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An experience of surplus killing of livestock by a snow leopard in Nepal

Among many other threats, retaliatory killing of snow leopards *Panthera uncia* by people in retribution of livestock depredation is the foremost challenge for long-term survival of snow leopards. Surplus killing of up to 100 or more goats and sheep by snow leopard in a single night have been reported in snow leopard range' countries including Nepal. Such incidences are unusual, but their impacts are substantial for subsistence agropastoral communities and snow leopard survival. Direct observation of surplus killing of livestock by a snow leopard in the corral is very rare. Here I report one incidence in a remote part of Nepal where a snow leopard killed 44 goats and was then trapped itself in a corral. This note highlights how I managed to rescue the trapped snow leopard.

Global population of snow leopard is roughly estimated below 6400 individuals (Sharma & Singh 2020). However, even with abundant wild prey, snow leopards often target livestock, as they are copious and easy to capture in the human altered ecosystem (Johansson et al. 2015, Suryawanshi et al. 2017). Nowell et al. (2016) estimated that the number of snow leopard individuals killed annually by people is between 221 and 450, 55% of which being retaliatory killings due to livestock depredation by snow leopards. With frequent livestock depredation and mass killing of goats and sheep, retaliatory killing of snow leopards by herders is not surprising (Jackson & Lama 2016, Lovari & Mishra 2016). Citing data from 19 GPS-collared snow leopards, Johansson et al. (2015) found that 62% of sheep and goats were de-

predated at night (20:00 – 06:00), often in corrals. They confirmed one, and possibly three, collared snow leopards were killed in retaliation for repeated predation on livestock in corrals. Incidents of surplus killing of livestock in corrals by snow leopard have been reported frequently in Nepal (DNPWC 2017) and elsewhere (GSLEP 2017), yet direct observation of such incidents are very rare. I opportunistically observed such an incident and subsequently negotiated release of the adult male cat with pastoralists in the Phu valley of Nepal.

Background of Observation Site

The remote Phu Valley (84°5' to 84°13' E and 28°40' to 28°50' N) of the Annapurna Conservation Area ACA is in the central part of northern Nepal (Fig. 1), where snow leopards,

their wild prey, people and domestic livestock have coexisted for several years. Human inhabitants of Phu valley, in the rain-shadow of the Trans-Himalayas adjoining the Tibetan plateau, traditionally maintain large herds of yaks, horses, goats, sheep and cattle. Livestock herding and trading are key economic activities in this subsistence economy. People practice Buddhism where killing of any living creature is deemed sinful.

Phu valley has one of the highest densities of snow leopards (6 per 100 km²) in Nepal (Wegge et al. 2012). However, frequent livestock depredation by snow leopards, despite abundant wild prey (blue sheep), poses conservation challenges (Thapa 2005). For example, in 2001 a single herder lost 35 goats to a snow leopard in one night from a corral. Corraling of goats has thus been discouraged in Phu valley. The number of goat corrals declined from thirty in 2005 to four by 2020. Human-snow leopard conflict has been on the rise. Not surprisingly, retaliatory killing of snow leopard is practiced secretly.

Observation Note

On 13 April 2021, a colleague and I had a rare chance encounter with a snow leopard as we travelled to Phu valley. During dinner at a hotel, the owner told us that earlier that day a snow leopard had killed a blue sheep near Phu Gate. I told her that we had not come across any evidence of a kill site on the road, but was told that people had taken away the blue sheep meat by then. We went to bed at midnight without any protest against the people for stealing the blue sheep's meat and made a plan of checking the kill site the following day. The next day, at around 4 pm, we visited the site and my colleague quickly spotted the cat. I reached for my camera - focused, zoomed in, and we were able to take photos of a snow leopard (Fig. 2). The next day, the loud vocalization of a snow leopard just above Phu village startled us, which is rare in that season. We investigated and found that a 2 to 3 year old yak had been killed nearby.

