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# news



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Original contributions and short notes about wild cats are welcome

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**Cover Photo:** First photographic evidence of a Pallas's cat in Bhutan. The animal was captured in Jigme Dorji National Park on 17.11.2012  
Photo: Jigme Dorji National Park

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# First radio-telemetry study of snow leopards in Afghanistan

**We report on the first snow leopard *Panthera uncia* telemetry study ever conducted in Afghanistan and the only major research effort of its kind presently carried out in the country. Between May and September 2012 we captured and fixed GPS telemetry collars on two male and one female snow leopard in the Hindu Kush mountain range of Wakhan District, Badakhshan Province in Afghanistan. The specific aims of this study are to determine ranging patterns and habitat preferences of the species, and better understand the prevalence of and reasons for livestock predation.**

A proliferation of modern weaponry combined with the disruption of traditional management of natural resources in a society war-torn for the last 30 years have imperilled wildlife in Afghanistan (Smallwood et al. 2011). The population size of snow leopards in Afghanistan is not known, but figures range between 50 and 200 animals. However, this is based entirely on an estimate of appropriate habitat and the likely density of snow leopards, not actual data. In addition it is believed that the population trend is steadily decreasing (McCarthy & Chapron 2003, Habib 2008). As in most parts of its range, the largest threats to the survival of this species in Afghanistan are hunting, declines in prey species, and retaliatory killing in response to livestock depredation (Simms et al. 2011). Wakhan District in the remote far north-eastern province of Badakhshan (Fig. 1) represents one of the last strongholds in Afghanistan for snow leopards, as well as for a number of important prey species including the Siberian ibex *Capra sibirica*, Marco Polo sheep *Ovis ammon polii*, and urial *Ovis orientalis*. Research and monitoring of the snow leopard in Wakhan is helping to enhance Afghanistan's awareness of the unique biological value of the population remaining in the country, and is generating interest in wildlife conservation.

Since 2006 the Wildlife Conservation Society (WCS) has been developing community capacity to manage conservation in Wakhan. This initiative includes the creation of a governance structure representing the local communities, and training and equipping 65 community rangers who patrol, carry out wildlife surveys, enforce no-hunting regulations and educate their community about wildlife conservation (Kanderian et al. 2011, Zahler 2010, Simms et al. 2011). To further the conservation measures being developed in Wakhan, we are investigating the ecology

of snow leopards using GPS telemetry. The specific aims of this study are to determine ranging patterns and habitat preferences of the species (McCarthy et al. 2005), and to inform shepherds about the presence of collared snow leopards in areas used by their livestock in order to decrease the risk of leopards preying on corralled animals. Home range size – the area used by snow leopards to meet their biological requirements – will improve our ability to refine population estimates, while identifying their preferred habitats will help protect these crucial areas. Once analysed, the information derived from this work will enable us to generate habitat preference models (Gavashelishvili & Lukarevskiy 2007). These will then be scaled up across Afghanistan, helping government to prioritize activities for the species nationwide.

## Methods

In May 2012 we started a snow leopard capture operation in Sarkand Valley, in the Hindu Kush mountains of Wakhan District (Fig. 1). In Sarkand Valley, camera traps deployed by WCS since summer 2011 have confirmed the presence of snow leopards; community rangers have also recorded relatively frequent sightings and indirect evidence (tracks, feces and scent spray sites) of snow leopards; and

the valley has an abundant population of Siberian ibex and is also an important area for urial in spring (Moheb et al. 2012). Furthermore, each spring the upper reaches of the valley slopes and surrounding highland pastures experience a seasonal influx of shepherds with their livestock. Snow leopards have been responsible for livestock depredation events and occasionally suffer retaliatory losses in and around Sarkand (Salahudin Ismaili, pers. comm., May 2012).

We carried out two capture operations in Sarkand, coinciding with the onset of Wakhan's temperate summer. The first ran from 27 May to 16 June 2012, and the second from 11-19 September 2012.

Snow leopards are shy and elusive animals, which need to be trapped in order to be approached and anesthetized before handling. Large cats are often captured in cage-traps; however, injuries can result and their deployment is particularly arduous in remote mountainous terrain like Wakhan. Therefore we used Aldrich foot-snares with modifications to minimize the possibility of injuries to captured animals (Frank et al. 2003).

