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Monitoring Mammals in Great Himalayan National Park, Himachal Pradesh

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1.0 INTRODUCTION

Monitoring can be defined as “biological recording with the specific aim of detecting changes in the distribution and abundance of species and their habitats”. It is usually undertaken to ascertain whether the prevailing conditions match the previously defined standards or norms. The intensity and frequency of monitoring depends on its aim. Monitoring is a long-term exercise, involving many people and therefore it has to be simple to execute. Monitoring as such provides no information on the cause of changes recorded, but it may be possible to interpret the patterns of changes on the basis of circumstantial evidence.

The Himalaya is rich in floral, faunal, ecological, geo-hydrological, socio-cultural and aesthetic values and supports a variety of large mammal species. The ever-increasing biotic pressure in the area has led to the decline of many animals through hunting and the fragmentation and loss of habitat. The long-term monitoring of these species and their habitat is important for the conservation of the biodiversity of the area.

The Great Himalayan National Park (GHNP), located in the upper Beas catchment, is supporting at least 31 species of mammals. Although the Park covers a substantial area of prime wildlife habitat, the animals are occurring at low densities and are affected by the activities of people living in adjacent areas. Thus there is an urgent need to monitor the animal populations in the Park. This section of the research project has been carried out to develop monitoring techniques suitable for execution by the GHNP frontline staff.

2.0 MAMMALS OF GHNP

Thirty-one mammalian species were recorded in the area by Gaston et al., 1981, out of which only 27 species were sighted during the study period. Primates are represented by Rhesus macaque (*Macaca mulatta*) and Common langur (*Presbytis entellus*), and are distributed widely at 1440 - 3420 m.

Common leopard (*Panthera pardus*) and Asiatic black bear (*Selenarctos thibetanus*) have been sighted only rarely (1440 – 3660 m) but scats, footprints and feeding signs have been recorded from village fringes to alpine zone. Although Snow leopard (*Panthera uncia*) has been sighted only once, in Saketi area of Tirth (Vinod, unpublished), secondary information suggests their presence in the upper Sainj, Jiwa and Parvati areas at altitudes over 3600m. Himalayan brown bears (*Ursus arctos*) was seen on the alpine meadows of Tirth, Della, Kamba, Rakti, Upper Jiwa and Parvati areas and scats were found regularly in these areas. Red fox (*Vulpes vulpes*) has been encountered in the alpine pastures of Della and Tirth areas. Yellow-throated marten (*Martes flavigula*) was a commonly encountered mammal, ranging from middle temperate to subalpine areas.

The most frequently encountered mammals in the area was goral (*Nemorhaedus goral*), which occupies a wide range of habitats from temperate to subalpine forest. Sightings are made most frequently in open grassy slopes at 2400 – 2800 m (Vinod et al., 1997). Both Himalayan tahr (*Hemitragus jemlahicus*) and Himalayan musk deer (*Moschus chrysogaster*) have been sighted occasionally (2900 – 4000 m), the former being recorded on the steep rocky slopes while the later in the 'krum boltz'. Gumtharao and Della are two known areas for musk deer, whereas Gumtharao, Nara, Pari, Kamba, Patl and Upper Jiwa areas appear to be important for Himalayan tahr. Blue sheep (*Pseudois nayaur*) has also been sighted on a few occasions in the alpine thatches of Tirth area.

Rarely encountered mammals include Barking deer (*Muntiacus muntjak*), Serow (*Nemorhaedus sumatraensis*) and Himalayan weasel (*Mustela sibirica*). Even though sightings of flying squirrels were low, their feeding signs on Kharsu oak (Quarcus semicarpifolia) leaves were recorded frequently. Pika (*Ochotona roylei*) has been encountered frequently in the alpine meadows.

3.0 SPECIES TO BE MONITORED

Based on the ongoing study four ungulate species viz., goral, Himalayan musk deer, Himalayan tahr and blue sheep were proposed for long term monitoring. These species are distributed in various habitats covering different altitudinal zones and are associated with many other fauna and flora. The number of species for monitoring were limited to four in order to maintain the process feasible and effective. All other mammals in the Park can be monitored by recording their presence/absence and encounter rate seasonally or during the time of routine patrolling by the frontline staff in order to detect changes in distribution and relative density between seasons and years.

4.0. TECHNIQUES FOR MONITORING

The following methods are found to be suitable for monitoring mammals in GHNP.

4.I. Monitoring of Presence/Absence

This is a simple technique, which involves recording of presence/absence of a given species in order to specify distributions on toposheets in relation to specific land features. Gaston et al. (1981, 1983) and Gaston and Garson (1992) successfully used this method in many parts of GHNP. Rodgers (1990) and Sathyakumar (1994) have also described this technique. In GHNP, this technique can be used to monitor all mammals, and a distribution map of the species can therefore be prepared. Presence can be based on either direct sightings or indirect evidences such as pellets, scats, tracks, scrapes, hoof marks and feeding signs. Adequate manpower, field equipment and field experience for identification of pellets/scats and other signs are the major requirements of this method.

