



Wildlife Survey in Gangotri National Park

*V.P. Uniyal
K. Ramesh*

October, 2004



भारतीय वन्यजीव संस्थान
Wildlife Institute of India



Uttarnachal Forest Department

Wildlife Survey in Gangotri National Park

V.P. Uniyal

K. Ramesh



भारतीय वन्यजीव संस्थान
Wildlife Institute of India



Uttarn

Department

October, 2004

Contents

Acknowledgements	i
Introduction.....	1
Objectives.....	2
Survey Area.....	3
Survey Efforts.....	6
Observation.....	7
Proposed Study.....	10
References.....	10



Acknowledgements

We would like to gratefully acknowledge with thanks the following individuals for their advise, assistance, and suggestions that have helped for conducting the survey and completing the report.

Uttaranchal Forest Department

Mr. S.K Chandola, Chief Wildlife Warden, Mr. Rajeev Bhartri, CF, Mr. D.N. Semwal, DCF, M.K. Sharma, ACF, Mr. D.S. Bhandari

Wildlife Institute of India

Mr. P.R. Sinha, Director, Dr. A.J.T. Johsingh, Dean, Dr. V. B. Mathur, Dr. P. K. Mathur, Dr. G.S. Rawat, Dr. S. Sathyakumar, Dr. B.S. Adhikari, Mr. Virender Sharma, Mr. Harender



1. Introduction

Biodiversity conservation, besides the ecological functioning, is also linked to aesthetic, ethical and economic values. Although looked upon as the resources to be exploited, there is an increasing realization, campaigning and strategies towards preserving the biodiversity in totality – both the species and the landscape. Establishment of Protected Area network is among the effective initial steps in this endeavor and is credited for ensuring conservation of several species of wildlife across the globe. However, in India, socioeconomic disparities and lack of adequate scientific knowledge to influence decision making, biodiversity conservation continue to face serious challenges. Specifically, the conflict of interest between biodiversity conservation and the people living close to PAs often negate conservation goal. In the recent years, because of the pressure groups operating on behalf of the local people, there is a shift in the conservation paradigm addressing their concern while executing conservation actions. National Forest Policy, National Conservation Strategy and the National Wildlife Action Plan emphasize the need for integrating biodiversity conservation with local people's subsistence. Given the requirement for the burgeoning human populations, there appears to be an incompatibility between conservation and addressing people needs, but scientific approach combined with practical experiences is expected to find the level playing ground. Efforts are already in place to include the benefit of science based conservation, and there is a phenomenal support from wildlife managers to generate sound empirical data for planning wildlife management. At the level of wildlife scientists, there is a change in the perception from charismatic species largely out of personal interest, to landscape level studies, focusing on the information that could help conservation. This could be seen in large scale surveys aiming at establishing distribution and status of species. It is clear that there is a huge gap in our knowledge to the level that even the occurrence of several species in most PAs is uncertain and more so, in the large proportion of areas outside these PAs.

On the other hand, wildlife research is often confronted by limited fiscal resources and trained man power, and most importantly the difficulty caused by remote and complex topography. The Himalaya is one such exceedingly challenging landscape, where the rugged terrain, poor logistic and infrastructure and harsh climatic conditions impede appropriate field research. This is perhaps the reason why a vast area of the landscape remains unexplored



here. None the less, the Himalayan range is among the most important bio-geographical zones in India (Rodgers et al. 2000) and is situated at the junction of three bio-geographical realms *viz.*, Palearctic, Africo-tropical and Indo-Malayan (Mani 1974). This unique feature enabled proliferation of a wide variety of floral and faunal assemblages from all these realms, making it a biologically rich and valuable at the regional and global scales. Most popular group of animals residing the landscape include a large number of wild goats and sheep, snow leopard, musk deer and pheasants. Considerable proportion of the species is listed in the Red Data Book of IUCN and status of several of them is still to be assessed. The present attempt to explore Gangotri National Park is in a way a joint endeavour between the Wildlife Institute of India (WII) and the Uttaranchal Forest Department (UAFD) to bridge the knowledge gap. Surprisingly, there is hardly any information on the wildlife wealth of the park, despite being religiously very popular and intensely visited site and more over, several institutions are involved in geomorphologic and climatic research for many years now. The available information on wildlife in this area is only from forest department records and casual observations while undertaking research on other disciplines. In this circumstance, any scientific data collection is a welcome addition and the information presented in this report out of a rapid survey is a beginning of scientific data generation being planned by WII and UAFD. Our rapid survey in this park lasting less than a week time (26th to 31st Oct 2004) had a very limited objective and was merely intended to explore the possibility of future research and conservation in this park. Therefore, this document should be viewed only as a preliminary report, not as a research document on the wildlife status of the area, although it contains some detailed information on the blue sheep, one of the important mountain ungulate and is reportedly common in this area. Broadly, the survey had the following objectives.

