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Conservation model for the Persian leopard

Lessons learned from Sarigol National Park, northeastern Iran

The endangered Persian leopard *Panthera pardus saxicolor* has recently attracted numerous research efforts in Iran; however, it is highly important that research projects support and improve the conservation status of the cat's habitats. Established in 2005, the Project Persian Leopard in Sarigol National Park is the oldest, but still ongoing, effort in Iran to save the species. It is composed of three main strands which aim to promote conservation of the area. Ecological research was mainly conducted within the national park to explore population parameters, food habits, reproduction, and prey demographics. At the same time, research was carried out in local communities, a partnership was formed with local stakeholders and educational programs were implemented. Finally, the project results were reported to the Department of Environment for consideration in formulating protection measures.

The Persian leopard once had a wide distribution in western Asia, from the Caucasus through Iran to Afghanistan, Pakistan and Turkmenistan (Nowell & Jackson 1996); however, it is 'guesstimated' that 871 to 1290 animals are at present left within its former range (Khorozyan et al. 2005). The range of the leopard is still known to include large areas of Iran, and it was 'guesstimated' that there were 550-850 specimens in the country (Kiabi et al. 2002). Accordingly, it seems that more than two thirds of the wild population of Persian leopards occurs in Iran.

As an endangered subspecies (IUCN 2008), the Persian leopard was formerly abundant across most mountain and forest habitats of Iran, but it is now decreasing in most of its range, mainly because of poaching, conflict with local people and loss of habitat (Kiabi et al. 2002, Farhadinia et al. 2009a).

Although a number of research-based projects have recently been implemented, most of these have failed to publish their results nationally or internationally and their outcomes have rarely been translated into an improved conservation status of the animal in the area.

Northeastern Iran still holds some of the highest density populations of the Persian leopard, including Sarigol National Park (SNP) which is well known for its leopard population (Bijani 1997). As the oldest continuing leopard project in Iran, Project Persian Leopard in SNP was initiated in 2005, its aims being to obtain a base of scientific knowledge about Persian leopard ecology and population status and to enhance the conservation status of the Persian leopard in SNP.

We report briefly the trends, achievements and outcomes of the first half-decade of the project. It is hoped that this multi-disciplinary conservation approach could be applied as a model for other Persian leopard habitats within the country as well as abroad.

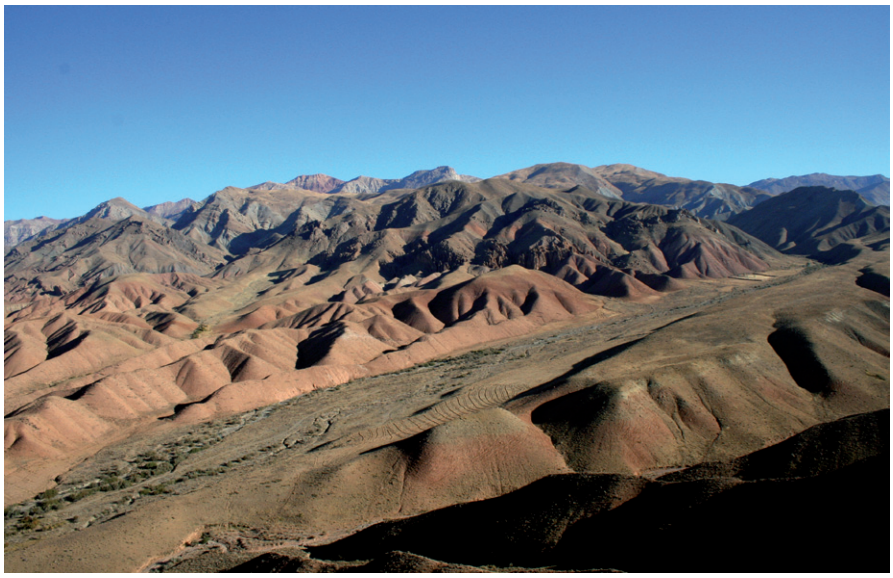

Fig. 1. Landscape of Sarigol National Park (Photo M. Farhadinia).

