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THE TORGHAR CONSERVATION PROJECT: MANAGEMENT OF THE LIVESTOCK, SULEIMAN MARKHOR (*CAPRA FALCONERI*) AND AFGHAN URIAL (*OVIS ORIENTALIS*) IN THE TORGHAR HILLS, PAKISTAN

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ABSTRACT

The Torghar Conservation Project (TCP) is a private conservation programme founded in 1986 following consultation by local Pathan tribal leaders and professional wildlife biologists from the USA. The TCP originally had as its main objective the restoration and conservation of the Suleiman markhor, Capra falconeri megaceros*, and the Afghan urial,* Ovis orientalis cycloceros*, on Pathan tribal lands in the Torghar Hills of Qilla Saifullah District, Balochistan, Pakistan. Other objectives, some of which are in the process of implementation, have been adopted later. These include important social and economic welfare programmes for the people of the TCP area and play a vital role in creating the incentives for the involvement of the tribesmen and their families in conservation. Schools and a Medical Centre have been set up and agricultural assistance also has been provided. This paper describes the TCP protected area and the successful restoration of valuable populations of markhor and urial after the imposition of a total ban on hunting and the recruitment of 64 local Game Guards and 10 other staff. Trophy hunting, which provides the majority of the TCP funding, has been introduced and a small, conservative annual harvest of markhor and urial is now permitted. Some additional financial support has also been contributed by international conservation organisations. Following upon five years (1997-2001) of severe drought, which greatly reduced the numbers of their livestock, the local people within the TCP area have decided to develop and introduce a sustainable management plan for their livestock, wildlife and range-land resources. This plan involves sustainable range management, wildlife conservation and a community-based veterinary service.*

I. INTRODUCTION

The local Kakar tribesmen, who live in the Torghar Hills of Balochistan, Pakistan, are semi-nomadic and are almost entirely dependent on domestic livestock, comprising large flocks of sheep and goats. Each year in early spring, most of the Kakar herdsmen, along with their families, move away to the north along traditional migration routes. Other tribal groups follow the same migratory pattern, accompanied by up to two millions of sheep and goats. These transhumants pass through the Torghar Hills twice a year, and grazing pressure is intense during these biannual migrations.

The Suleiman markhor, *Capra falconeri megaceros*, and the Afghan urial, *Ovis orientalis cycloceros*, are largely sedentary in the area of the Torghar Hills. In the 1950s the mountains of northern Balochistan were rich in wildlife and held significant populations of these two species. Due to uncontrolled hunting, by the mid 1980s the total combined population of markhor and urial was estimated at about 200 heads (JOHNSTON, 1997a). Therefore, these two species were threatened of extinction, due to both poaching and competition for grazing with livestock, and there was a need to manage the wildlife and the livestock.

The tribal lands in Balochistan are largely autonomous and are beyond the effective control of the federal and provincial governments. They are governed by tribal law in most matters, including access and permission to hunt, although wildlife is nominally controlled by the Provincial Administration. However, while the Provincial Forest Department is technically responsible for wildlife management in the Torghar Hills, it has been unable to fulfill its duties satisfactorily. The Torghar Conservation Project (TCP) was originally conceived and developed in 1985 to address this problem. It had the restoration and conservation of the Suleiman markhor and the Afghan urial as its main objective, and at the same time to develop some welfare programmes for the people of Torghar.

In this paper we present (1) the context of the TCP, (2) the realizations of the TCP improved by an NGO, called the Society for Torghar Environmental Protection (STEP), created for the purpose of managing the TCP as a community-based, government-recognised, and non-profit conservation organization, and (3) the future threats to the wild caprines and the remedies.

II. THE TORGHAR-CONSERVATION-PROJECT CONTEXT

II.1. THE PROTECTED AREA

Location, surface and topography

The TPC protected area is located in the Torghar Mountains (Black Mountains) in the Toba Kakar Range (31°12'N, 68°28'E). They are a chain of rugged sandstone ridges, approximately 90 km long and 20-25 km wide.