Prior to the capture operation, a team of rangers led by Hussain Ali, a WCS snow leopard specialist, investigated Sarkand to identify locations suitable for snare placement – areas frequented by snow leopards, particularly scent spray sites and well-worn game trails. We deployed 12 snares in these key sites, on both sides of the valley, at distances ranging from 450 m to 2 km away from our base camp (Fig. 2). We monitored each snare at hourly intervals around the clock with a trap-site transmitter (TBT-500, Telonics, USA) – a VHF radio beacon that increases pulse rate when the trap is triggered. This allowed us to remotely monitor the traps and minimize disturbance.

We immobilized captured leopards with ca. 4 mg/kg tiletamine-zolazepam (Zoletil, France) or a combination of ca. 3.5 mg/kg ketamine



**Fig. 1.** Wakhan District in Afghanistan (in green) showing the location of Sarkand village situated north of the trapping area.

**Table 1.** Morphological and physiological data for 3 captured snow leopards. HT = head-tail, RR = respiratory rate,  $T_b$  = rectal temperature measured with an electronic thermometer, SpO<sub>2</sub> = saturation level of oxygen in hemoglobin, measured with a pulse oxymeter. Reference: values according to Johansson et al. (2013).

Animal	Age Years	HT cm	Tail cm	Weight Kg	RR (/min)	$T_b$ (°C)	SpO <sub>2</sub> (%)
Male 1	3-4	202	92	30-35	24-30	36.9-38.7	87-89
Male 2	4-5	210	97	34	18-34	37.0-37.9	89-94
Female 1	5-7	204	95	35-40	22-24	39.1-39.2	NA
Reference	-	-	-	24-45	16-42	34.9-40.5	71-99

(Imalgene 1000, France) and ca. 0.08 mg/kg medetomidine (Zalopine, Finland), delivered in the muscle by dart gun from an average distance of 6 m. All captured animals were thoroughly examined by veterinarians and biologists, who also took standard morphological measurements and DNA samples (skin, blood and fur).

We fitted the tranquilized animals with Argos-GPS collars (Vectronics, Germany), weighing 595 g and set with a timed drop-off system that automatically removes the collar after 13 months of operation. The collars were programmed to record eight GPS acquisitions per day, each being immediately uploaded to satellite. To test their functioning and accuracy, all collars were deployed for two consecutive days on local livestock prior to the capture operation. The collar GPS data is downloaded to computer using Vectronics GPS Plus software and then imported to Google Earth for routine monitoring.

### Results and Discussion

In total we captured two male and one female snow leopard over approximately 280 trap-nights. This equates to one animal caught per 93 trap-nights, a reasonably high success rate for such an elusive big cat.

The first animal captured, an adult male, was caught on the very first night of trapping in May when only one snare had been set; the second animal, another adult male, was captured 12 days later; and the third animal, an adult female, was caught 2 days after starting the second capture operation in September. During both capture operations we did not catch any other carnivores; however, two domestic goats were trapped during daytime and released uninjured.

All three animals were calm throughout the capture and tranquilization process, and except for broken claws on the non-snared front paw, they were uninjured by the process. This confirms that foot snaring is a safe and efficient means of catching this species (Fig. 3).

The three cats were caught in snares set on the western side of the valley, and the two males by the same snare. The first male was darted at 1:52 h and was ambulatory, yet not completely recovered, by 3:45 h. The second male was darted at 5:11 h and had recovered by 7:15 h. The female was darted at 21:12 h and walked away recovering by 1:20 h.

The anaesthetics went smoothly and were uneventful, and physiological parameters remained within normal range for the three animals (Table 1; Johansson et al. 2013). The tiletamine-zolazepam combination we used in both males worked fine but produced relatively rough recoveries. In comparison the ketamine-medetomidine combination we used for the female offers the ability to use atipamezole (Antisedan, Finland) as a partial antagonist and returns the animal more quickly to physiological normalcy. In addition medetomidine considerably hastens and smoothes recovery which for snow leopards is particularly appreciable as it decreases the risk of the animal moving into its steep and dangerous rocky habitat when still uncoordinated. For this reason we prefer the ketamine-medetomidine combination. Following release, the leopards remained within two kilometres of the capture location for about two days before leaving the area.