Project Site

With an area of more than 7,037 ha, SNP is located some 20 km east of the city of Esfarayen, North Khorasan Province. It was part of Sarigol Protected Area, which was established in 1973, and was then separated and promoted to national park status in 2002 by the Iranian Department of Environment (DoE). The altitude range of 1,400-2,940 m, mean annual temperature of 14° C and annual precipitation of 273 mm give the region a temperate semi-arid climate (Darvishsefat 2006). The area is mainly composed of hilly terrain fading to high rolling mountains aligned in a north-south direction. Highest elevations can be found in north central parts of the park (Fig.1).

The main ungulate inhabiting the area is the Urial sheep *Ovis orientalis* together with a low density of wild boar *Sus scrofa* and occasional sightings of wild goat *Capra aegagrus* outside the SNP boundaries. Stone marten *Martes foina*, grey wolf *Canis lupus*, red fox *Vulpes vulpes*, manul *Otocolobus manul* and Asiatic wild cat *Felis sylvestris ornata*, as well as Persian leopard, are the main representatives of the order Carnivora confirmed in the area.

Steps to Conservation

The Project Persian Leopard in the SNP was planned as a multi-disciplinary conservation project with three functional aspects:

Step 1: Ecological Surveys

Basic ecological data are of great significance in developing conservation projects. Because of the scarcity of information on various aspects of Persian leopard ecology, collecting this data was emphasized as an important objective of the project.

Understanding the position of the SNP leopard population in relation to other Iranian leopard populations was essential, and this was studied through genetic and craniometric analysis (Farhadinia 2010). Moreover, the government has often considered SNP as one

of the best reserves in which to release problem leopards captured in other habitats, so it was important to be aware of the genetic status of the SNP leopard population.

We used scat analysis and kill monitoring to investigate the leopard's diet and prey preferences (Maheshwari 2006). At the same time the kills provided useful information pertaining to prey selection, while the scat samples were also analysed for parasites (Rohani unpublished report).

In order to monitor leopard population trends, camera trapping was used, a technique described by various authors (e.g. Karanth et al. 2004, Ghoddousi et al. 2008). In order to implement the procedure effectively, we followed the guidelines set out by Henschel and Ray (2003) and Sanderson (2004). Accordingly, we identified leopard trails during continuous tracking over a period of one year. Camera trapping was carried out at 12 stations across SNP for a duration of 90 days during two consecutive winters (2006-2007 and 2007-2008). Capture-recapture models were used to estimate the leopard population for each sampling season independently. A total of 6 adult leopards were photo-trapped in the area (4 males, 1 female and one animal with unknown gender, seemingly an adult male; Fig. 2 and 3). Unfortunately one male was poached in August 2006. Although we failed to confirm presence of cubs using camera traps, our continuous tracking proved the existence of one cub in 2005 and two cubs in 2007 within SNP. Reproductive ecology, a critical parameter in establishing population trends, was also studied (Farhadinia et al. 2009b).

The Urial sheep as the main ungulate in SNP was studied, with emphasis on demographic aspects (sex and age composition, group size, etc.). The DoE also conducts an ungulate census to update population size once to twice a year.

Step 2: Local Empowerment and Participation

SNP is surrounded by around 20 villages and the city of Esfarayen. As the first stage, it was considered essential to prepare a baseline composed of socio-economic data on the circumstances of local communities. The baseline was later used to identify the most relevant targets and stakeholders and their needs. Also, research was carried out in the area and nearby cities to identify NGOs that could be involved in data gathering and so make public awareness efforts more effective. Their capacity for partnership in a local participatory approach was evaluated according to their previous activities, organizational structures and interests.

Fig.2. An adult female in Sarigol National Park in March 2007 (Photo Iranian Cheetah Society).

Negotiations were held with local government authorities and important companies to illustrate the project objectives. As a result, we were successful to raise additional funds from local authorities for local educational purposes.

As a result, a local NGO, the Forough Women's Society of Esfarayen, was recognized as eligible to participate in the project. Their volunteers received training related to the leopard by conservation educators from the Iranian Cheetah Society (ICS) and game guards and they had a chance to visit the area to gain more practical knowledge. Finally, a Coordination Core Group was formed to design and implement educational activities.