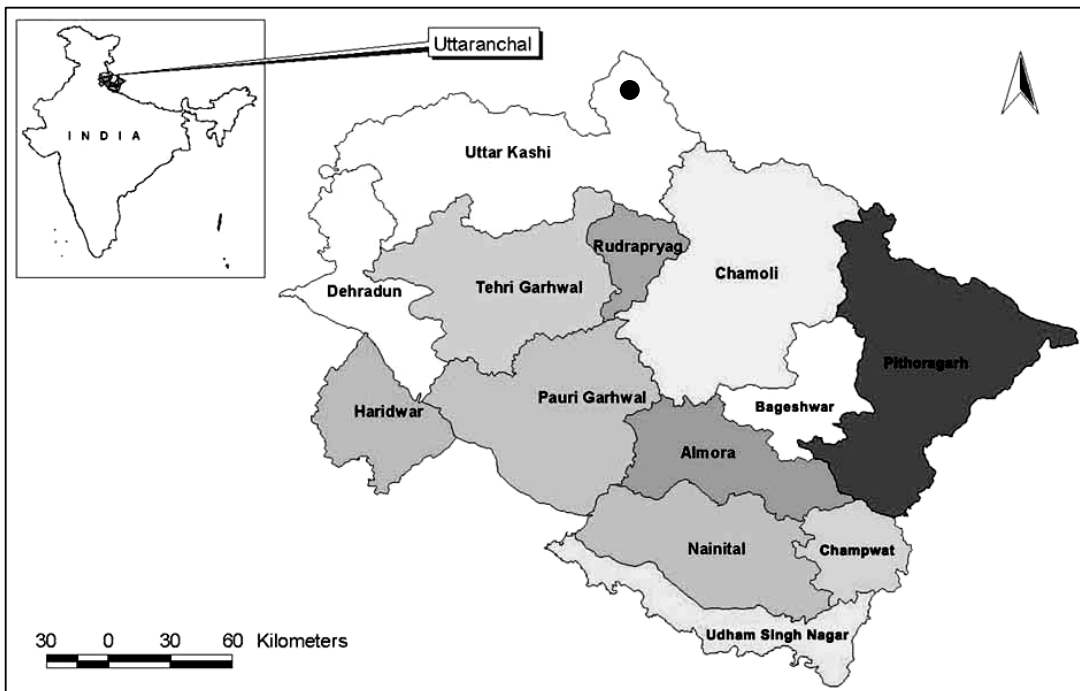
2. Objectives

- To gather baseline data on wildlife status, specifically the blue sheep in the Gangotri National Park.
- To undertake a reconnaissance on the research potential in this park and to suggest priority research projects critical for scientific management of the park.

3. Survey Area - Gangotri National Park

The Gangotri National Park (GNP) (Lat. 78°45' to 79°02' East and 30°50' to 31°12' North) is located in the upper catchment of Bhagirathi river in the Uttarkashi District of Uttaranchal State, India. The northeastern park boundary is located along the international boundary with China. It falls under the Biogeographical zone – 2A West Himalaya (Rodgers and Panwar, 1988) and covers an areas of 2,390 sq km. (Fig.1&2), including a considerable stretch of snow-clad mountains and glaciers. The Gaumukh glacier, the origin of river Ganga is located inside the park. The Gangotri, after which the park has been named, is one of the holy shrines of Hindus. The park area forms a viable continuity between Govind National Park and Kedarnath Wildlife Sanctuary. High ridges, deep gorges and precipitous cliffs, rocky craggy glaciers and narrow valleys characterize the area. There is a high variation in the elevation gradients from 1,800 to 7,083m, which in turn reflects in the diverse biomes, from subtropical communities to alpine meadows. So far 15 species of mammals and 150 bird species have been documented in the park (Paramanand *et al.* 2000). This includes some of the rare and charismatic species such as snow leopard (*Uncia uncia*), black bear (*Selenarctos thibetanus*), brown bear (*Ursus arctos*), musk deer (*Moschus chrysogaster*), blue sheep or bharal (*Pseudois nayaur*), Himalayan tahr (*Hemitragus jemlahicus*), Himalayan monal (*Lophophorus impejanus*), Koklass (*Pucrasia macrolopha*) and Himalayan snowcock (*Tetraogallus himalayensis*).

