, accounts for less than 5% of total trophy hunting income. Although these economic benefits are not negligible, it is unlikely that the cheetah trade will make a significant contribution to Namibia's economic development, regardless of the quota in place. Income from cheetah hunting remains relatively modest because the total number of successful cheetah hunts is low. Hunters are often reluctant to invest substantial sums in pursuing cheetah because these animals are notoriously hard to catch and their coats are generally of low quality (Jackson 1995). Nevertheless, conservation efforts and farmers' incomes are enhanced by the economic benefits that are associated with the sport (MET 1997).

**5.1.2 Estimated Economic Benefits Associated With Opening the US Market**

The number of cheetah exported as trophies averaged only 20 between 1983 and 1995 (Barnes 1996). Most of these have been exported to Europe (Jackson 1995) since current regulations do not allow trophies to be imported to the US and the Asian demand is low (in part because cheetah parts are not associated with health-related or aphrodisiac effects). As mentioned, the Namibian government estimates that if the US market is opened there will be a demand for an additional 20 export permits per year (Jackson 1995). This would double the present economic value to the Namibian economy of cheetah trophy hunting, thereby increasing the benefit to farmers and contributing at least an additional N$20,000 to cheetah conservation.

It has been demonstrated that farmers respond to economic incentives that encourage conservation and game management. For example, in 1967 after a statutory change gave landowners property rights to the wild animals on their range, some farmers switched from cattle ranching to running game reserves catering to hunters. Farmers became more open to the idea of conserving biodiversity when it was established that it has an economic value. Game populations have increased, although game farms still yield low profitability in comparison with livestock ranching (Nowell 1996).

**5.1.3 Costs Associated with Cheetah Predation**

Although no firm data are available, recent studies reveal that farmers substantially overestimate their losses due to cheetah predation (Marker-Kraus et al. 1996). Nevertheless, each calf killed represents an immediate loss of approximately N$300-500 to the farmer (Nowell 1996). Cheetah predation on game farms can pose a more serious problem because cheetah take more game than cattle, and because some game animals are more valuable; exotic individuals can be worth as much as N$1000-20,000 (Nowell 1996). Environmental education and instruction in farm management techniques can help farmers and game farms owners minimize their losses (Marker-Kraus et al. 1996).

## 5.2 Policy Precedents

Three other endangered species management policies that were considered as models for this analysis. The bontebok, a South African ungulate, is currently listed as endangered under the ESA and listed under CITES Appendix II. Currently, the US allows the import of safari hunted bontebok with special permit requirements (Nowak, personal communication). In addition, the Argali sheep, a species found in Mongolia, Kyrgyzstan, and Tajikistan, is currently listed under the ESA as threatened (Federal Register 1996b). The sheep was

downlisted as part of a conservation solution where Safari Club International obtained a safari hunting permit and then auctioned it to the highest bidder with USFWS permission (Gabel, personal communication). The proceeds from the auction financed a project to enhance the conservation of the species. Lastly, the Canadian polar bear is listed as threatened under ESA, and is CITES Appendix II, yet the US allows limited trophy hunting imports. The USFWS requires that trophy hunters pay US$1000 in addition to the standard permit fee, which is then used for conservation of the polar bear in Alaska and Russia (Federal Register 1994).

## 6.0 Analysis and Recommendations

It has been the stated goal of the Namibian government and local and international interests to maintain a viable population of wild cheetahs. While we have researched the issues affecting the viability of the cheetah population, our analysis and recommendations focus on the major policy issue at hand: whether USFWS should downlist the Namibian cheetah population from endangered to threatened. Considerable interest has been expressed in downlisting this cheetah population to allow importation of trophy-hunted cheetahs into the United States, in accordance with the 1992 CITES quota, and potentially as a component of larger conservation efforts. We describe below the three policy options we considered as feasible and evaluate the costs and benefits of each. We have used a range of available evidence to formulate our recommendations, which we hope will offer a means to link diverse interests.

### 6.1 Options Available to USFWS

1) The agency may decide to make no change, thus denying the petition. Under this option, the cheetah will retain its listing as an endangered species, and the current practice remains under which no import permits are issued to trophy hunters.