The lack of good topographical maps at the 1:25,000 to 1:50,000 scales has presented a constant problem for the estimation of the TCP protected area, developing accurate surveys and conducting land-use planning. Using

1:50,000 maps, JOHNSON (1997a) estimated the area of the TCP area to be about 1,000 km^2. However, in 2001 the survey team, using a 1:250,000 map, and traveling the boundaries using a GPS, clearly defined the boundaries and estimated the TCP protected area to be 642 km^2. The area of the markhor habitat currently unprotected was further estimated to be 207 km^2 (FRISINA *et al.*, 2002). Negotiations are underway to allow the inclusion of this area into the TCP, along with several adjacent tribal areas, which support further populations of Suleiman markhor and Afghan urial, and where the tribes' people are anxious to join the TCP. JOHNSON (1997a) described a "Core Protected Area" within the TCP area to comprise about 300 km^2 embracing three parallel ridges separated by two northeast draining streams. This important area is regularly patrolled by TCP Game Guards.

The altitude varies between 2,500 m and 3,300 m. The southernmost ridge has a north-facing slope that gradually rises to 2,800 m and is dissected by several deeply incised drainages. The south-facing slopes drop precipitously from the crest forming a series of step-like cliffs to the Khaisore Valley. The northern ridges consist of steep, upturned rock strata resembling a series of parallel, jagged toothcombs.

Climate and vegetation

The area is characterised by dry cold winters (average mean temperature 4°C) and warm summers (average mean temperature 26 °C). Heavy snow often falls in winter and violent thunderstorms and dust storms occur in summer. Total annual precipitation is between 180 mm and 270 mm (SUPERINTENDENT OF GOVERNMENT PRINTING, 1991). From the winter of 1997 to April 2001 there was almost no rainfall and little snow in the Torghar Hills and the consequent drought had severe effects on the livestock of the area. The wildlife was affected to a lesser extent.

Shrub-steppe plant communities dominate the semi-desert landscape of the Torghar Hills. Bunchgrasses, forbs, wild almond *Amygdalus brahnica* trees, *Ephedra* sp., *Artemisia* sp., and other shrubs occur on the upland slopes. *Cargana* sp. and *Tamarix* sp. are growing in low lying areas and drainage lines where water is available. Trees are scarce but juniper, *Juniperus macropoda*, wild pistachio trees, *Pistacia khinjuk*, and almond trees are scattered across the landscape (FRISINA, 1998). The TCP area lies within the “Balochistan juniper and pistachio scrub forest” and the “arid subtropical habitat” described by ROBERTS (1997). The Balochistan Gazetteer (SUPERINTENDENT OF GOVERNMENT PRINTING, 1991) provides a general description of the flora of the Balochistan Province.

II.2. PEOPLE AND ECONOMY

The total human population of the TCP area in the Torghar Hills comprises about 4,000 members of the Kakar tribe. Most of the +/- 400 families have permanent houses in the mountains while some family members move around seasonally with their flocks. The largest village is Tanishpa with about 25 households. The Torghar Hills lie across several traditional migration routes that are followed by the local Torghar herdsmen and other Pathan tribes on their seasonal treks between the Afghan plains, where some of them

spend the summer, and the winter grazings in the Torghar Hills and to the south. The numbers of these transhumants are estimated to be about 200,000, accompanied by up to 2 million heads of livestock. Almost every adult man is armed and they hunt large and small game during their seasonal migrations. The Game Guards of the TCP effectively control this poaching within the TCP area.

Torghar society is marked by extreme poverty. There are almost no sources of permanent or temporary employment in Torghar, apart from the jobs provided by the TCP. A little agriculture has been developed at Tanishpa where there is some level ground and a source of water for irrigation. Crops grown include grains, alfalfa, almonds and apricots. Many wild products, pistachio nuts, wild rhubarb, *Rheum* sp., and other edible plants are collected. The wild pistachio tree is a main source of fuel, food and income. Unfortunately the wild pistachio trees are badly damaged by porcupines, *Hystrix indica*, whose population has greatly increased since the local extermination of the leopard, *Panthera pardus*.