Fig.1 – Map of Uttaranchal State





Blue Sheep (Bharal)



Chirbasa



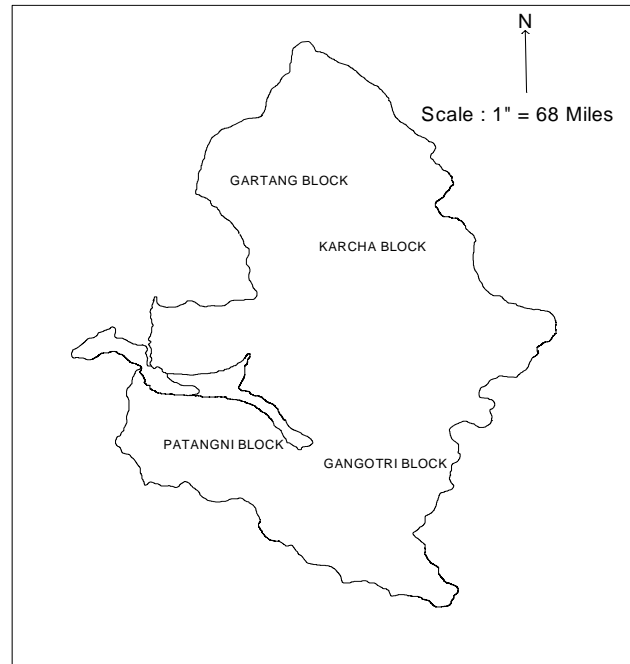
Bhojbasa



Gaumukh



Documentation of Field Data

Fig. 2 – Map of Gangotri National Park

Source: Park Authority

4. Survey Efforts – Duration and Route

We undertook a rapid survey in the Gangotri National Park during 26 to 31st October 2004. Prior to the actual field visit, detailed discussions were held with the forest officials regarding the state of knowledge on the park's wildlife and identified Gangotri Range as appropriate site for this short survey. Once in the field, we designed to use the existing trails for the survey and chose the trail from Gangotri, essentially the park entry point, to the Gaumukh glacier. The data collection was done all along the survey route (16 km) and quantified habitat details at every kilometer around 10m radius plot (n = 17, Table 1). Permanent mile stones or markings done by the Public Works Department on the pilgrimage route from Gangotri to Gaumukh helped measure the distance. Geographical coordinates of the start and end points of the survey route and the habitat plots were recorded using Garmin 12 CX Global Positioning System (GPS). The GPS also provided the elevation data for these points. Silva Ranger Ultra field compass was used to record slope and aspect information. In each of the habitat plots, dominant plant species and percentage of ground cover were recorded based on ocular estimation. Sufficient time was devoted to scan maximum possible area for locating blue sheep. The time spent on the entire survey route (8hr 45min) and between the habitat plots were recorded for analytical purpose. Once the blue sheep was



located, information on the total number and group composition in five classes (adult male, sub-adult male, adult female, sub-adult female and young ones or new born) were noted down. The data were converted into encounter rate (i.e. number recorded/effort), both using distance and time as survey efforts.

5. Observation

The Gangotri National Park is typical of high altitude ecosystem, with decisive influence from Tran Himalayan elements in both physical and biological characteristics. The survey route was dominated by alpine scrub, although forests of kharsu oak and betula were observed in patches in lower and higher elevation areas respectively. The mountain sides along the entire route from Gangotri to Gaumukh are steeper and are distinctly broken up by consequential landslides. These landslides appeared to have caused irreversible isolation between forest patches including the alpine vegetation. The impact of these natural events on the forest and the dependent organisms is important to document, so as to assess the long-term value of this park in the wildlife perspective. The surveyed areas ranged between 3,200m to 4,000m elevation (average = 3,600m) in southeast to southwest facing slope and the slopes were generally steeper with an average of 50° (40 – 65°). The ground vegetation, although getting dried, was suggestive of high ground biomass in this area, and the recorded ground vegetative cover ranged from 10 to 50% (average = 25%).

Table 1 – Description of the sampling plots and habitat data in the survey route

Date	Location	Sampling Points	Latitude	Longitude	Altitude (m)	Aspect (°)	Slope (°)	Dominant vegetation	Ground Veg. Cover (%)	Time Spent (minutes)
28/10/04	Gangotri	NP Check Post	30 59.743	78 57.351	3180	140	40	<i>Cedrus deodar</i>	25	10
		P1	30 59.792	78 57.459	3214	130	60	<i>Rose sericea</i>	20	10
		P2	30 59.762	78 58.001	3300	180	45	<i>Artemisia gmelini</i>	30	35
		P3	30 59.811	78 58.583	3320	200	50	<i>Rose sericea</i>	50	30
		P4	30 59.697	78 59.174	3340	180	60	<i>Artemisia gmelini</i>	20	35
		P5	30 59.546	78 59.729	3390	160	65	<i>Rose sericea</i>	30	30
		P6	30 59.342	79 00.208	3490	200	55	<i>Rose sericea</i>	25	35
		P7	30 59.201	79 00.746	3550	180	50	<i>Rose sericea</i>	30	20
	Chirbasa	P8	30 58.974	79 01.258	3600	180	60	Rocky	0	30
		P9	30 58.724	79 01.716	3620	180	50	<i>Rose sericea</i>	30	25
		P10	30 58.384	79 02.176	3700	180	50	<i>Artemisia gmelini</i>	30	30
		P11	30 57.952	79 02.388	3760	180	50	<i>Artemisia gmelini</i>	40	45
		P12	30 57.581	79 02.768	3810	200	50	<i>Artemisia gmelini</i>	50	25
		P13	30 57.140	79 03.024	3830	180	40	Rocky	10	25
29/10/04	Bhojbasa	P14	30 56.896	79 03.502	3880	220	50	<i>Artemisia gmelini</i>	40	25
		P15	30 58.569	79 03.904	3920	180	60	<i>Artemisia gmelini</i>	15	45
		P16	30 56.190	79 04.328	3930	200	50	Rocky	10	45
	Gaumukh	P17	30 55.661	79 04.840	3950	180	50		0	45