The movements of the collared snow leopards are being monitored daily via the Vectronics software and Google Earth. As of 1 May 2013, the three collars deployed have been functioning well and provided a total of ca. 5,000 data readings, and the three animals had moved a minimum combined total of ca. 3,600 km.

Preliminary examination of data has shown interesting range-use patterns, such as quite distinctly separate territories occupied by the two males (Fig. 3); it has also allowed us to evaluate the position of collared animals against reported livestock depredation cases. Photographs of the collared snow leopards visiting camera-trap sites on regular occasions revealed that they quickly resumed their home-ranging routine and are in good body condition (Fig. 4).

To our knowledge, this project represents the first wildlife telemetry study ever conducted in Afghanistan and is the only major research effort of its kind currently underway in the country. Besides providing the first detailed data on snow leopards in Afghanistan, it represents a unique opportunity for Afghan biologists, veterinarians, students and local rangers to gain rare



**Fig. 2.** Hussain Ali setting a foot snare at a scent spray site he found during a preliminary survey of Sarkand Valley, 8 September, 2012 (Photo WCS Afghanistan/ Hussain Ali).

field experience in this domain of wildlife research. For example, two WCS-trained Afghan veterinarians were present and hands-on at the three captures, and gained experience darting two of the animals; and three rangers are being trained as “snow leopard rangers”. We plan to resume the capture effort in spring 2013 when increasing ambient temperature reduces the risk of hypothermia in anesthetized animals. We hope to capture and collar a further 2 or 3 snow leopards by the end of 2013.

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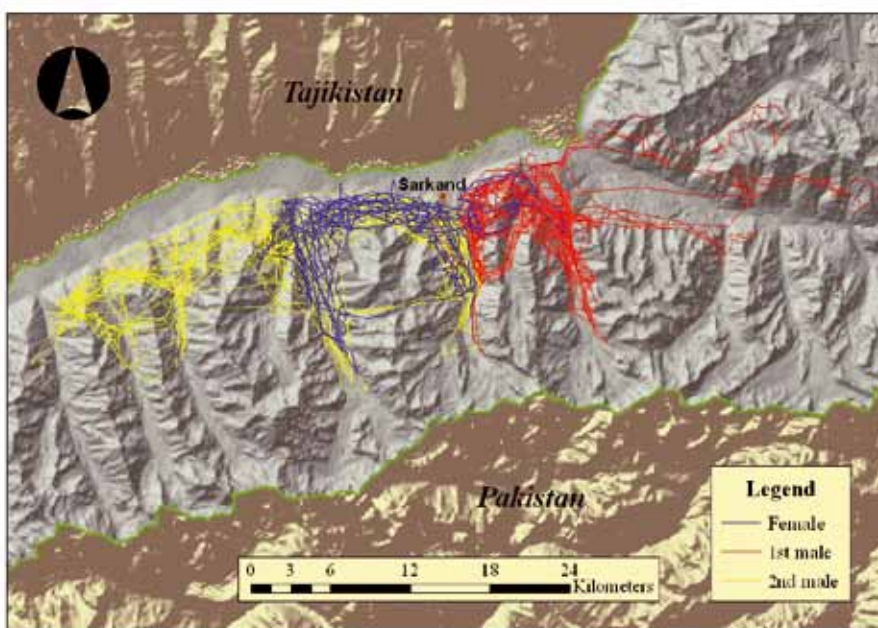
Finally sincere thanks also go to the people of Wakhan, particularly Sarkand village. Without support from the community in Wakhan this research would not be possible, nor would efforts to conserve snow leopards be enjoying success.

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**Fig. 3.** Map showing range-use patterns of the three collared snow leopards and the location of Sarkand village.

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**Fig. 4.** The collared female snow leopard with one of her two sub-adult cubs photographed by a camera trap one month after capture, 13 October, 2012, Wakhan District (Photo WCS Afghanistan).