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Abstract: Sightings of snow leopards *Uncia uncia* in the wild are rare. This is because snow leopards occur in low numbers and are very elusive (Schaller 1977). Snow leopards may be sparsely distributed, but they may not, however, be very elusive in the world's highest park, Sagarmatha (Mt. Everest) National Park (86° 30' 53" E to 86° 99' 08" E and 27° 46' 19" N to 27° 06' 45" N) in Nepal.

Snow Leopard Sightings on the Top of the World

Som B. Ale¹ and Roberto Boesi²

Sightings of snow leopards *Uncia uncia* in the wild are rare. This is because snow leopards occur in low numbers and are very elusive (Schaller 1977). Snow leopards may be sparsely distributed, but they may not, however, be very elusive in the world's highest park, Sagarmatha (Mt. Everest) National Park (86° 30' 53" E to 86° 99' 08" E and 27° 46' 19" N to 27° 06' 45" N) in Nepal.

Over most of their range, snow leopards rely on blue sheep *Pseudois nayaur* or ibex *Capra ibex* as their principal prey. Sagarmatha is unusual in that it lacks both, but supports Himalayan tahr *Hemitragus jemlahicus*, a cliff hugging goat, well suited to the narrow, rugged V-shaped valleys of Sagarmatha. Such terrain provides limited strategic travel routes for snow leopards, increasing the probability of human sightings.

In the 1960s, the endangered snow leopard disappeared from the Everest region (Fleming, undated) for reasons wholly unknown today. Flourishing tourism since the first ascent of Mt Everest in 1953 has brought unprecedented prosperity yet adverse ecological impacts to the region. Yet these may not have precipitated the disappearance of snow leopards.

In 1976, to better manage the opportunities of tourism with conservation, Sagarmatha (area of 1,148 km²) was declared a National Park. This protection by the Department of National Park and Wildlife Conservation, with the aid of the Royal Nepal Army, is very real and effective. Since 1983, goats and poultry have been officially removed from the park (Sherpa 1985).

The region did see some hunting and snaring despite the religious sentiments of the local Buddhist Sherpa population. This poaching was, however, carried out largely by non-Buddhist people from lower valleys. Nonetheless, some protection of non-predatory species existed which prevented the decline or extinction of most large mammal populations from Sagarmatha, allowing them to recover remarkably well after the protec-

Fig. 1. Main villages in Sagarmatha National Park (dotted lines represent main routes).



tion measures were introduced.

By the late 1980s, signs showed that transient snow leopards from adjoining Tibet were visiting the park (Cat News 1987, R. Jackson pers. comm.), perhaps in response to burgeoning populations of Himalayan tahr, musk deer *Moschus chrysogaster* and some game birds (e.g. impeyan pheasant *Lophophorus impejanus*, Tibetan snow cock *Tetraogallus tibetanus* and blood pheasant *Ithaginus cruentus*). By the 1990s, there were unpublished reports of snow leopard sightings and stock losses (yak calves) in the Nangpa-Bhote Kosi valley (B. Brower, pers. comm.). Since the onset of the new millennium, the anecdotal reports of sightings of snow leopards by local people and tourists heightened.

In May 2002, Pemba Tsering Sherpa, a local herder from Kangyuma, saw a big cat at dawn, ambling out of thin birch forest to the main human trail and then disappearing into the forest that graded into cliffs.

On 22 December 2003, S. Severgnini, an Italian student working on Himalayan tahr, was lucky to spot a young Himalayan tahr male carcass, in a grassy slope some 15 meters below the main tourist trail (3,600 m) in between Namche and Kangyuma (Fig. 1.) on the way to the Everest base camp. Later at 2 pm several hovering Himalayan grif-

fons *Gyps himalayensis* led D. Jackson, a regular trekker, to the site. His curiosity showed no bounds when he noticed something lunging at vultures. He hopped down hill from the other side, when he sighted the majestic snow leopard gazing at him. It roared (or rather mewed) twice before it disappeared down into the cliff face.

At 9 am on December 23, 2003, one of us (R. Boesi) located the carcass under a pine tree, possibly dragged there by the cat. There were clear marks of canine teeth on the throat and muzzle—typical sign of a cat kill. The body was open, with half of the chest gone and it was disemboweled. At 9:30 am on 24 December, a cat was lying under the tree next to the carcass, possibly guarding it. It was there the following day too.

On 24 October, 2004, (Phortse valley, 3,750 m asl), at 4:30 p.m, a series of sharp whistles made by alarmed Himalayan tahr somewhere down the Phortse village drew our attention (S. B. Ale and his assistant, B. Gurung). We hurried downhill some 200 m only to locate an alarmed Himalayan tahr on grassy slopes, frequently whistling and constantly staring down toward the cliff. Male Himalayan tahr make such repeated whistles while courting females, but October was no rutting month. Another half an hour elapsed while we impati-

ently scanned the surrounding slopes and cliffs with Bushnell spotting scope and binoculars. We spotted the cat lying on a rock 100 m above us amongst several noisy alarmed impeyan pheasants perched on nearby rocks. It rose and ambled towards us. It stopped along the base of a huge overhanging rock, smelt it, rubbed its chin, and sprayed on it while making a 180 degree turn. The cat (Fig. 2.) remained under our surveillance for about 15 minutes.

On 31 November 2004, (Namche valley, 3,600 m), one of us (S. B. Ale) sighted another individual, judged by the size of its fore-pugmarks, near Namche twice, at dusk and at dawn.

The return and the recovery of snow leopards as an important top predator to this world heritage site is indeed exciting and may pose two conservation related questions. How do biologists, conservationists and local communities work together to conserve this recovering snow leopard population for the benefit of both wildlife and people? Promotion of eco-tourism may be one option, which requires careful planning.

How do we monitor the snow leopard and its associated impacts? A novel predator may often have significant ecological impacts on the region's prey-predator dynamics and community structure. The kid to female ratio of Himalayan tahr is now alarmingly low, being 0.1, whereas it was about 0.6-0.8 in 1991-1992 (Lovari *et al.* in press). On the other hand, the Pangboche herd showed a low number of kids in 1989 (Lovari 1992) suggesting that kid mortality can be substantial occasionally, whatever the reason. In 2002 and 2003, rates from the birth season (May-June) to the reproductive period (November-December), dropped from 0.7 to 0.2 and from 0.6 to 0.2, respectively (R. Boesi & S. Lovari unpubl. data; Lovari *et al.* in press). That means kids disappeared in the first months of life in those years. Predation by snow leopards may have been the possible cause for this substantial kid mortality.

To the same extent, in 2002-2004, an unquantified, but clearly detectable (S. Lovari, pers. comm.) decrease in musk deer abundance in the Namche area might be due to the increase in snow leopards. An analogy can be drawn to the dramatic effects of wolves that re-



Fig. 2. Adult snow leopard in Sagarmatha National Park (Photo S. Ale).

turned to Yellowstone, the world's oldest national park (Berger *et al.* 2001, Ripple & Beschta 2004). Clearly, predation can have an impact on local prey population (Gilg *et al.* 2003, Terborgh *et al.* 2001, Sinclair *et al.* 2003), and therefore the tahr-snow leopard system should be carefully monitored.

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¹ Som B. Ale, PhD Candidate, Biological Sciences (M/C 066), University of Illinois at Chicago 845 W. Taylor Street, Chicago, IL 60607, USA. <sale1@uic.edu>

² Roberto Boesi, PhD, Dipartimento di Biologia Evolutiva, Università degli Studi di Siena, Via Aldo Moro 4, I-53100 Siena, Italy. <melurus@tiscali.it>