During the survey, except for one record of pika, other observations were only on blue sheep, which accounted for 276 individuals. This included 39 adult male, 16 sub-adult male, 125 adult female, 29 sub-adult female and 67 young ones. We also recorded three groups of all males and the rests were mixed groups led by females. The largest group consisted of 33 individuals, and a similar number on the way back included 26 adult males on the slopes near Chirbasa. The encounter rates of blue sheep are given in the Table 2, and this could provide the basis for initiating further census program. Although the data is from one time sampling, there was no double count as the entire routes were covered fairly in short time, and this can easily be taken as the minimum population of blue sheep in this area. This is perhaps the highest recorded density anywhere in the known blue sheep areas in the western Himalaya and exploration into other areas of GNP is only likely to inflate the abundance. Uniyal (2004) has documented 245 blue sheep during his 20 days stay in Nanda Devi National Park. The blue sheep in GNP appeared to be habituated by human presence, as many of the groups were found to be unmindful of the large number of people on pilgrimage. One could easily reach within 5m distance from the animals, perhaps indicating not so rampant poaching. These factors coupled with high biomass of vegetative cover could be surmised to explain the high abundance of blue sheep in this area. Given the infrastructure and logistics, and the population status of the species, this park is an ideal site for undertaking research on the species biology, particularly with a focus on group structure, movement pattern and breeding biology. Regarding other taxa, more than the potential, there is an urgent necessity to document the distribution and status of several of the taxa on priority basis. Remote Sensing and Geographical Information System could be effectively used to for this purpose. A more in-depth analysis on the spatial structure of the species should involve landscape ecology principles (Forman and Gardner).

Table – 2. Sighting details of Bharal in Gangotri National Park

Details of Observation	Adult male	Sub adult male	Adult female	Sub adult female	Kid	Total
Total	39.0	16.0	125.0	29.0	67.0	276.0
Average group size	1.4	0.6	4.5	1.0	2.4	9.9
Minimum	1.0	2.0	1.0	2.0	2.0	2.0
Maximum	8.0	6.0	26.0	8.0	6.0	33.0
Encounter rate (no/km)	2.4	1.0	7.8	1.8	4.2	17.3
Encounter rate (no/hour)	4.5	1.8	14.3	3.3	7.7	31.5
Encounter rate (no/km/hour)	0.3	0.1	0.9	0.2	0.5	2.0

6. Proposed Study

The following proposed research should be taken up on priority so as to plan effective management strategy for the park.

- ❖ *Floral and Faunal diversity along with spatial distribution and relative abundance.*
- ❖ *Impact of biotic pressure (e.g. tourism/pilgrimage) on the floral and faunal components.*
- ❖ *Developing spatial database and documenting the landscape configuration.*
- ❖ *Study on population structure and movement patterns of blue sheep including their response to predators.*

7. References

- Kandari, O.P. 2001. Zoogeography and Distribution of Popular Mammals. Garhwal Himalaya, Nature, Culture & Society. (Eds. O.P. Kandari & O.P. Gusain). Trans Media, Media House, Srinagar Garhwal.
- Mani. M.S. 1974. Ecology and Biogeography in India. The Hague. Dr. Junk Publisher. Monographiae Biologicae, 23:727pp.
- Parmanand, Goyal, C.P. and Singh, R.L. 2000. Management Plan of Gangotri National Park. Wildlife Preservation Organisation, Forest Department Uttar Pradesh.
- Rodgers, W. A., Panwar, H.S., and Mathur V.B. 2000. Wildlife Protected Area Net work in India. Wildlife Institute of India, Dehra Dun
- Uniyal, V.P. 2004. Bharal- The Most Sighted Ungulate of Nanda Devi National Park, *Tiger paper*. Vol. 31.No. 1: 21-25.