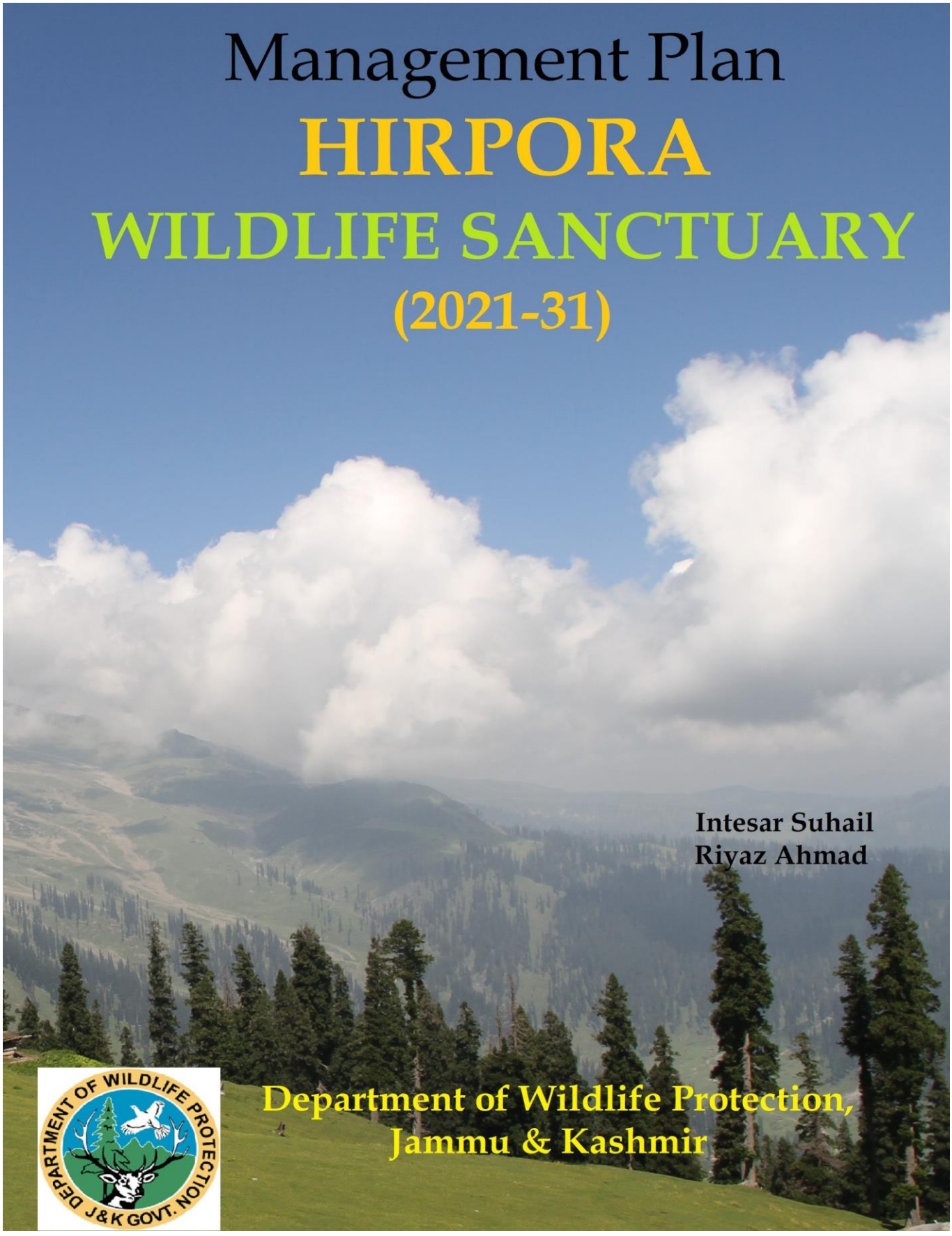
Management Plan

HIRPORA WILDLIFE SANCTUARY

(2021-31)



Intesar Suhail
Riyaz Ahmad

Department of Wildlife Protection,
Jammu & Kashmir

Contents

Page no.

Foreword i

Introduction ii
Acknowledgements iii

Part I EXISTING SITUATION

Chapter-1. Introduction to the area 13

1.1 Name, Location, Constitution and Extent of the Area

1.2 Approach and Access

1.3 Significance and Conservation Value of the Area

Chapter-2. Background Information 18

2.1 Boundaries

2.2 Geology, Rock and Soil

2.3 Terrain and Drainage

2.4 Climate

2.5 Flora

2.6 Fauna

Chapter-3. Management: Past and Present 41

3.1 History of Management

3.2 Present Management

- 3.2.1 Administrative Setup, Organizational Structure & Human Resource
- 3.2.2 Present Management Practices
- 3.3.3 Eco-Sensitive Zone

3.3. Problems in Management

- 3.3.1 Domestic Livestock Grazing
- 3.3.2 Encroachment
- 3.3.3 Forest Fires
- 3.3.4 Fire-wood & Fodder Collection
- 3.3.5 Pathological Problems
- 3.3.6 Lack of Human Resource & Administrative Units
- 3.3.7 Lack of Infrastructure & Equipment
- 3.3.8 Human-Wildlife Conflict
- 3.3.9 Soil Erosion
- 3.3.10 Pollution

Part II THE PROPOSED MANAGEMENT

Chapter-4. The Vision, Objectives & Issues 64

4.1 The Vision

4.2 Management Goals

4.3 Objectives of Management

4.4 Issues in achieving the Management Objectives

4.5 The SWOT Analysis

Chapter-5. The Management Strategies 69

5.1 Habitat Management

- 5.1.1 Afforestation & Aided Regeneration
- 5.1.2 Soil Conservation
- 5.1.3 Pasture Development
- 5.1.4 Forest-fire Control

5.2 Protection & Surveillance

- 5.2.1 Anti-Poaching Measures
- 5.2.2 Anti-Grazing Measures
- 5.2.3 Demarcation & Fencing

5.3 Infrastructure Development

- 5.3.1 Staff Residences
- 5.3.2 Foot Bridges
- 5.3.3 Shelter Sheds & Watch Towers
- 5.3.4 Entry Gates & Check-posts
- 5.3.5 Nature Interpretation Centre
- 5.3.6 Equipment

5.4 Reorganization of Administrative Units

- 5.4.1 Reorganization Proposal
- 5.4.2 Zonation
- 5.4.3 Taking over of Pending Notified Areas

5.5 Research, Survey & Census

5 .6 Conservation of Medicinal Plants

5.7 Eco-development Activities

- 5.7.1 Constitution of Eco-Development Committees
- 5.7.2 Reducing Fire-wood & Fodder dependency of Communities
- 5.7.3 Village Community Facilities

5.7.4 Livestock Vaccination
5.7.5 Livelihood Support

5.8 Mitigation of Human-Wildlife Conflict

5.9 Eco-tourism

5.10 Wildlife Health Management

5.11 Awareness and Publicity

Chapter-6. The Budget 108

Activity Monitoring Formats

References

Appendices

Foreword



The Pir Panjal along with the Greater Himalayan Mountain Range that cradle the vale of Kashmir have played a major role in shaping its ecological and socio-cultural identity and at the same time the high altitude passes in these mountains have served as the means of connectivity of this region with the outside world. Rising sharply to an average elevation of more than 4000 meters, the Pir Panjal separates the Jammu hills to the south, from the Kashmir valley. Situated in the Pir Panjal and characterized by dense coniferous forest tracts, pristine high-altitude lakes and vast alpine meadows is the Hirpora Wildlife Sanctuary, a repository of immense floral and faunal wealth.