2) The agency may accept the petition to downlist the cheetah from endangered to threatened and promulgate special regulations allowing the importation of cheetah trophies into the United States without a permit (Nowak, personal communication). Such a downlisting would almost certainly be tied to requirements that conservation measures be enforced in Namibia to safeguard the viability of the cheetah population.

3) The agency may compromise: keep the cheetah listed as an endangered species but permit importation of a limited number of trophies according to a restricted quota system. This option would bring the structure of US regulations into conformity with the CITES quota system.

### 6.2. Analysis of the Three Options

#### 6.2.1 Policy Option I

**Maintain the current status of the Namibian cheetah**

Maintaining the current endangered status of the Namibian cheetah is the most "conservative" option available to USFWS, justifiable on the grounds of biological and ecological uncertainties related to the species. For example, an accurate census of Namibian cheetah is not available and current population trends cannot be established with certainty. Also, two unique characteristics of the cheetah make the species susceptible to abrupt population declines. First, genetic diversity within the species, both locally and globally, is extremely limited, so a disease outbreak may spread rapidly. Second, population size depends on the

cheetah's unique social system -- based on coalition-building among territorial males -- that may make the population respond disproportionately to loss of key individuals. Finally, it can be argued that the Namibian cheetah deserves maximum protection since it is the only source from which the captive population and the wild pockets that survive in other regions can be repopulated.

Because the current prohibition serves as a deterrent to US safari hunters, allowing the import of cheetah trophies into the US could increase hunting pressure on the cheetah. The majority of trophies exported from Namibia under current CITES regulations -- approximately 40 per year out of a total CITES quota limit of 150 -- go to Europeans. The entry of US citizens into this market could increase the annual take to over 40, even though the CITES quota limit of 150 would remain as an upper boundary. The Namibian government estimates that, at the outset, US hunters would demand an additional 20 export permits annually. It is unclear whether this modest increase would have detrimental effects on the population if numbers are lower than presently estimated, or if the population is currently declining rather than fluctuating within a stable range. Retaining the current endangered status and allowing no trophy imports would prevent this additional mortality.

From a regulatory point of view, two other arguments can be presented in favor of maintaining the status quo. First, making an exception under the Endangered Species Act for Namibian cheetah may set a precedent encouraging the weakening of protections for other endangered species. Second, the present listing accurately reflects the global condition of the species. However, arguments can also be offered against retaining the current language. For example, unless a change is made, no new economic incentives for cheetah conservation will come from the US market. Extra income that Namibian farmers may expect from American cheetah hunters will not be forthcoming, and US hunters will not contribute to the portion of export permit fees that the Namibian government now passes directly to cheetah conservation agencies. Furthermore, a decision to reject the petition may alienate the Republic of Namibia and Safari Club International, both of which have engaged in good faith actions to promote cheetah conservation. Failure to acknowledge these efforts, and to join in the management of the Namibian cheetah, may discourage a cooperative, international solution.

**6.2.2 Policy Option II**

**Downlist the Namibian cheetah from endangered to threatened under ESA**

One of the most compelling arguments for downlisting the Namibian cheetah, and permitting trophy hunting by US residents, is that total cheetah mortality may be reduced as a result. Under this scenario, farmers might kill fewer cheetah in order to have individuals available for trophy hunting. This reduced mortality should compensate for the additional losses caused by American hunters. Opening the US market will increase the likelihood that a given Nambian farmer will profit from cheetah conservation. This in turn will aid in efforts to change attitudes. Farmers may learn to appreciate the cheetah as a valuable commodity to be conserved rather than as a pest to be eliminated and, consequently, will be encouraged to institute farm management techniques that reduce cheetah predation on livestock.

Trophy hunting already generates funds that contribute to conservation of cheetah in Namibia. Under the current structure, based on the NAPHA contract described earlier in this report, N$1000 from each hunt is donated directly to the Namibian Wildlife Federation for Cheetah Conservation. If US hunters fill the CITES quota, this could ensure an annual total revenue of N$150,000 for cheetah conservation from hunting-related activities.

There are also political reasons to accept the petition to downlist. The Namibian government is ultimately responsible for managing the cheetah population within its borders. Acceding to the petition demonstrates trust in Namibia's good faith conservation efforts and may enhance opportunities for inter-governmental cooperation. Reclassification of the cheetah would also address the concerns of US hunting interests and encourage their full participation in cheetah conservation.