The Group developed lesson plans and designed two educational manuals for local students, specifically for primary and high schools (available at www.wildlife.ir). Also, a number of educational materials were designed for dissemination among local people. According to local inquiries, livestock depredation by leopards is not significant in SNP, but it is more common outside the park. This conclusion was also confirmed by scat analysis (Farhadinia & Mahdavi 2007). As a consequence, prey-poaching by people from marginal villages to SNP was identified as having the highest priority for public awareness efforts. Therefore, nine villages were selected for educational activities in the first phase.

Public meetings and workshops were held in local communities to discuss the leopard, mainly in schools and in accordance with Ministry of Education. We found that a combination of educational procedures was highly useful (e.g., events, games, leopard theatre, etc.). Particular attention was paid to highlighting the role of game guards in protecting SNP and the leopards.

A number of art and cultural events were organized for people living in the city of Esfarayen in close partnership with the city Governor's Office as well as the Municipality.

Step 3: Law Enforcement

This is normally a government task carried out by the Iranian DoE through enhancing the conservation status of habitats and establishing conservation units inside the reserves.

Our surveys revealed that the leopards mainly prey on Urial sheep, especially males, in SNP (Farhadinia & Mahdavi 2007). The DoE used to issue legal permits to hunters, so our data was presented to the decision-makers to reconsider the question of hunting permits as these are only issued for adult rams. However, a low number of hunting permissions is still issued for the protected area as well as areas around the SNP.

The North Khorasan DoE is trying to increase protection facilities in the area, and special attention has been paid towards Sarigol Protected Area which is the most important buffer zone adjoining the national park.

It is recommended to regularly train the game guards in workshops, where they can discuss findings and get mutual feedback in order to increase their knowledge about the species.

Fig. 3. A pair of Persian leopards during the mating season in February 2007 in Sarigol National Park (Photo Iranian Cheetah Society).

After the First Half-decade

The Sarigol Leopard Project has been a mid-term effort for conservation of the endangered leopard in one of the species's hotspots in the northeast of the country. Undoubtedly, the final success of this project will best be judged on the basis of its conservation achievements in securing the long-term future of the leopard in the area.

Since 2006, when an adult male was killed by local people, no leopard has been reported to have been poached within the national park. Previously, Urial, the main prey of the leopard, were more concentrated around the central game post, mainly because of active poaching throughout SNP, but, as a result of significant anti-poaching activities in recent years, they are now more widespread across SNP, which increases prey availability for the leopards. The number of game posts has been increased from two to four (one temporary seasonal post in high elevations) within the national park and the protected area, and the DoE plans to establish a visitor centre and museum to educate local people and visitors. Also, the project has had a significant role in enhancing our knowledge of the Persian leopard's ecology and population trends in Iran. Moreover, a few university theses have been conducted within the area at graduate/postgraduate levels. The DoE has approved compilation of Sarigol Mass Plan into which the results of Project Persian Leopard in the SNP can be integrated.

Local communities around SNP are now more familiar with the leopard through various educational activities. Also, the DoE has produced a documentary movie about SNP to be broadcast on national TV and disseminated among local people. Meanwhile, the ICS has initiated a new film focused on the Persian leopard. The local NGO that was empowered during this project tried to continue with its plans to concentrate on other environmental issues and is trying to establish itself with local objectives and funding. Also, the area has been advertised in the Iranian mass media several times with the aim of drawing the attention of national and local authorities to supporting conservation.

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Leopard conservation in the Caucasus

The leopard *Panthera pardus* is a Critically Endangered flagship species of the Caucasus. In 2007, conservation experts and institutions from all six Caucasian countries joined to develop a Strategy for the Conservation of the Leopard in the Caucasus Ecoregion, based on a review of the status of the leopard population and its prey (Cat News Special Issue 2, 2007). Now, three years later, the IUCN/SSC Cat Specialist Group, WWF and NACRES organised a discussion group at the annual conference of the International Bear Association IBA in Tbilisi, Georgia. The meeting was part of the symposium "Large Carnivores in the Caucasus", organised and supported by the Secretariat of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The leopard is listed as a strictly protected species in Appendix II of the Bern Convention. The aim of the meeting was to discuss the status of the leopard, the implementation of the Strategy and next steps with wildlife conservationists from the Caucasian countries.

The Strategy has so far been endorsed by the relevant authorities of four countries, Georgia, Azerbaijan, Armenia, and Turkey. The participants from the six counties presented a brief review of the situation of the leopard and leopard conservation activities.