With its fascinating landscape and rich biodiversity, Hirpora Wildlife Sanctuary has always found a special mention among the Protected Areas (PAs) of Jammu & Kashmir. Hirpora is home to the charismatic Markhor (*Capra falconeri*), the world's largest mountain goat and deserves adequate protection so that one among a few of the last remaining populations of this threatened species is saved for the generations to come. Besides Markhor, the wildlife inhabiting the Hirpora landscape include the Himalayan Brown Bear (*Ursus arctos*), the Asiatic Black Bear (*Ursus thibetanus*), the Kashmir Musk Deer (*Moschus cupreous*) and the Common Leopard (*Panthera pardus*). The sanctuary is also home to a rich diversity of birds which includes groups as diverse as pheasants, woodpeckers, finches, thrushes, accentors, warblers, flycatchers and a variety of birds of prey.

Burgeoning pressure of modern consumption centric life demands a delicate balance among the ecological, sociological and commercial drivers and that balancing act only can lead to the long-term sustenance of the tremendous bio-diversity that places like Hirpora are abound with. Wildlife Management Planning is the first step in this direction. To achieve the holistic goal of long-term sustenance of ecosystems and simultaneous socio-economic development, a well-designed pre-planned document is a pre-requisite.

The Pir Panjal landscape has had a distinction of having a working plan dating back to 1925 with revisions in 1964 and 1977. With the notification of Hirpora Wildlife Sanctuary in 1987, the need to have a detailed wildlife specific management plan for the PA was felt and in 2009 a "Species Recovery Programme" for Markhor was formulated which, treating Markhor as a flagship species laid down detailed management interventions to be undertaken for the next five years to conserve the associated faunal species with their habitat as well. This was followed by the first management plan (2015-20), which was an improved version of the previous one. The present management plan, having a tenure of 10 years (2021-31) is a comprehensive document developed on the basis of experiences gained and lessons learnt from the implementation of previous plans and aims at strategizing the management inputs so as to achieve the conservation goals. The management strategies outlined in the present plan are based on scientific knowledge gained through applied-field-research. Apart from highlighting the core ecological values and prioritizing their promotion, the present plan gives special attention to various aspects of participatory management including community alleviation through livelihood generation and regulated eco-tourism.

I am sure the implementation of the management strategies put forth in the management plan will go a long way in addressing the various conservation issues facing the managers and their effective execution in the field over the next decade, will help in safeguarding the sanctuary as a refuge for the rare wildlife that it harbors.

I complement Sh. Rashid Y. Naqash, Regional Wildlife Warden, Kashmir, Sh. Intesar Suhail, Wildlife Warden, Shopian and Sh. Riyaz Ahmad, Project Head, Wildlife Trust of India for completion of revision of management plan of Hirpora Wildlife Sanctuary in a time bound manner.

Suresh K Gupta (IFS)
Chief Wildlife Warden,
Jammu & Kashmir

Introduction

Hirpora Wildlife Sanctuary was created in 1987, but the region has always been famously known as an important habitat of the Markhor (*Capra falconeri*), the largest goat in the world. Markhor has a limited geographical distribution in the moist to semi-arid mountain tracts of Pakistan, India, Afghanistan, Uzbekistan, Turkmenistan and Tajikistan. Within India, Markhor is only found in Jammu & Kashmir. Here it is distributed mostly across the Pir Panjal mountain range with the main population inhabiting the Kazinag mountains in the north and Hirpora being the citadel of this magnificent species in the south.

Schaller (1997) estimated the total population of the Markhor in Jammu & Kashmir to be 250-300 whereas Roberts (1997) speculated that the animal in the Pir Panjal on both the sides of the Line of Control (LOC) had been practically exterminated. Ranjitsinh (2005) reported that no information on the status and distribution of the species in Jammu & Kashmir existed. A survey conducted by the Department of Wildlife Protection, Jammu & Kashmir (Suhail & Baba, 2002), however confirmed the occurrence of Markhor within the limits of J&K. Later in 2005, the Department of Wildlife Protection in collaboration with the Wildlife Trust of India (WTI) and the Nature Conservation Foundation (NCF) undertook surveys in the past distribution range of Markhor in J&K to know their present status. The survey confirmed the presence of Markhor in the three wildlife sanctuaries namely Hirpora, Limber and Lachipora through direct sighting. The survey also designated these areas as the best possible sights for population recovery of the species and stressed that any conservation programme should concentrate on these areas as a priority.

Apart from Markhor, the biological diversity that Hirpora Wildlife Sanctuary supports, includes a varied range of mammalian, avian, reptilian and lepidopteran life forms which makes it ecologically one of the most significant Protected Areas (PAs) in the region. The Hirpora landscape consisting of an array of high mountain peaks, expanses of alpine meadows & pastures, high altitude glacial lakes and vast tracts of rich coniferous forests is a true representation of a Himalayan ecosystem. The significance of such ecologically important yet fragile areas has always demanded a thorough scientific and methodical planning for their conservation.

The present management plan is aimed to protect and conserve the flagship species, Markhor along with other faunal and floral elements by adopting a scientific yet participatory approach sustainably meeting the requirements of various stakeholders including local communities.

Rashid Y Naqash
Regional Wildlife Warden, Kashmir

Acknowledgements

We express our deep sense of gratitude to Shri Suresh Kumar Gupta IFS, Chief Wildlife Warden, Jammu & Kashmir for his valuable guidance and encouragement which were a driving force behind preparation of this management plan. We are extremely grateful to Shri Rashid Yahya Naqash, Regional Wildlife Warden, Kashmir for his constant support & advice during the entire period of formulation of this plan.

The team of experts and officers including Dr Khursheed Ahmad, Assistant Professor-cum-Scientist & Head, Division of Wildlife Sciences, SKUAST-Kashmir, Shri Irfan Ali Shah IFS, Conservator of Forests, Working Plan Circle, Shri Tawheed Deva IFS, Conservator of Forests, South Circle and Dr. Sameena Charoo, Research Officer, Wildlife Protection Department involved in review of the drafts at various stages deserve special thanks for their painstaking efforts which were helpful in improving upon the drafts.

We are highly thankful to Shri Sameer Dar, Researcher Wildlife Trust of India, for providing the valuable data from his study on nomadic herders in Hirpora Wildlife Sanctuary and to Shri Tahir Ghazanfar from the same organization for his assistance in the field.

We also wish to thank the office staff of Wildlife Division, Shopian, particularly Shri Mohammad Yaseen Bhat, Jr. Assistant and Shri Gulzar Ahmad Khan (ReJ) for their assistance in extraction of data from office records. We are indebted to Shri Shabir Ahmad, I/c IT cell, Photo Interpretation Division, J&K Forest Department for preparation of digitized maps.

Last but not the least, we wish to thank Shri Lateef Ahmad Wani, I/c Range officer Hirpora and the frontline staff of the sanctuary namely Shri Mushtaq Ahmad rather, I/c BO; Shri Aamir Ahmad Ganai, Shri Mudasir Ahmad Shah & Shri Raja Suhail Mir, Wildlife Guards; Shri Mushtaq Ahmad Ganai, Shri Ghulam Mohiuddin Ganai & Shri Mohammad Ashraf Khan, Helpers and Shri Rais Ahmad Jan & Shri Aatif Hussain Malik, Rahbar e Janglat for sharing their field experiences and providing fruitful suggestions.