While there would be benefits to downlisting, there are also costs and concerns. Downlisting the cheetah to threatened misrepresents the global status of the species and may cause an increase in the risk of extinction. Also, a change in US classification may send a dangerous signal. The US is in a position of influence as a world conservation leader, often setting the standards for species conservation. A reclassification of the cheetah under the ESA could potentially lead to a change under CITES or lead to changes in the attitudes or policies of the international community.

Also, if the cheetah is downlisted and import permit restrictions lifted, the US would lose the measure of control over cheetah mortality that it currently has. If demand for cheetah trophies is greater than predicted, or if this demand increases at some future time, the full CITES quota may be taken even during years when the cheetah population is declining or at below 2,500 individuals. In this circumstance, the flexibility of US regulatory response would be constrained. Past experience shows that the status of the population can change rapidly. For example, during the drought in the 1980s, cheetah predation on livestock increased, and removals by farmers increased dramatically. Once the species is downlisted, regulators lose the power to respond rapidly to changes in the viability of the population that may result from disease or other stochastic events.

The petition submitted to USFWS requests that the Namibian population of cheetah be downlisted from endangered to threatened and that, simultaneously, special regulations be promulgated to allow the import of trophies without permits. Doing away with permits, however, eliminates a potential revenue source. Income from the sale of import permits could generate additional revenue to be dedicated to cheetah conservation. In one example of such a program, USFWS has used funds derived from import permits to further conservation of the Canadian polar bear (Federal Register 1994).

### 6.2.3 Policy Option III

#### Maintain the current status but permit a limited quota of trophy imports

Option III is a compromise solution that we believe retains the best aspects of the two previous options while minimizing the associated drawbacks. The Namibian government and its conservation partners have made a strong case that limited trophy hunting conforming to CITES regulations may be an important component of an integrated cheetah conservation and management plan. However, downlisting the cheetah from endangered to threatened -- as would occur under Option II -- would provide a lower level of protection for the cheetah under US regulations than presently exists under international protocols and could misrepresent the actual status of the cheetah. Option III, thus, would retain the endangered status but allow limited hunting by US interests.

The strictly limited hunting that we recommend be allowed under Option III would provide increased market-based incentives to encourage cheetah conservation. This option would maintain the endangered status of the cheetah but allow for limited imports based on an

adjustable quota, which would range from 0 to 150 animals, the maximum allowable under CITES. This number should be reevaluated annually and reflect trends in the Namibian cheetah population, i.e., an increase in cheetah numbers could allow for a higher quota, while a decrease would require an immediate lowering of the quota. The quota should be set at 20 for the first several years of the program for the following reasons: (1) the Namibian government offers this number as its best estimate of the initial demand from US hunters; (2) this is a reasonable figure given present estimates of the size of the Namibian cheetah population; (3) it will serve as an effective, but conservative, means to test the premise that sport hunting can contribute to cheetah conservation; (4) this program will encourage MET, hunting groups, and cheetah conservation organizations to gather more complete and accurate ecological data (e.g., population size and reproductive rates); and (5) it is flexible, reversible, and responsive to changing circumstances.

One unique aspect of this proposal involves generating funds for cheetah conservation through the auction of import permits. Permits would be sold by an NGO -- such as Safari Club International -- in partnership with USFWS, at an annual auction. These permits would be valid for one year and would require detailed reporting, at the time the trophy is imported, of the age and sex of the animal taken and the location of the kill (to provide information to biologists studying the effects of hunting on the cheetah's unique sociality). Unlike current USFWS import permits, these permits would be fully transferable (i.e., could be resold) and could be purchased by any interested party (including conservation groups). Since permits would be purchased preceding the safari hunts, they could be transferred between parties in the event that the original buyer fails to take a cheetah. This transferability minimizes each hunter's financial risk and gives buyers greater security in the bidding process. A protocol would be established between USFWS and the partner NGO, in cooperation with the Namibian government, to ensure that a percentage of the auction proceeds go to conservation efforts. Currently, MET, CCF, and Afrikat have effective programs in place to which funds raised in the US could be contributed.

One of the risks associated with Option III, from the conservationist's point of view, is that it would likely result in additional legal kills of this endangered species. According to present estimates, however, 20 kills represents less than 1% of the current adult population. This level is not likely to significantly affect the viability of the population, according to the conclusions of PHVA. Also, as argued above, economic incentives that encourage farmers to conserve cheetah may, in fact, reduce total mortality.