The local Kakar tribesmen are semi-nomadic and are almost entirely dependent on domestic livestock, comprising large flocks of sheep and goats and a few donkeys and camels for their survival. Small numbers of cattle and horses are also kept. The size of the flocks of sheep and goats depends on the affluence of the owner and the season. There has been a recent upward trend in the numbers of livestock that poses a direct threat to the ecology of the habitat and its biodiversity. There has also been a concurrent abandonment of the traditional "Pagor" system of rotational grazing of common pastures.

Each year in early spring, most of the Kakar herdsmen, along with their families, move away to the north along traditional migration routes, out of the Torghar Hills and into the plains of Kakar Khorasan. Nearly 20 other tribal groups from nearby areas, said to number over 200,000 people, follow the same migratory pattern, accompanied by up to two millions of sheep and goats. These transhumants pass through the Torghar Hills twice a year on their way to and from their tribal summer pastures in Khorasan and further north in Afghanistan. While grazing pressure is intense during the biannual migrations, once these are over in the spring, the ranges of Torghar are almost devoid of livestock during the dry summer months. On their return in autumn, the local tribesmen graze their domestic livestock on the valley floors and on the lower slopes of the Torghar Hills throughout the winter.

The resident population of domestic sheep and goats within the TCP/STEP area is said to approach +/- 40,000 heads after good rains. However, in 1999, when there had been very little rain in the three previous years, a limited survey of 245 (out of a total of about 400) households indicated that their domestic livestock population had fallen to 34,624 sheep and goats, 125 cattle, 184 camels, 22 horses and 618 donkeys (RAJA, 2000).

A further survey carried out in May 2000, while the drought was still having a marked impact, revealed that the livestock numbers held by the same 245 households had further declined to 24,298 sheep and goats, 119 cattle, 184 camels, 22 horses and 562 donkeys (RAJA, 2000). By April 2001, it was estimated that only about 17,000 sheep and goats, owned by the 245 households, had survived. The impact on other domestic animal species was not as severe (FRISINA *et al.*, 2002).

II.3. WILD FAUNA

General wild fauna

In the 1950s the mountains of northern Balochistan were rich in wildlife and held significant populations of Suleiman markhor, Afghan urial, leopards, Asiatic black bears, *Ursus thibetanus*, etc. Due to uncontrolled hunting, accelerated by the easy availability of cheap automatic weapons from the political unrest in Afghanistan, the leopard and the black bear, were either wiped out or were on the verge of extinction in the Torghar Hills by the mid 1980s, and the total combined population of markhor and urial was estimated at about 200 heads (JOHNSON, 1997a).

There now remain small populations of the following species: Suleiman markhor, Afghan urial, wolf, *Canis lupus*, hyaena, *Hyaena hyaena*, fox, *Vulpes vulpes* and *V. cana*, Pallas's cat, *Felis manul*, steppe wild cat, *F. sylvestris ornata*, and stone marten, *Martes foina*. The porcupine, which in the past was controlled by the leopard, is now a serious agricultural pest. However, the TCP is prepared to help reintroduce the leopard if the people wish it. Small mammals include the pika, *Ochotona rufescens*, and the Afghan mole vole, *Ellobius fuscocapillus*. About 78 bird species have been recorded, many of which breed in the area. The area is rich in reptiles, including the horned viper and the leaf-nosed viper.

Suleiman markhor and afghan urial

The biology (population dynamics, genetics, habitat requirements and disease situation) of the Suleiman markhor and the Afghan urial in the Torghar Hills have not been studied in any great detail, but they are well enough understood to allow conservative management of their populations and habitats (FRISINA *et al.*, 1998; FRISINA, 2000; FRISINA *et al.*, 2002).

The markhor and urial in the area are largely sedentary, although extensive local movements occur when prompted by deteriorating grazing conditions or disturbance. The Afghan urial is more widespread than the markhor in Torghar and has a greater tendency to travel through the mountain range, using the long, open ridges as corridors. Markhor are said to prefer the most rugged areas with bare screes, rock faces and precipitous cliffs, interspersed with patches of vegetation. However, habitat usage by the two caprines is not mutually exclusive and there is a considerable overlap (WOODFORD, 1997; FRISINA, 1997).