Intesar Suhail,
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Project Head, WTI

PART I

EXISTING SITUATION

CHAPTER-I

Introduction to the Area

Rodgers & Panwar (1988) bio-geographically placed the Kashmir valley in the Province North-west Himalaya (2A) of the Zone Himalaya. The valley is encompassed between the Pir Panjal Mountains running from West-Northwest to East-Southeast and the Greater Himalayan range, almost running parallel to the former to its north-east. Roughly around 135 km long and 32 km wide, the valley of Kashmir is mainly drained by the River Jhelum with Veshav, Lidder & Sind streams as its main tributaries.

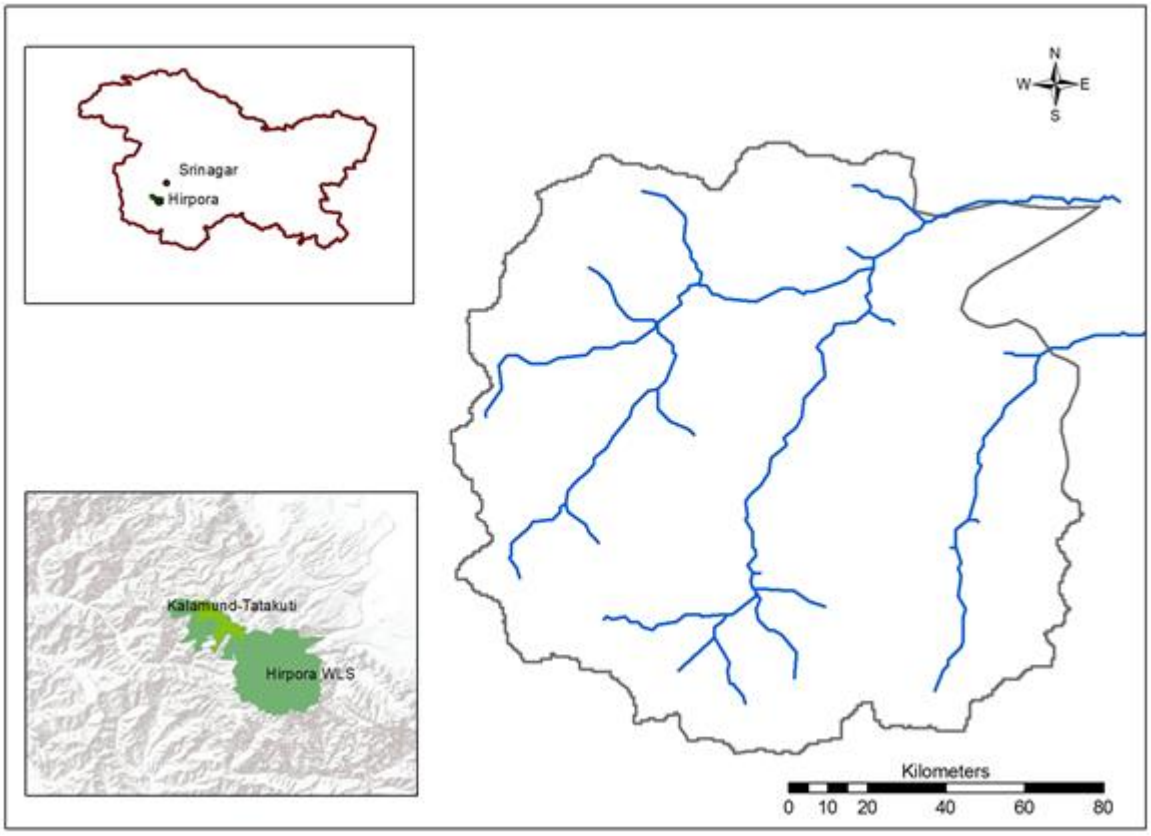
Hirpora Wildlife Sanctuary situated in the Pir Panjals comprises of a typical Himalayan landscape, showing diverse mountainous features with varied vegetation types along the altitudinal gradient. The vegetation ranges from the sub-tropical through temperate to sub-alpine and alpine but differs from other western Himalayan forests in the preponderance of conifers and less of oaks.

1.1 Name, Location, Constitution and Extent of the Area

Hirpora Wildlife Sanctuary gets its name from the village Hirpora (a corruption of the name Surpora: Bamzai 1962), a small hamlet that lies on the northeastern fringes of the Protected Area (PA). This area has been a traditional route for travelers coming to the Kashmir valley from the plains of India and finds mention in Kalahan's *Rajtarangini* and Khsemendra's *Samayamatrika* (11th century AD). Historians named the route as Salt Road because of the salt traders, who used to enter the valley through the passes on this route. The route was later developed by the Mughal rulers and came to be known as the Mughal Road. The same route has also been used by migratory herders, the *Bakarwals* to enter into the Kashmir valley with their livestock to graze in its alpine and sub-alpine pastures during summer. This road has recently been widened and partly re-aligned and rebuilt into a motorable highway connecting the town of Shopian with Rajouri and Poonch in the Jammu province.

Hirpora Wildlife Sanctuary is situated in Shopian district of Kashmir, in the Pir Panjal range of the Western Himalayas and covers an area of 341 Km^2 (Figure 1.1). It is located between latitude

33° 29' to 33° 41' N and longitude 74° 30'E to 74° 43'E and covers an altitudinal range of 2557 to 4745 m.



FigureI.I: Location and boundary of Hirpora Wildlife Sanctuary with major streams

The Sanctuary was carved out of the Shopian Forest Division in the year 1987 through a government notification No. FST/WL/San/Hirpora/87 (SRO-153), dated 19th of March 1987. (See Appendix). While framing the organizational set up of the Department of Wildlife Protection, the Government of Jammu & Kashmir, further notified the establishment of Sanctuary, vide its order No 128-FST of 1991 dated 13th of May 1991.

A subsequent notification (DCS/LA/07/16-21/PRC dated 17.10.2007) extending the eastern and southern boundary of the sanctuary and adding another 150 km^2 was issued in lieu of the land diversion for the Mughal Road, increasing the area to 341 km^2 (See Appendix).

I.2 Approach and Access

The Sanctuary lies about 70 km south of the capital city of Srinagar in the Shopian district of Jammu & Kashmir. The district headquarter is approximately 12 km, the nearest airport, Srinagar about 70 km and the nearest railhead, Kakapora about 30 km from Hirpora. From Srinagar, the sanctuary is easily approachable by road. Frequent bus and cab services are available from Srinagar and neighboring towns for Shopian.

I.3. Significance and Conservation Value of the Area

Hirpora forests form an important habitat for the Markhor (*Capra falconeri falconeri*), a mountain goat listed in schedule I of the Indian Wildlife (Protection) Act, 1972, Appendix I of the CITES (1992) and included under the Near Threatened category of the IUCN Red List (2014). Globally, apart from Jammu & Kashmir, Markhor is distributed in Afghanistan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. In Kashmir the main population of Markhor is distributed mostly across the Pir Panjal Range and the Kazinag mountain ranges. Whereas Hirpora is the main citadel of markhor in the South Kashmir Pir Panjals, the Kazinag National Park along with the two sanctuaries: Limber & Lachipora together with the Naganari Conservation Reserve form the stronghold for this species in the north. Thus, for the long-term survival of Markhor, Hirpora Wildlife Sanctuary is of immense importance, as it presently harbors the southernmost population of its Kashmir sub-species. Hirpora along with adjacent areas of Tattakuti-Kalamund, which are under the process of being declared as a sanctuary, together provide a reasonably sized area for this threatened species to thrive. Ranjitsinh (2005) considers the area to be having a "potential source population for conservation and restocking of the species in the rest of its range".