To minimize further the impact of a US quota, USFWS should work with Namibian organizations to improve current hunting protocol. A more detailed protocol should encourage hunters to target individuals that contribute the least reproductive fitness to the population (i.e. non-territorial males or non-reproductive males and females) as suggested by studies of the cheetah's social structure and genetic weaknesses. Information on making such determinations could be provided by MET to local hunting guides and to hunters as they obtain permits. This selectivity would afford the Namibian cheetah greater protection from the loss of reproductive individuals.

An additional concern with Option III is that it may set a precedent allowing trophy hunting of an endangered species. A precedent already exists. USFWS currently allows the import of trophy-hunted bontebok, an endangered ungulate from South Africa. USFWS determined that hunting provided an economic incentive for conservation and, therefore, enhanced species conservation. This animal, like the Namibian cheetah, uses private land as its primary habitat. In contrast, bontebok hunting is restricted to USFWS-certified game farms. Such a program

could not be put in place for the Namibian cheetah because the animal ranges across the land of many property owners. Nevertheless, while the situations are not identical, the bontebok case may serve as a model.

A final argument against this option is the potential weakening of the ESA. Following this line of reasoning, this policy would set a dangerous precedent by allowing a new set of exceptions to the hunting and import restrictions that presently exist under the ESA. We argue, however, that in certain circumstances, limited trophy hunting may actually be a key component of a conservation strategy designed to ensure the survival of a species. In such cases, limited exceptions to hunting restrictions do not stray from the original intent of the ESA. If flexibility in policy setting works to improve the protection of an endangered species, the precedent being set is a positive one. Importantly, the language of the ESA is in many ways symbolic, and the public tends to respond emotionally to any change in that language. By maintaining the "endangered" status of the cheetah, Option III anticipates and lessens this response.

Annual monitoring of the Namibian cheetah is an important component of this option. A mechanism for improving the system presently in place to monitor the cheetah population has been proposed by MET and the World Conservation Union Species Survival Commission Cat Specialist Group. USFWS should request annual census data from these Namibian organizations and set an adjustable quota that responds to fluctuations in the population. No imports should be allowed if:

1) an annual cheetah census reveals that the population has dropped below the minimum viable population size (MVP) of 2,500 adults according to the Cheetah Conservation Strategy (Nowell 1996);

2) there is not substantial census data to determine the status of the population. This requirement would provide incentives to the Namibian government to enhance the cheetah-monitoring system;

3) there is other information indicating that safari hunting is not working as a conservation tool. For example, USFWS obtains farmer surveys and government reports that indicate farmers are continuing to kill indiscriminately or are capturing cheetahs with the intention of setting up a trophy kill.

An additional benefit of Option III is that it brings the US regulatory stance into conformity with current CITES rules for cheetah and encourages US participation in conservation efforts. While the United States is a party to CITES, it has not issued permits for the import of cheetah trophies taken legally under the CITES quota system that has been in place since 1992 (Teer 1995). Option III allows US hunters to enter the Namibian market for trophy hunting of cheetah. The price of the import permits sold at auction to trophy hunters in the US would provide a proxy value for cheetah and provide increased revenue for cheetah conservation. For example, if each import permit were to sell for US$2,000 and if 20 were sold, $40,000 would be generated. The majority of this money would be funneled into conservation. This revenue would be in addition to the money generated by the current NAPHA agreement, part of which goes to mitigate farmers' livestock losses.

The money generated through Option III would serve not only to fund conservation monitoring efforts, but also to support conservation education programs like those being

conducted by CCF. And to ensure that trophy hunting works as a conservation tool, such support is vital. Continued education of local landowners is especially critical as the cheetah is found primarily on private lands. These landowners, in the end, may control the fate of this felid, not just those in Namibia, but *Acinonyx jubatus* throughout the world.

## 7.0 Conclusion

In summary, we feel that the appropriate response to the petition to reclassify the Namibian cheetah is to maintain the current endangered status while allowing the importation of a limited number of cheetah trophies under a flexible quota system. This action balances economic and ecological reality in a manner that best supports the maintenance of the viability of the Namibian cheetah population. Option III supports the Namibian government's conservation strategy, utilizes strictly limited safari hunting as a conservation tool, and makes use of market forces to generate funds for cheetah conservation. In these ways, Option III can best meet the complex and diverse needs of both human and cheetah.