III. REALIZATIONS OF THE TORGHAR CONSERVATION PROJECT

III.1. MARKHOR AND URIAL POPULATION MANAGEMENT

Since its inception, the TCP (later managed by STEP) has achieved an almost complete cessation of unauthorised hunting of markhor and urial by both local tribesmen and outsiders throughout the TCP protected area (JOHN-

SON, 1997a). This has been accomplished because Torghar is a tribal society and the tribal chieftains have given their full support to a hunting ban. As a result, the markhor and urial populations of the TCP area, which were almost exterminated by 1983-1984, have grown steadily and continue to do so.

From 1985 to 1999, several surveys have been carried out to determine the population status of the Suleiman markhor and Afghan urial in the Torghar Mountains (JOHNSON, 1997a, 1997b; FRISINA *et al.*, 1998; FRISINA, 2000; FRISINA *et al.*, 2002). A further survey, planned for November 2004, has been postponed until April 2005 for security reasons. All surveys have been conducted during the rut in November, were supervised by biologists sponsored by the US Fish and Wildlife Service and were accompanied by the TCP Game guards. Torghar's markhor and urial populations in the whole TCP area have recently (November 1999) been estimated at 1,684 and 1,742 respectively (FRISINA, 2000).

Thus a sustainable trophy harvest of markhor could be up to 18 trophy males a year and up to 13 for the urial. In the past, while their populations have been steadily increasing, harvest levels at Torghar have not been more than three markhor and four urial in any one season. Since the markhor and urial have polygynous mating systems, the populations' overall reproductive rate would be little affected by the loss of a small number of adult males (CAUGHLEY, 1977).

At present STEP/TCP receives two markhor and five urial permits per annum from the Pakistan National Council for Conservation of Wildlife (NCCW). The urial permits are often not used because of the current political situation and the high price of the urial trophy in comparison with the rates for the same or similar species in Central Asia. Current trophy hunting has had no impact on the ability of the Torghar markhor and urial populations to increase the male population segment. For similar species and populations, HARRIS (1993) concluded that the annual harvests of trophy males could be equivalent to one or two percent of the total population without negative consequences. The harvesting of males within a limit of 10 to 20 percent of the replacement of the trophy-sized segment is considered by WEGGE (1997) to be a safe and conservative harvest level for stable or increasing wild sheep and goat populations. Harvest levels at Torghar have thus been conservative.

In 1992, the Suleiman markhor was placed on Appendix 1 of CITES (Convention on International Trade in Endangered Species of Wild Species). Appendix 1 includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. In 2000, the Afghan urial was placed on Appendix 11 of CITES. Appendix 11 includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. The Suleiman markhor is currently listed as Endangered by the United States Fish and Wildlife Service (USFWS) under the Endangered Species Act, and at present (2004) permits cannot be issued for the import of trophies from this species into the United States of America. Attempts are at present being made to have the markhor downlisted to "Threatened" which would enable a limited number of markhor trophies to be imported into USA.

III.2. FUNDING, AND DEVELOPMENT AND WELFARE PROGRAMMES

The TCP/STEP has been self-sufficient since its creation and has depended almost entirely on revenues derived from limited trophy hunting fees paid by international sportsmen. However, throughout the 19 years of the TCP's existence in Balochistan, the United States Fish and Wildlife Service, Office of International Affairs has provided much valuable technical assistance without any cost to the Project. The TCP has also received grants from the World Wildlife Fund-Pakistan, the Houbara Foundation, Safari Club International and the United Nations Development Program (UNDP) Small Grants. A Global Environment Fund (GEF) Medium-sized Project "Conservation of Habitats and Species in Arid and Semi-arid Ecosystems in Balochistan" has recently been approved and is ready for implementation in the Torghar Mountains and the Chagai Desert.