Figure1.2: Markhor, the largest Goat in the World. ***(Photo: Jainy Maria)***

Besides Markhor, the area is home to several threatened mammalian species including Kashmir Musk Deer, *Moschus cupreus* (IUCN: *Endangered*; CITES: *Appendix I*); Common Leopard, *Panthera pardus* (IUCN: *Vulnerable;* CITES: *Appendix I*) Himalayan Brown Bear, *Ursus Arctos* (IUCN: *Least Concern*; CITES: *Appendix II*) and Kashmir Gray Langur, *Semnopithecus ajax* (IUCN: *Endangered;* CITES: *Appendix I*);

Hirpora Wildlife Sanctuary has been designated as an Important Bird Area (IBA) under one of the Birdlife International's important programmes spread across 100 countries (Rahmani et al. 2012). This programme aims to identify, monitor and protect a global network of priority sites for conservation of the world's birds and associated biodiversity. IBAs have now been recognized as sites of high biodiversity importance and designated as *"Important Bird & Biodiversity Areas"*.

The threatened bird species recorded in the sanctuary include Egyptian Vulture, *Neophron percnopterus* (IUCN: *Endangered*; Birdlife Data Zone: *Endangered*); Bearded Vulture, *Gypaetus barbatus* (IUCN: *Near Threatened*; Birdlife Data Zone: *Near Threatened*); Himalayan Vulture, *Gyps himalayansis* (IUCN: *Near Threatened*; Birdlife Data Zone: *Near Threatened*) and Kashmir Flycatcher, *Ficedula subrubra* (IUCN: *Vulnerable*; Birdlife Data Zone: *Vulnerable*).

Hirpora Wildlife Sanctuary has a distinction of possessing some of the largest and magnificent alpine water bodies found in the Pir Panjals. These high-altitude fresh water lakes fed by glaciers act as water reservoirs and feed a number of streams, most of which then join the main drainage, *Rambiara* to

flow down into the valley. The water bodies besides acting as transit sites for a few of the migratory bird species in passage also play an important role as high altitude aquatic ecosystems, supporting a diverse zoo and phytoplankton setup. Four of the high-altitude lakes within the limits of the sanctuary include:

1. Bhagsar (Elevation: 3940 msl, Area: 71.65 ha)
2. Laksukhsar (Elevation: 4020 msl, Area: 30.28 ha)
3. Nandansar (Elevation: 4010 msl, Area: 20.50 ha)
4. Chandansar (Elevation: 3918 msl, Area: 16.38 ha)

In addition to the ecological attributes, this area is of immense cultural significance as the historically important Mughal Road passes through the Sanctuary. While the road has been renovated and remade, some of it following the original alignment, old remnants of the road still exist.

Also existing are the old "*Sarais*" or rest houses constructed by the Mughals a good five centuries ago and now in ruins. These archeological sites are of great interest to a student of History. The area also has a considerable aesthetic value as access to alpine areas is relatively easy and the landscape offers excellent vistas for travelers, nature lovers and tourists.

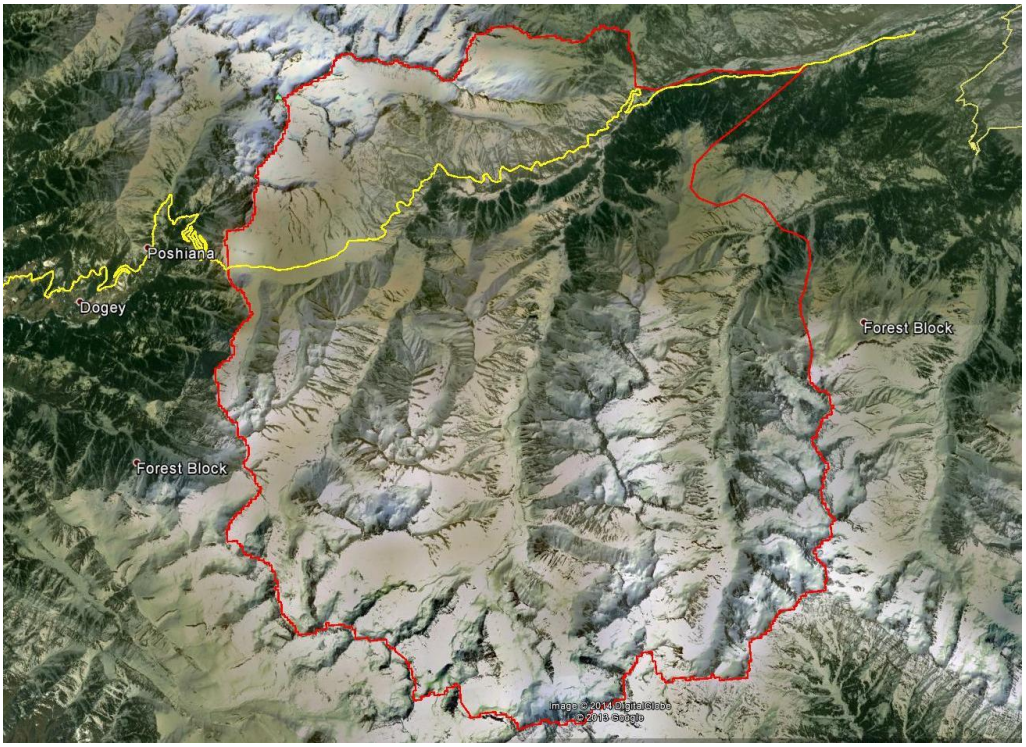


Figure1.7: A Satellite Imagery of Hirpora Wildlife Sanctuary with Mughal Road shown in yellow



Figure1.8: Mughal Monument, The Aliabad *Sarai (Photo: Intesar Suhail)*

CHAPTER-2

Background Information

2.1. Boundaries

The prominent land features on different directions along the boundary of the Hirpora Wildlife Sanctuary include:

North:	Nabapir Pass, Shipkor, Patandoban
Northeast:	Village Hirpora
East:	Topi, Tatjan, Prishi
Southeast	Gurwatan
South:	Bhagsar, Rupri Gali,
Southwest	Laksukhsar
West:	Nandansar, Pir Panjal Pass
Northwest	Chhatapani ko Nezo, Dhelimarg

2.2. Geology, Rock and Soil

The Pir Panjal Range contains rock formations belonging to the Pre-Paleozoics, Paleozoics, Mesozoics and Cenozoics. The rock formations can be grouped as the recent and sub-recent (*Karewa*) deposits of the flatter and gently inclined valley parts and the older formations of the hilly parts (Ticku 1977). The hilly parts embrace all the more solid rock systems of schist, slates, lime stone and shale together with volcanic rocks known as Panjal Trap. From Hirpora onwards there is a continuous descending series of slate and sand stones mingled with a few bands of conglomerates till Aliabad where these rocks are underlined by white or buff quartzite.

According to Ticku (1977), the soil is in the area is of 'good depth' and 'clayey to loamy' in nature, as they were generated from such clay rock systems as Panjal sedimentaries and *Karewas.* The soil varies with the underlying rock formation and the soil depth depends majorly on the slope and the dip of the rocks; steeper the slope, shallower the soil. However, shallow soils are supported by trap rocks. 1977).

2.3. Terrain and drainage

The topography of Hirpora Wildlife Sanctuary is mountainous with slopes of moderate to steep gradient broken by rocky cliffs (Figure 2.1). The landscape is dominated by mountainous valleys, rugged cliffs and upland pastures. The altitude of the Panjal ridge varies from 3500 to 5000 m (Figure 2.2). It is characterized by deeply cut valleys and precipitous gorges (Chakraborty 1983).