### *7.1 Table I. Benefit/Cost Comparison*

| Option I: Maintain Endangered, No US Trophy-Hunting Imports | |
| --- | --- |
| **BENEFITS** | • Most conservative option given biological uncertainties<br>• Maintains maximum legal protection for Namibian cheetah under ESA<br>• Means potential for lower cheetah mortality<br>• Maintains the original intent of the ESA; does not set a precedent for exceptions |
| **COSTS** | • Offers no additional economic incentives for local conservation of the cheetah<br>• Generates no new revenue for the Namibian economy<br>• Does not recognize hunting as a possible tool for cheetah conservation<br>• Potentially alienates the Namibian government and Safari Club International |
| **Option II: Downlist to Threatened, Allow US Import of Trophy Cheetah without Permits** | |
| **BENEFITS** | • Potentially reduces cheetah removal by farmers due to an increased likelihood that they will host a safari hunter<br>• Could provide as much as N$150,000 for monitoring and conservation of the Namibian cheetah under the NAPHA contract<br>• Potentially generates the most revenue for the Namibian economy<br>• Shows a willingness to support Namibian Cheetah Conservation Strategy<br>• Recognizes the legitimacy of US hunting interests |
| **COSTS** | • Conveys inaccurate message to international community about viability of Namibian cheetah population<br>• Lacks responsiveness to fluctuations in the cheetah population<br>• Goes beyond CITES regulation and intent<br>• Is difficult to reverse if population trends demand it<br>• Fails to explore the US market potential for import permits to further cheetah conservation<br>• Could result in the maximum number of cheetah deaths through hunting |

| | Option III: Maintain Endangered, Allow US Import of Trophies with Quota and Permits |
|---|---|
| **BENEFITS** | • Maintains the legal status of the Namibian cheetah under ESA<br>• Could establish a stronger hunting protocol than that recommended by Namibian Cheetah Conservation Strategy<br>• Establishes quota that can be adjusted to respond to cheetah population trends<br>• Most closely resembles current CITES rules for cheetahs<br>• May be tailored to explore the US market for trophy hunting of cheetahs<br>• Increases likelihood that a farmer will host a safari hunter and thereby could lower cheetah removal by farmers<br>• By maintaining "endangered" language, avoids public perception that protection will be lowered |
| **COSTS** | • May lead to increased cheetah mortality<br>• Requires some additional research, oversight, and administration<br>• Has few precedents for implementation |

## 7.2 Table II. Summary of Recommendations

| The US Fish and Wildlife Service should: |
|---|
| • Maintain "endangered" status of Namibian cheetah.<br>• Establish tradable permit system to allow limited import of trophy-hunted cheetah into US.<br>• Develop compact with an NGO to auction permits and channel majority of proceeds to cheetah conservation organizations.<br>• Request updated farmer surveys from CCF to monitor farmer-cheetah relations.<br>• Request an annual census and other relevant population data from the Namibian government.<br>• Link future quota of US import permits to results of population surveys.<br>• Establish a conservative starting quota of 20 for US cheetah imports.<br>• Adopt a target minimum viable population (MVP) of 2,500 individuals.<br>• Set US quota to zero if annual census results show cheetah population to be below MVP.<br>• Collaborate with Namibian organizations to strengthen and improve hunting protocol.<br>• Require detailed reporting of age, sex, location and method of taking cheetah at time of US importation.<br>• Continue to encourage and fund cheetah conservation education programs aimed at farmers, ranchers, community children, and other local parties. |

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# Appendix I. Problem Solving Team, Fall 1997

### *Peter Balint*
Peter has a BA in English, an MA in education, and is currently enrolled in the Ph.D. program in Environmental Policy at the University of Maryland. His primary area of interest is balancing economic development and environmental protection in rural areas of Latin America. Peter lived in Mexico and worked with local NGOs in Central America and the Caribbean on a variety of environmental projects.