The development and welfare programmes initiated by TCP/STEP included the construction of water tanks, dams and irrigation channels to provide water for the people and livestock during droughts. Young fruit trees have also been supplied to those who live in suitable places. A Medical Camp has set up by TCP/STEP at Torghar, especially for those women, children and the elderly who are unable to travel the 90 km to Qilla Saifullah or to Quetta.

Funds are also made available each year by the TCP for emergency drought relief, the provision of tents and food and for those families in need of immediate financial support. Over sixty local Pathan tribesmen are currently employed as Game Guards with salaries and benefits derived directly from the TCP/STEP. The TCP/STEP has thus succeeded in providing considerable social and economic incentives for the Kakar people of the Torghar Hills to manage their domestic livestock sustainably and to conserve their wildlife wisely.

IV. FUTURE THREATS TO THE WILD CAPRINES AND REMEDIES

There are, however, some possible future threats to the populations of wild ungulates in the Torghar Hills. These include competition for grazing by uncontrolled numbers of domestic livestock (some purchased with money acquired from the trophy-hunting programme), and the possibility of disease transmission from livestock, particularly those of the nomads from Afghanistan, to the wild caprines (WOODFORD, 1997). These threats are particularly severe during periods of drought when contact between wild caprines and domestic livestock at water points or on the higher pastures is more intimate and frequent.

Any substantial increase in the numbers of domestic sheep and goats grazing the Torghar Hills in winter could severely compromise the continued expansion of the valuable markhor and urial populations. Marketing of surplus livestock in the fall is said to be difficult and sometimes this results in more animals being overwintered on the over-grazed ranges than is desirable. Thus improved marketing and slaughter facilities are needed.

In 2001, following five years of severe drought, the local people of the Torghar Hills, in consultation with the TCP/STEP and with external advisors supplied by the USFWS, made the decision to tie their future more to the management of their valuable wildlife populations and less to traditional livestock production. As a result, they have decided to undertake a new system of conservative range management that emphasizes flock-size reduction and maintenance at the "drought level," and thus the protection of the markhor and urial populations from competition for forage, especially in winter.

IV.1. COMPETITION FOR GRAZING AND RANGE MANAGEMENT

Two land use types have been identified within the TCP area. The Type 1 recognises an area reserved for wildlife alone and Type 2 is set aside for sustainable use by both domestic livestock and wildlife. These areas are designed to provide year-round habitat for both markhor and urial. The local herdsmen of Torghar have agreed to work towards the cessation of livestock grazing in these areas and have, except for a few instances during the recent drought, avoided grazing these areas for several years.

It is very important that the herdsmen understand and agree with the necessity to allow the forage plant communities periodic rest from grazing during the growing season so that the plants can perform their essential biological processes of photosynthesis, food storage in roots, seed production etc. (FRISINA, 1989; FRISINA *et al.*, 2002).

The new strategy for range management will include the reintroduction and implementation of the "Pagor" rotational grazing system. This system will be adapted to maintain the soil and vegetation in harmony with the wild and domestic ungulates.

IV.2. DISEASE TRANSMISSION AND ANIMAL HEALTH SERVICE

Since it is impossible to vaccinate wild caprines against the common diseases of sympatric domestic sheep and goats, strategic veterinary extension work for the domestic livestock is needed to ensure that the available vaccines and drugs are used to the maximum economic and strategic advantage to immunize and treat the livestock. A number of infectious diseases, some of which could be transmissible to the markhor and urial, frequently afflict the domestic livestock of Torghar. These diseases include: Contagious ophthalmia, Foot and Mouth Disease (FMD), *Peste des petits ruminants* (PPR), Contagious caprine pleuropneumonia (CCPP), Anthrax, Contagious ecthyma, Sheep and goat pox and Sarcoptic mange (TAJ MUHAMMAD, pers. comm. 1997).

There is at present no evidence of disease transmission from the domestic livestock to the wild Caprines. However, it must be recognised that there is little to be gained from improved veterinary care of the domestic livestock if this results in more under-nourished sheep and goats continuing to over-graze the range, especially in winter. It is thus of supreme importance that the livestock numbers are strictly controlled and that the veterinary service demonstrates that livestock productivity from a smaller, healthier flock is greater than that derived from a very large flock managed in the traditional manner.