The western and southern sides are steep while as the eastern mountainous ridge is gentler to moderate slope (Figure 2.3). The gentle and graded nature of the slope on the northern flank makes it ideally suited to the accumulation of snow. Pertinently, all Pir Panjal glaciers rest on the northern slopes. The terrain is undulated, crisscrossed by gullies and numerous smaller mountain drains or *nars.* The altitude of the sanctuary varies from 2557m above msl to 4745m above msl.



Figure 2.1: A view of Rocky Cliffs *(Photo: Riyaz Ahmad)*

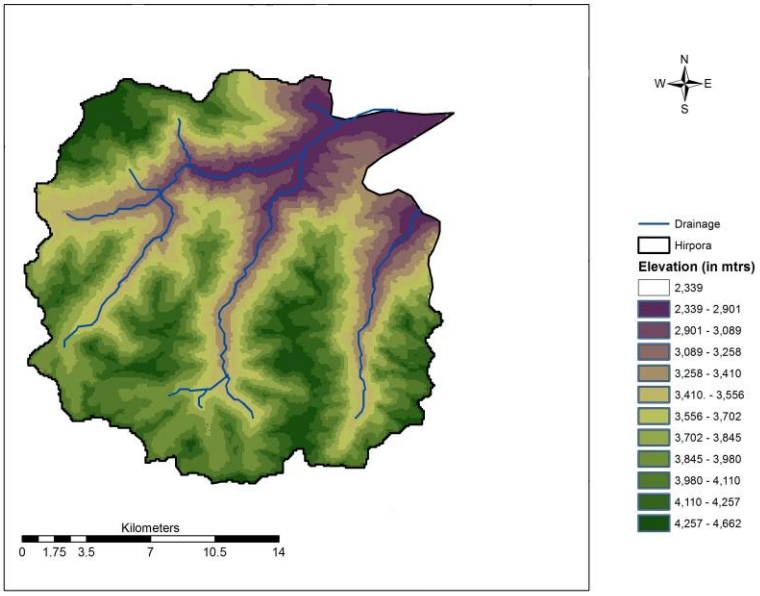


Figure 2.2: Major Elevation Classes present in Hirpora Wildlife Sanctuary

The main river draining the Hirpora catchment is called Rambiara, the sources of which are the twin lakes of *Chandansar* and *Nandansar*. Various tributaries join it before it hits the valley, the important one being the Rupri nalla originating from Bhagsar. Others include *Khushikidar nar*, *Zaz nar* and *Kaukul*. All these are perennial owing to high snowfall and presence of several lakes in the upper reaches.

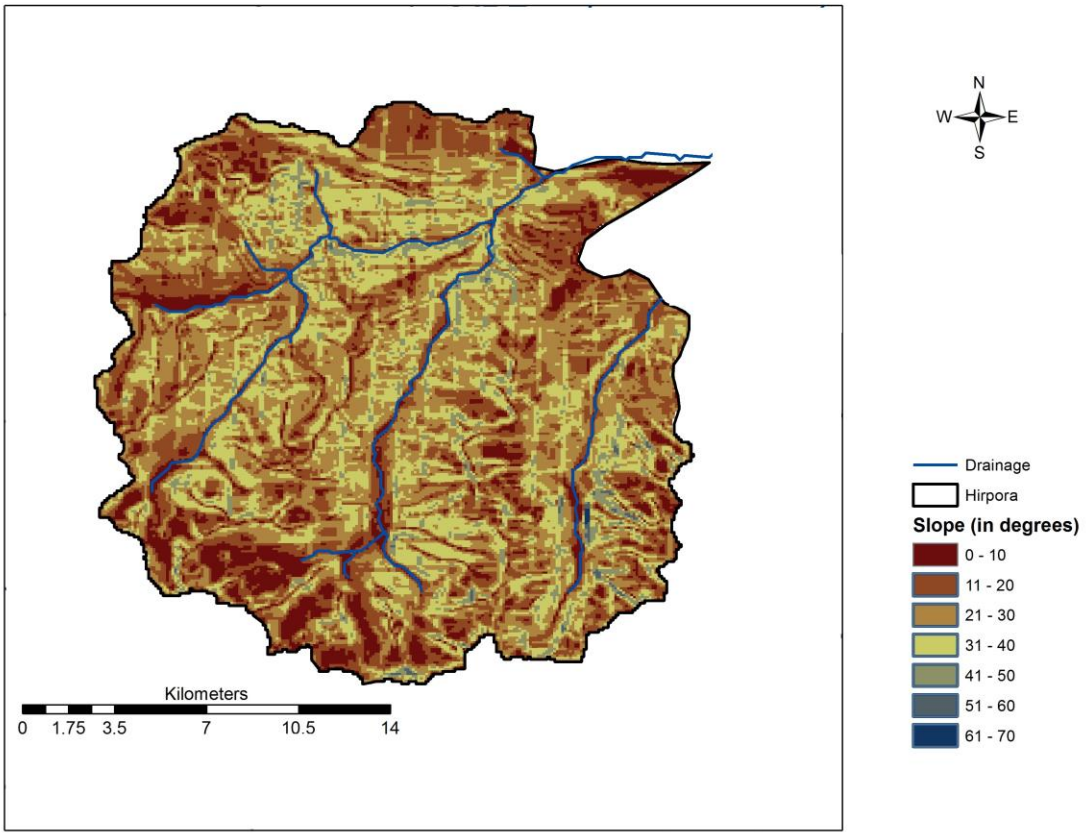


Figure 2.3: Major Slope Classes present in Hirpora Wildlife Sanctuary

2.4 Climate

Although the basic pattern of weather and climate over the Himalayas is governed by the summer and winter monsoon system of Asia (Mani, 1981), the weather systems in Kashmir valley are chiefly affected by extra tropical western system (Western Disturbances), which moves in winter over the north of the sub-continent from west to east.

The climate of the area may be described as Sub-Mediterranean to typically Temperate with higher degrees of variation in precipitation and dryness (Figure 2.4). Generally, two spells of dryness

are experienced one in June and another in September to November. Snow is the main source of precipitation and in some parts of the sanctuary may be found till June. Heavy snowfall occurs in the Pir Panjal range which decreases rapidly eastward (Chakraborty, 1983). Shopian receives about 800-900 mm of rain annually.

Four distinct seasons occur across the year: spring (March-May), summer (June-August), autumn (September-November) and winter (December-February) (Ivan 1997). The winters are cold while the summers are pleasant. The entire Sanctuary however, generally remains under snow cover from the Ist week of December to 15th of April. During winter the average temperatures remain between –3.4° C (minimum) and 8.0° C (maximum) while during summer season the average temperatures have been recorded between 9.5° C (minimum) and 22.7° C (maximum). In winters, from December to February, temperature may sometimes drop down up to - 20° C.