On 21 April, we woke up early in the morning; there were noises and commotion in the entire village. Immediately after tea, we saw a middle-aged woman crying and heading towards Okhal Goth (name of a corral) with her bamboo basket, and at the same time, other people with bamboo baskets were following her to the site, which is about 15 minutes away from the village. We came to know that a snow leopard had entered into the corral (Fig. 3) and killed all of goats the previous

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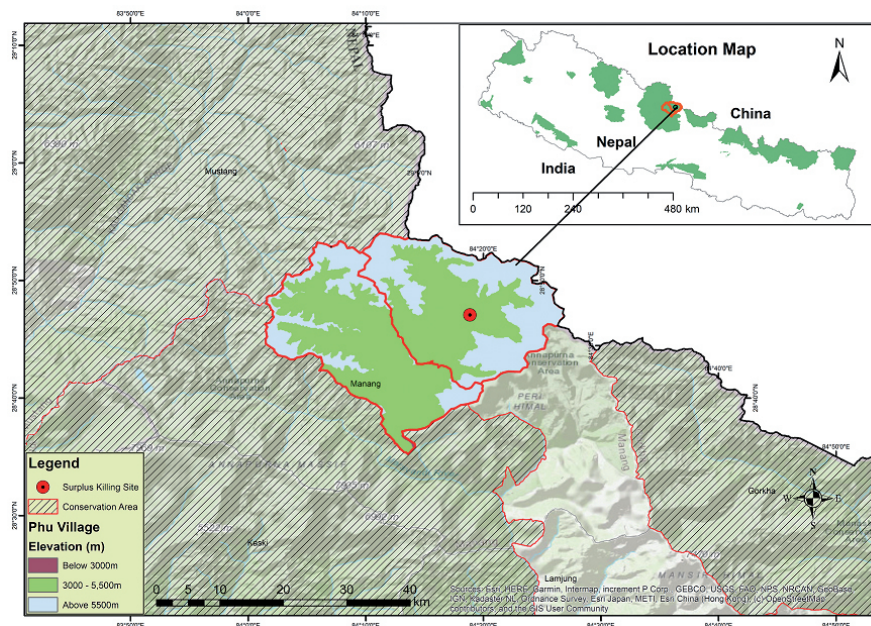


Fig. 1. Location map of surplus killing of livestock.



Fig. 2. First day click of snow leopard around blue sheep killed site 1 (Photo K. Thapa).



Fig. 3. Snow leopard into the first corral where 44 goats killed out of 45 goats (Photo K. Thapa).

night (Fig. 4). I began walking towards Okhal Goth to investigate and get pictures of the dead goats. However, near the Okhal Goth, a middle-aged man yelled at me, "Why did you come here, sir?", and ordered me to return to Phu village immediately. At that time, there was no quarrel, so I immediately headed back to the village. Before reaching the village, I heard a whistle, a gesture for me to stop. It was the corral owner who approached me and said, "Sir, stay in the village. I'll take pictures of all the dead goats and give it to you." He also requested that we provide all the photos to ACAP as proof of the incident so that he would be able to quickly get appropriate relief. The herder was in a state of disarray, his body language and eyes reflected what he was going through on the inside. Just two days earlier, I had interviewed him for a video about Foxlights.

Foxlight is a solar-charged device that emits different colours of light at night when triggered, so as to alarm and scare predators away from corral areas. Foxlights had earlier been distributed in Phu Village, and Tenzing had been using the Foxlights in his corral and had thanked me for it. However, with this incident, there is a doubt in the credibility of Foxlights that they may not be as effective as we expected them to be.

Later in the day, several villagers requested me to return to the Okhal Goth and said that the snow leopard was trapped inside. They hoped that I could take pictures of the snow leopard and of dead goats as an evidence for compensation from the government. I had never imagined a snow leopard inside a corral and I headed for there without a delay. The villagers were demanding to translocate the trapped snow leopard and quick compensation. It was already 4 pm, weather turned unfavourable,

and it started to snow. Three policemen arrived at the scene, and I felt some relief and thought that the snow leopard is now safe. My intention was to release the snow leopard in its natural habitat, but such was not possible in front of the frenzied crowd. It was now 22:00 h, and we, including all the villagers, went to the village for dinner and an in-depth discussion of the event. Eventually, everyone agreed upon releasing the snow leopard in its habitat and we all returned to the Okhal at 11 pm. Amazingly, the snow leopard had escaped. Villagers showed me an escape hole from which the snow leopard could easily go out (Fig. 5). The snow leopard's footprints were easily seen around the corral in the fresh snow. Although it seemed the snow leopard had fled during our absence, there was doubt in my mind. Soon we heard a goat bleating from another corral just 20 meters away. We rushed to the corral and through the door hole we could see the snow leopard inside (Fig. 6). The cat had just left the corpses of 44 out of 45 goats, ran into another corral and was killing goats at midnight. The villagers were furious and said this snow leopard was habituated to eating livestock. Villagers even believed that this snow leopard would enter their houses and attack people too.