4.2. Encounter Rate

Encounter rate (ER) is a standardised expression of number of animals encountered per unit of survey effort. ER can be based on direct sightings or indirect evidences such as pellets groups and other signs and given as rate per kilometre or hour. Fox et al. (1988) used ER based on indirect evidences for estimating snow leopard abundance while Sathyakumar (1994) estimated the abundance of ungulate in Kedarnath Sanctuary by this method. Similarly Gaston et al. (1981) and Gaston and Garson (1992) estimated the abundance of mammals and pheasants in GHNP, expressed as encounter/ 100-h search. As the number of animal's seen/ hour varies with respect to terrain type and observer efficiency, it is advisable to express ER as number/km walk.

4.3. Scanning

Ungulates such as goral, Himalayan tahr and blue sheep which inhabit habitats with little or no cover on steep slopes or alpine areas can be monitored by scanning method (Green, 1979, Sathyakumar, 1994). This technique involves careful scanning of such habitats with binoculars and/or a spotting scope from a vantage point. The results are usually expressed as animals' seen/hour of scanning. By estimating the area of a scan, a true density of animals, together with details of group size, composition and sex ratio can be obtained. Weather and visibility play an important role in this technique, making the monsoon period generally unsuitable.

4.4. Silent Drive Count

Green (1985), Kattel (1989) and Sathyakumar (1994) estimated the density of mammals such as Musk deer and Serow by this method. It is similar to block drive census, in which the area of interest is selected and divided into small patches based on natural boundaries. In each patch, a base line is identified and 10 to 15 men called 'beaters' are placed at intervals of 30 - 50 m. Three to five men called 'observers' are placed above the area being driven at vantage points, to record any animals which are undetected by the beaters. The beaters scramble quietly through the patch at a slow pace and record all the animals sighted. Data on species, time, number, sex, location, activity and direction of movement are recorded. In GHNP, this method can be used to monitor Musk deer. Gumtharao and Della areas are potential areas to conduct Silent drive count and the best period is May-June and October. It would be ideal to conduct the drive in the early mornings.

4.5. Line Transect Sampling

This method involves walking along a straight line and counting the number of animals sighted at various perpendicular distances on either side of the line, as described by Burnham et al.

(1980). In GHNP, this technique can be used to estimate the density of Goral (See 4.2.)

4.6. Wildlife Habitat Monitoring

Remote sensing is a valuable tool for monitoring larger areas in Himalaya. But habitat changes in smaller areas can be effectively monitored by 'Repeat photography technique'. Gaston and Garson (1992) had used this technique over a period of 10 years in GHNP. The method involves photography of a habitat from a vantage point at regular intervals of time as described by Sathyakumar (in press).

5.0. AREAS TO BE MONITORED

In Tirthan, Rolla-Basu (ROBA), Rolla –Shilt (ROSH) and Chalocha-Nara trails are ideal for monitoring gorals. Trails such as Sakti-Jognidhar (SAJO), Majhan-Shugard (MASH), both in Sainj Valley and Gathipat-Majan (GAMA) in Jiwa valley are also suitable for monitoring goral. Vantage points at Kharongcha, Rolla and Chidor are suitable for scanning of gorals. Scanning from points at Chidor, Nara, Pari, Patl, Gumtharao, and Della areas can monitor Himalayan tahr. Musk deer can be monitored by silent drive counts only in Gumtharao and Della areas. Tirth and Raktisar meadows are most suitable for scanning blue sheep.

6.0. TIME OF MONITORING

Winter (especially during February) is the best season monitoring the gorals. Himalayan tahr and musk deer can be monitored during late spring (mid May to mid June) and/or autumn (October – November). Blue sheep can be monitored during mid September to mid October. Early morning and evening hours are the best time for monitoring these animals.

7.0. CONCLUSIONS

None of the techniques described above will fully meet all the requirements of monitoring. A combination of two or more techniques mentioned above will be best for long term monitoring of mammals in GHNP. Monitoring of goral, Himalayan Tahr, musk deer and blue sheep might be helpful in assessing the habitat quality, provided direct effects such as poaching and disease outbreaks have been minimal. The result obtained from this study indicate that encounter rate based on direct sightings and the scan method are feasible for monitoring gorals. The scan method is best for Himalayan tahr and blue sheep, and silent drive count is most suitable for musk deer.

8.0. SUMMARY OF MONITORING PROGRAMME

Species	Applicable Techniques	Seasons (Months)	Name of Trails	No. of Samples
Goral	Encounter rate	Winter (February)	Rolla-Shilt Rolla-Basu Chalocha-Nara Sakti-Jognidhar Majhan-Shugard Gathipat-Majaun	2 walks
	Scanning	Winter (February)	Kharonghcha Rolla Chidor	Twice
Himalayan Musk deer	Silent drive count	Spring (May-June) Autumn (October)	Gumtharao Della	Once
Himalayan tahr	Scanning	Spring (May-June) Autumn (October)	Gumtharao Della Nara Patl	Twice
Blue Sheep	Scanning	Late Summer (mid Sep.)	Tirth Raktisar	Twice

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*Original not seen.