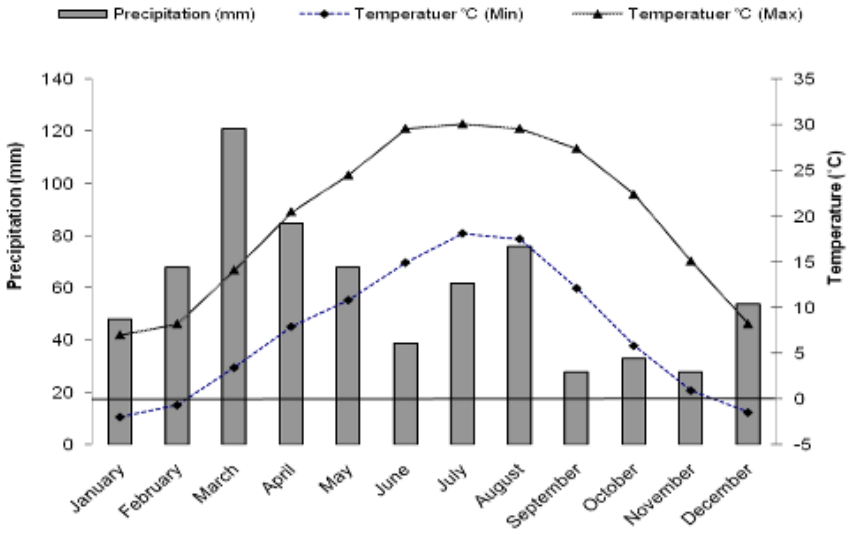


Figure 2.4: Monthly variation of average precipitation, minimum & maximum temperatures (Anantnag)

2.5 Flora

In the Western Himalaya and also in the Pir Panjal Range, there is no tree growth above 3,600m. Forest mainly occurs between 1,950-3,200m. The meadows lie largely above 3,000m although at certain places, sub-alpine blanks are also found below the tree line (Ticku, 1977).

The forests of the Pir Panjal and of the Hirpora Wildlife Sanctuary can be conveniently divided into three well defined zones: the Kail zone, the Fir zone and the Alpine zone.

a) The Kail Zone: The Kail (*Pinus wallichiana*) is more widespread species in this zone and within the sanctuary it is found in *Chirinbal*, *Kamalkote*, *Hustvunz*, *Laid*, *Kokad pad*, *Pattandoban*, *Mian ka Bela*, *Raineur* and along the lower parts of *Begampathri*. Kail forms almost true stands with almost complete absence of broad-leaved associates in some pockets.

But in some areas *Acer, Prunus, Populous and Salix* are the broad-leaved associates whereas the Fir, Spruce and Yew are the coniferous associates. The undergrowth too is limited to species like *Rosa*, *Indigofera*, *Plectranthus, Viburnum, Salix,* and *Skimmiea.* Kail is found upto 3,000 m.

b) The Fir Zone: The Pir Panjal is known for its Fir (*Abies pindrow*) and Hirpora Wildlife Sanctuary is no exception. It may be found from 2100m to 3200 m near the *Sotchalpathri*, *Patandoban*, *Hustvunz*, *Shipkor*, *Raineur*, *Topi*, and *Kamalkot* areas within the sanctuary. It has been argued (Ticku 1977) that the absence or paucity of summer monsoon is responsible for the scantiness of the ground flora in these forests but plenty of snow in winter helps the Fir seeds to germinate in abundance.

c) Alpine zone: Found above 3200m, extant grasslands dominate the landscape.

The vegetation types present in Hirpora Wildlife Sanctuary (Figure 2.5) and surrounding areas include the Western Mixed Coniferous Forests (12/c1d), Deciduous Sub-alpine Scrub (14/1s2) and Sub-alpine and alpine pastures (14/DS1) (Champion and Seth 1968).

However, before this classification came into practice, there was enough evidence to classify the Kashmir Valley Forests as a type by themselves, christened as "Kashmir Valley Temperate Type" (Ticku 1977). According to this classification, the dominant communities for the entire Pir Panjal are given in figure 2.5

Major vegetation types found in Hirpora are:

Riverine: (below 2500m): The riverine vegetation includes the stream side flora which is confined to the main nallahs and their tributaries. This is typically constituted of conifer species like the Blue Pine and Fir in lower areas whereas along the higher areas it is open grasslands. The dominating shrubs are *Viburnum continifolium, Berberis lycium, and Sorbaria tomentosa.* Other tree species found here are *Aesculus indica* and *Juglans regia* associated with *Ulmus nitida, Robinia pseudoacacia, Populus ciliata and Salix caprea.*

Middle slopes/Temperate zone: (2500-3100m) Blue Pine and Fir forests dominate the middle slopes. The other conifer species associated with Blue pine and fir is spruce (*Picea smithiana*). The broad-leaved trees associated at some locations include Maple (*Acer caesium)* and *Prunus spp.* The dominant shrub species include *Rosa brunonii, Indigofera heterantha, Taxus walliciana* and *Isodon sp.* The ground cover is dominated by Kashmir Elder (*Sambucus wightiana*) and *Stipa sibirca.*

Kail community:

i) *Pinus wallichiana, Abies pindrow, Picea smithiana*.
ii) *Populus ciliata, Corpus colurnna, Acer pictum, Prunus padus*.
iii) *Viburnum nervosum, Indigofera gerardiana*, *Desmodium tiliaefolium, Salix sp., Skimmea sp., Rosa sp*.
iv) *Sambucus ebulus*
v) *Frageria vesca, Viola serpens, V. odorata, Salvia glutinosa, Thymus serpyllum.*

Kail-Fir community:

i) *Pinus wallichiana, Abies pindrow.*
ii) *Viburnum nervosum, Rosa sp., Cotoneaster sp., Rhododendron sp.*
iii) *Sambulcus ebubus*
iv) Viola sp., Frageria vesca, Salvia sp.

Fir- Kail Community:

i) Abies pindrow, Pinus wallichiana, Picea smithiana
ii) Aesculus indica, Prunus padus,
iii) Viburnum nervosum, V foetens, Skimmia laureola,
iv) Sambucus ebulus, Polygonum sp., Pteridium aquilinum Frageria vesca, Geranium wallichianum, Anemone sp.

Fir Community:

i) Abies pindrow, A spectabilis, Picea smithiana, Pinus wallichiana
ii) Acer caesium, Acer pictum, Aesculus indica, Taxus baccata, Betula utilis
iii) Viburnum foetens, Skimmia laureola, Rosa sp, Spiraea sp.
iv) *Sambucus ebulus, Polygonum sp, Rumex sp*.
v) Frageria verca, Viola spp, Geranium wallichianum, Gentiana kurroo, Strobilanthus sp.

Figure 2.5: Vegetation Communities in Hirpora Wildlife Sanctuary



Figure 2.6: A view of Riverine Forest *(Photo: Riyaz Ahmad)*



Figure 2.7: Conifer stands with alpine zone in the back ground *(Photo: Intesar Suhail)*

Sub-alpine: (3100 -3500m) The Fir and Birch (*Betula utilis*) forests dominate the subalpine vegetation. The associated tree species include Spruce and Blue Pine while the dominant shrub species are *Juniperus, Lonicera and Caragana.* The ground cover is dominated by the herb species, *Sambucus wightiana* and grasses like *Stipa sibirca.* Blue Pine is also associated with *Rosa brunonii,* Birch and Elm (*Ulmus wallichiana*). Other dominant shrub species include *Indigofera heterantha.* Part of the sub-alpine habitat is dominated by sub-alpine meadows and scrub.

Alpine (3500– 4000m): The alpine meadows comprise the alpine pastures, locally known as "margs" and are used as summer pastures by migratory herders and local shepherds. These meadows harbour open grassland communities and form the characteristic alpine tundra. Chief constituents of these communities include the following colourful alpine herbs with various medicinal uses: *Aconitum heterophyllum, Aquilegia nivalis, Callianthemum* spp., *Aster* spp., *Salvia hians, Phlomis bracteosa, Geranium himalayense, Potentilla atrosanguinea, P. kashmirica, Geum elatum* and *Selinum vaginatum,* to name a few. A few ground-hugging herb-like shrubs like *Salix flabellaris* and *Gaultheria trichophylla* with the hygrophilous herbs like *Pedicularis* spp., *Primula* spp., *Anemone* spp., *Aconitum violaceum, Ranunculus* spp. are also common here (Puri 2011). At places where the glaciers descend to alpine

meadows, *Rhododendron* spp. are also present (Dar *et al.*, 2002). Juniper, Caragana and *Lonicera* sp. are other shrub species present in this zone.