Russia. No representative from Russia attended the Tbilisi meeting. Russia has both a National Strategy and a National Action Plan for the conservation of the Persian leopard (V. Krever, pers. comm.). According to recent information from Russian colleagues (V. Rozhnov, V. Lukarevski, V. Krever, pers. comm.), the breeding and rehabilitation facilities at the Sochi reintroduction site are ready, and four leopards (two males from Turkmenistan and two females from Iran) are at the site. However, the suitability of the specimens as founders for a captive bred population for future releases is questionable. More founder individuals either from the conservation breeding programme of EAZA or from the wild are needed. The participants of the Tbilisi meeting expressed the wish that the Russian reintroduction programme should become a part of the common effort for the conservation of the leopard in the whole ecoregion. Without any doubt, the best source would be the population in NW Iran, which is at the same time the only source population for a natural recolonisation of the Caucasus.

In Daghestan, initial works by means of camera-trapping was conducted by colleagues from Daghestan Center of Russian Academy of Sciences (Yuri Yarovenko, pers. comm.). Obviously cross-border cooperation with Georgia could provide more precise information regarding leopard. Current political circumstances make cooperation on governmental level difficult, but technically coordinating the efforts of NGOs and scientists is realistic.

Georgia. Camera-trapping based monitoring started last year in Tusheti region of Georgia, Eastern Greater Caucasus – bordering to Daghestan, Russian Federation. This region (Tusheti, Khevsureti, Daghestan) was identified as an area of a leopard sub-population in the Caucasus (see Status Report). In Tusheti, NACRES conducts this work with support of WWF, the Agency of Protected Areas and Tusheti National Park staff. The male leopard "Noah", pictured regularly for several years in Vashlovani NP, was not discovered in 2001. In April 2009, the WWF Caucasus Programme Office and NACRES organised a workshop to develop a national action plan, the Leopard Conservation Action Plan for Georgia. The meeting hold in Tbilisi united 20 participants representing the Agency for Protected Areas, National Park Administrations, Institute of Zoology, Biodiversity Protection Service of the Ministry of Environment, several NGOs, Ilia State University, IUCN South Caucasus Office, and various interest groups. The National Action Plan was submitted to the national authorities, but is not yet officially endorsed.

Azerbaijan. Azerbaijan has started to do opportunistic surveys in various known or expected leopard areas in the south and northwest of the country. The efforts have confirmed the presence of leopards, but the exact distribution, the number of specimens and the travel routes are not know. The capacity for a systematic surveillance is lacking. Azerbaijan's ministry of environment has developed a National Action Plan for the conservation of the leopard (Ministerial Decree N 514/U from 14.09.2009). No scheme for compensation of livestock attacks by leopard has been established, because this task proved to be politically delicate. The most important advance has been made in establishing protected areas. Since 2000, the total area under protection has increased from 4780 km² to 8551 km².

Armenia. The National Action Plan for Leopard Conservation in Armenia, based on the ecoregional strategy, was developed in winter 2008 and endorsed by the Ministry of Nature Protection in spring 2009. One of the important issues is to improve the monitoring of leopards in Armenia, which is however hampered by methodological flaws and budget restrains (I. Khorozyan: A brief concept on how to bolster up the leopard monitoring in Armenia and adjacent countries of the Caucasus ecoregion, unpublished report 2010). As the survival of leopards in Armenia clearly depends on immigration of individuals from Iran, a close cooperation regarding monitoring and conservation between these two countries is ultimate.

Iran. Based on the IUCN Red List (www.iucnredlist.org), more than 65% of wild Persian leopards live in Iran. According to the last status assessment, at least 500 leopards exist in Iran, of which 10–20% in NW Iran. More than 10 areas are confirmed to hold leopards; most are officially conserved by the Iranian Department of Environment. Recent food habits surveys conducted by the Iranian Cheetah Society (ICS) in northern Iran revealed that predation on livestock leads to high conflict with local people and is the main cause of mortality for leopards even within protected areas. 75% of poached animals discovered are males, mainly young and old individuals, apparently occupying home ranges outside the area of the established population. Presently, genetic investigation is ongoing on the Persian leopards, and various research and educational efforts are aiming to conserve the species in Iran.