Our first task was to rescue live goats and the snow leopard safely. The locals gradually rescued the live goats by dragging them with a Kongeso (a tool made of nylon rope). However, the snow leopard had already killed eight goats and injured more than 10 more. It was already 3:30 am and the snowfall was continuous and heavy. The second incident had left the villagers furious, and therefore, they made a plan of putting the snow leopard in a 200-liter drum for its translocation to Chame - the district headquarters. There was

a hostile environment in the crowd because I strongly opposed that plan. At around 16:00 h in the morning, the villagers got angry with us, told us to do whatever we wanted and left for their homes. Now only five of us, including the three police officers, were there, serving as watchdogs for the snow leopard. It was getting brighter but the snowfall was getting heavier. We could have rescued the snow leopard safely in absence of the villagers, but it was not a good idea to do so because the local people, ultimately, are the primary stakeholders in conservation of the snow leopards. There were no more orders from top authorities and no chance of using a satellite GPS collar on this cat. Finally, I decided on using a tactic to save the snow leopard. I threatened to leave the cat as it was in the cage and go back home. The tactic worked and the villagers agreed upon releasing the snow leopard but under the condition that they get proper relief/compensation. I promised them that ACAP would provide relief to the affected people. At around 17:00 h, I managed to rescue the snow leopard and release it in its natural habitat in presence of all the villagers (Fig. 7). My associate's cheerful face showed that he was pleased with the decision and that made me feel much better. I was now fortunate to have directly saved at least one snow leopard in my lifetime. The villagers were taking pictures and videos from their mobile phones but I could not tell if they were happy. Nevertheless, I knew that the owners of the two corrals who were disabled and had no property other than those goats were immensely sad. I still remember them joining their hands in front of me begging for relief. I heard that they got proper compensation by government against their loss, which will help save the snow leopards.



Fig. 4. Tenjing Karsang Lama with depredated livestock in Okhal (Photo K. Thapa).



Fig. 5. Goat corral main door on top chance to enter and escape snow leopard above the door (Photo K. Thapa).



Fig. 6. Snow leopard in another corral (Photo K. Thapa).



Fig. 7. Freed snow leopard leaving the corral (Photo K. Thapa).

Discussion and Recommendation

Despite high density of blue sheep, livestock depredation is increasing rapidly, likely indicating an increase in the number of snow leopards in Phu valley. Suryawanshi et al. (2017) suggested that snow leopard numbers increase when the abundance of wild ungulates increases, but that would exacerbate the problem of livestock depredation for pastoralists. Lucherini et al. (2018) reviewed 73 publications and concluded that surplus killing of livestock most likely occurred when availability of large number of easy prey disrupted the regular hunting sequence of pumas *Puma concolor*, and that confinement, stormy weather and poor anti-predator behaviours of the prey/livestock may even escalate surplus killing. Under the certain circumstances, such as in dark night and enclosure, prey loss anti-predator capabilities, hence carnivores may kill a great many more prey animals than they can possibly consume at the time (Kruuk 1972). In my experience, when people steal or take away the carcasses of prey species killed by snow leopards, the snow leopards are attracted to livestock, especially in the areas with poorly constructed corral and unattended livestock herding practices. The two incidents described here occurred in poorly

constructed corrals during a snowy night. It was observed that both the corrals had suitable holes above their roofs and doors through which a snow leopard could easily enter. Absence of herder, lack of guard dog and no sight of dung fire in and around the corrals may have favoured the entry of the snow leopard into the corral even though both the corrals had Foxlights operating during the night. Samelius et al. (2021) suggested that improved predator-proof corrals could be an important deterrent measure for snow leopard conservation complemented with community-managed incentive schemes such as livestock insurance scheme and ecotourism promotion (Gurung et al. 2011). However, such measures are expensive. Nonetheless, it could be executed in areas where local participation is guaranteed with greater understanding of stakeholders (conservation organization/s and local herders). I suggest that improved predator-proof corrals along with modern deterrents (Foxlights, electric fencing, etc.) would be effective at keeping traditional livestock guarding practices such as guard dogs, dung fire, people shouting, etc. alive. That is why there is a need for practical, action-oriented snow leopard conservation strategies, strongly accompanied

by an economic programme to benefit the local people.

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