Figure 2.8: Birch trees in the sub-alpine zone *(Photo: Intesar Suhail)*



Figure 2.9: An alpine meadow *(Photo: Riyaz Ahmad)*

Rock Faces (above 4000m): This altitude starts to replace the margs with rock dominated terrain. The rocky areas contain sparse vegetation but some of cliffs and hill tops are covered by dwarf evergreen shrubs including *Juniperus recurva, Rhododendron anthopogon* etc. associated with herbs, *Stachya sericea, Sieversia slata, Veronica melissaefolia* and medicinal plants like *Sausurrea sacra.*

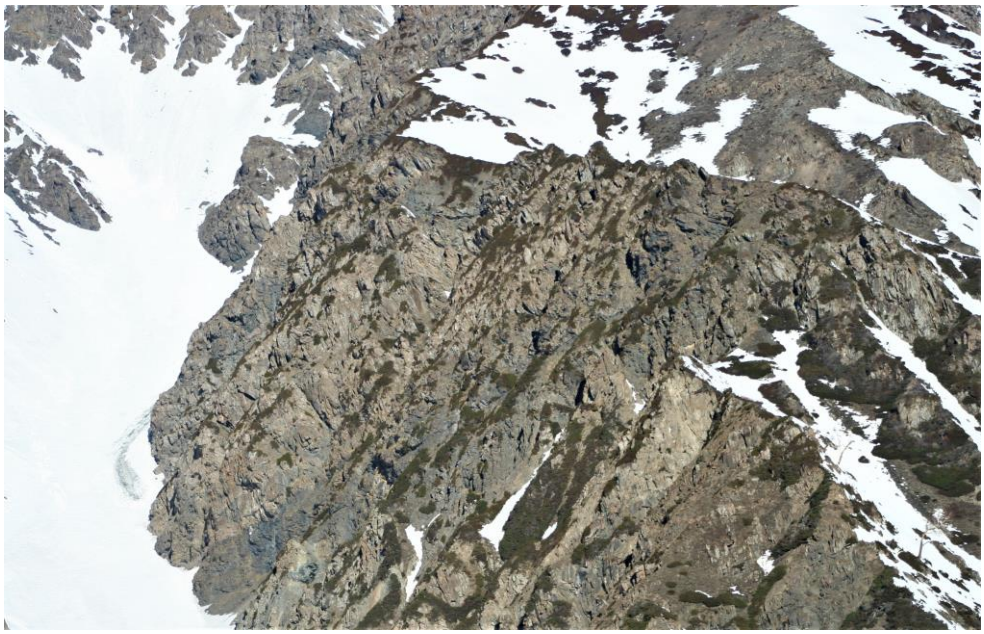


Figure 2.10: The Rock Faces with Juniper patches *(Photo: Intesar Suhail)*

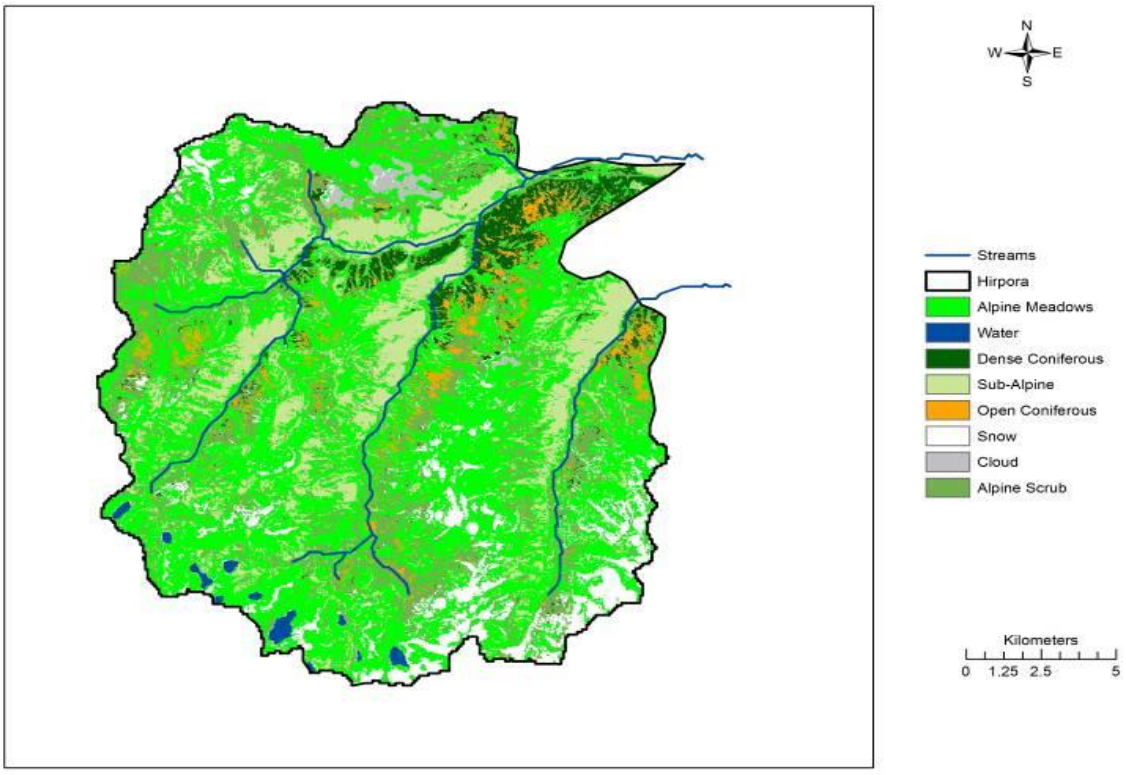


Figure 2.11: Major Vegetation Classes present in Hirpora Wildlife Sanctuary

Medicinal plants

The Pir Panjal Range of mountains is famously known for the wealth of medicinal plants it harbors. Some important ones are *Aconitum heterophyllum, Artemisia absinthium, Datura stramonium, Dioscorea deltoidea, Saussurea costus, Meconopsis aculeate, Geum elatum, Jurinea macrocephala, Codonopsis ovata, Picrorhiza kurroo, Potentilla spp., Corydalis govaniana, Saxifraga ligulate*. (Appendix)