### *Rob Billerbeck*
Rob has a BS in Zoology and ten years of professional computer consulting experience, including acting as a CAD/GIS manager for a civil engineering firm. He served as a technology consultant for telemetry projects on monkeys in Brazil and sharks in the Bahamas, and has been a teaching assistant for ecology and conservation lab courses. Recently he consulted to a land trust on grant writing and construction management of erosion control work. Rob's current focus is on problems faced by small land trusts acting as land managers.

### *Patricia Bright*
Patricia received her Doctorate of Veterinary Medicine in 1995 from the Virginia - Maryland Regional College of Veterinary Medicine. As an avian and exotic animal veterinarian, she worked with both USFWS and the State of Hawaii on captive breeding programs for endangered bird species. Her areas of interest are endangered species conservation, the biology of small populations and epidemiology. She currently works as a relief veterinarian in the endangered species division at the Patuxent Environmental Research Center. She plans to pursue a Ph.D. in epidemiology upon completion of the CONS degree.

### *Corinne Egner*
Corinne received a BA at Oberlin College with majors in Biology and Environmental Studies, as well as a Masters in Arts of Teaching at Fairleigh Dickinson University. Having taught HS biology for 9 years, Corinne combined her educational skills and interests in GIS and remote

sensing to develop and evaluate educational materials and software on stratospheric ozone at NASA.

### Tom Gnade
Tom graduated from Loyola College in Maryland in 1996 with a Bachelor's of Science degree in Biology. Tom served as a consultant for AAI Corporation, and interned at the Maryland Department of the Environment, focusing on water quality issues in the Chesapeake Bay area. His interests include methods of limiting the adverse effects of development by establishing priorities for the conservation of ecologically valuable landscapes.

### Charlene Houle
Charlene received her B. S. in Ecology and Evolutionary Biology from the University of Connecticut. Due to an interest in animal conservation (both vertebrates and invertebrates), she became involved with several species conservation projects, including raising and monitoring endangered species for state environmental programs. She also participated in monitoring areas for insect biota and working on site conservation plans for the Nature Conservancy.

### Ron Lacoss
Ron received his BS in zoology from the University of Massachusetts and a MA in science education from the University of Northern Colorado. He taught science as a Peace Corps volunteer in Kenya and currently teaches environmental science at the Landon School in Bethesda. Ron's interests are varied, including environmental education, environmental ethics, forest conservation, stream ecology and grassroots activism. Ron is a member of the Transportation Committee of the local Sierra Club, currently involved in advocating alternatives to sprawl and highway construction in Montgomery County.

### Reagan Lake
Reagan received a BA from the University of Arizona in 1993. Since joining the CONS Program, Reagan worked in the Latin American Division of The Nature Conservancy, assessing the conservation status of neotropical birds. She also participated in various field research projects, including three months in Brazil studying the behavior of the golden lion tamarin. She hopes to apply her research skills to the conservation of critical habitat and imperiled species in Latin America.

### Ingrid Latchis
Ingrid received a BA in Environmental, Population and Organismic Biology from the University of Colorado at Boulder. She participated in studies on the behavior of mule deer and Abert's squirrels in their natural habitat in Colorado. Her primary interest is the integration of genetics and animal behavior into wildlife conservation. Ingrid recently spent 2 months in Brazil where she worked for a local NGO on the preservation of the Pantanal.

### Julie Lyke
Julie has 7 years of experience as an international environmental policy analyst. She conducted 20 in-depth studies for 5 different environmental organizations. She also initiated, developed, and managed a $100,000 policy analysis program for the US government to support decision making and international negotiations regarding global forest policy. Julie holds a Masters degree in International Economics from Johns Hopkins.

### Nancy McAllister
Nancy earned a BS in Biology from Grove City College in 1993. Before entering the CONS

Program, she taught life science for 3 years in rural Pennsylvania. During her summers, she conducted research for several conservation organizations, including the Smithsonian Institution and The Nature Conservancy. Most recently, Nancy helped to organize the corporate wildlife habitat certification process for the Wildlife Habitat Council.

### *Jennifer Steinberg*
Jennifer received her BA in English from the University of Wisconsin-Madison in 1991, then spent four years writing for *The Journal of NIH Research*, the Discovery Channel's magazines, and *Discovery Channel Online*. She joined the CONS program to study a range of conservation issues--including endangered species management, habitat restoration, and preservation of endangered cultures--and spent the summer working at the Patuxent Wildlife Research Center and World Wildlife Fund.