The provision of a Community-based Animal Health Service for the domestic livestock within the TCP/STEP area has been discussed and agreed with the herdsmen. This service will involve the selection, training and equipping a small number of young, local tribesmen to act as "Barefoot Vets" throughout the Project area. These young men will travel throughout the TCP area on donkeys or camels and will undertake a strategic vaccination programme for sheep and goats and will administer appropriate anthelmintics (WOODFORD, 1997; FRISINA *et al.*, 2002).

It is plain that any veterinary intervention must be conditional on agreed and implemented range and livestock management policies that will also minimise contact between the wild caprines and the domestic livestock. There is evidence that the tribal herdsmen and their leaders understand this and will be prepared to cooperate if presented with logical overall management plans designed specifically for the sustainable maintenance of their environment upon which they, their livestock and their wildlife resources so precariously depend.

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The TCP was founded in 1985 through the efforts of the local Pathan tribal chieftain, the late Nawab Taimur Shah JOGEZAI and of Sardar Naseer TAREEN, in consultation with wildlife biologists from the United States of America (JOHNSON, 1997a). Up until April 1994, Sardar TAREEN and members of the local Pathan ruling family, the Jogezais, executed the programme. At that time, Sardar TAREEN and his associates also formally established the Society for Torghar Environmental Protection (STEP). Much of the material used in this paper has been gleaned from the Torghar Conservation Plan 2003 (Society for Torghar Environmental Protection, 65, 3rd Floor, Regal Plaza, Circular Road, Quetta, Balochistan, Pakistan).

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PROJET DE CONSERVATION DU TORGHAR : GESTION DU BÉTAIL, DES MARKHORS DE SULEIMAN (*CAPRA FALCONERI*) ET DES URIALS D'AFGHANISTAN (*OVIS ORIENTALIS*) DANS LES MONTAGNES DU TORGHAR, PAKISTAN

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MOTS-CLÉS: Markhor de Suleiman, *Capra falconeri megaceros*, urial d'Afghanistan, *Ovis orientalis cycloceros*, bétail, conservation, gestion du bétail et des habitats, service vétérinaire, Balouchistan, Pakistan.

RÉSUMÉ

Le projet de conservation du Torghar (TCP) est un programme de conservation privé, fondé en 1986 après consultation des chefs des tribus Pathans et des experts biologistes de la faune des Etats-Unis. Le TCP avait comme objectif initial principal de restaurer et de conserver le markhor de Suleiman, Capra falconeri megaceros*, et l'urial d'Afghanistan,* Ovis orientalis cycloceros*, sur les terres tribales des Pathans dans les montagnes de Torghar du district de Quilla Saifullah au Balouchistan (Pakistan). D'autres objectifs, dont certains sont en cours de réalisation, ont été fixés par la suite. Ces objectifs comportent des programmes importants d'aide sociale et économique aux populations concernées par le TCP et jouent un rôle vital d'incitation des hommes de la tribu et de leur famille à s'impliquer dans la conservation. Des écoles et un centre médical ont été construits et une assistance agricole a aussi été fournie. Cet article décrit la zone protégée du TCP et la restauration réussie de populations conséquentes de markhor et d'urial après l'imposition de l'arrêt total de la chasse et le recrutement*

de 64 gardes-chasse locaux et de 10 autres personnes. La chasse sportive, qui fournit la plus grande partie du financement du TCP, a été introduite, et un petit prélèvement durable de markhor et d'urial est maintenant autorisé chaque année. Une aide financière supplémentaire a aussi été fournie par des organisations internationales de conservation. Suite à cinq années de grande sécheresse (1997-2001), qui ont sérieusement réduit la quantité de bétail, les populations locales de la zone du TCP ont décidé de développer et d'introduire un plan de gestion durable pour leur bétail, pour leur faune sauvage et pour leurs ressources naturelles présentes dans l'habitat. Ce plan implique une gestion durable de l'habitat, la conservation de la faune sauvage et un service vétérinaire géré par les communautés.