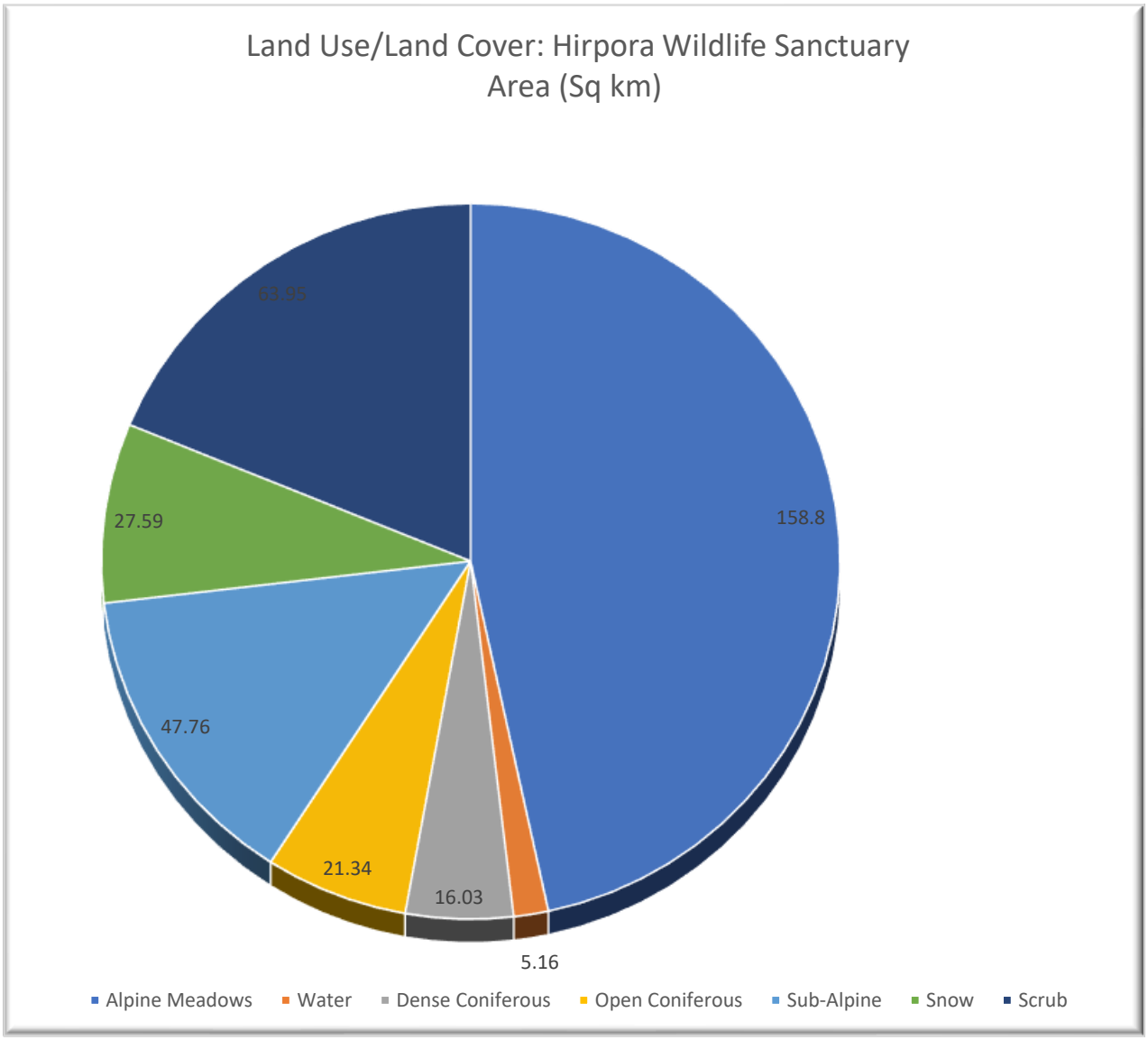
Figure 2.12: *Gentiana tianschanica*, an important medicinal plant *(Photo: Riyaz Ahmad)*



Figure 2.13: *Saussurea gossypiphora,* the Jogi Badshah *(Photo: Riyaz Ahmad)*

Table1: Land Use/ Land Cover of Hirpora Wildlife Sanctuary

Land cover category	above 3100m Area in km²	below 3100m Area in km²	Totals Area in km²
Alpine Meadows	150.45	8.35	158.80
Water	4.10	1.06	5.16
Dense Coniferous	5.84	10.19	16.03
Open Coniferous	8.34	13.00	21.34
Sub-Alpine	41.34	6.42	47.76
Snow	25.27	2.32	27.59
Scrub	56.60	7.35	63.95
Total	291.94	48.69	340.63


Land Use/Land Cover: Hirpora Wildlife Sanctuary
Area (Sq km)
158.8
5.16
16.03
21.34
47.76
27.59
63.95
Alpine Meadows
Water
Dense Coniferous
Open Coniferous
Sub-Alpine
Snow
Scrub

2.6 Fauna

According to the bio-geographic demarcation of Jammu and Kashmir by Rodgers and Panwar (1988), the Hirpora Wildlife Sanctuary falls in the North-west Himalayan Province (Province 2A) of the Himalayan zone. This Province includes the whole Kashmir valley, characterized by temperate and sub-tropical Vegetation. The faunal life is of this region is distinguished by the absence of many species which inhabit the Indian peninsula, but by the presence of many species of Indo-Chinese forms which do not occur in the peninsula, but commonly occur in the central and North-Eastern Himalayas, Southern China and Myanmar (Hilaluddin, 1997). Faunal elements show affinities with Northern Palearctic fauna as well as Eastern and Oriental fauna, forming a unique assemblage of great conservation value.

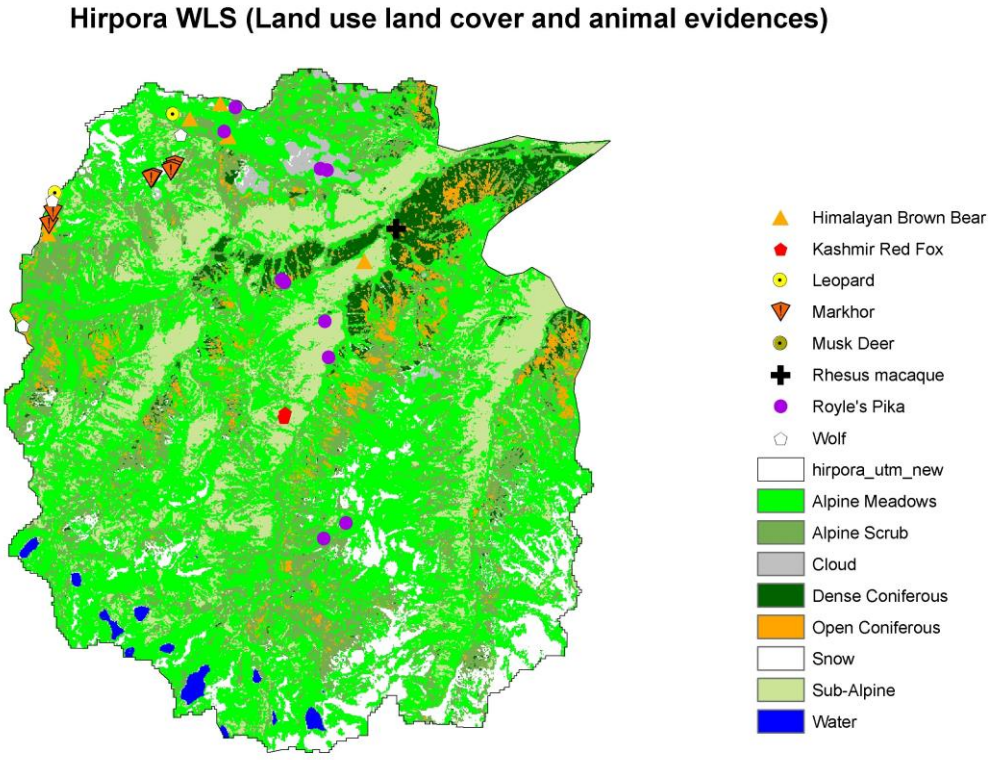


Figure 2.14: Map showing evidences of wildlife species found in different habitat types in Hirpora Wildlife Sanctuary *(Source: WTI, 2011)*

Mammals

22 species of mammals have been recorded within the limits of Hirpora Wildlife Sanctuary (Table 2), which include six species that are threatened as per the IUCN Red List. A recent survey (Puri, 2011) in Hirpora Wildlife Sanctuary recorded a mammalian encounter rate of 0.32/ km (n=41).

Table 2: Mammals found in Hirpora Wildlife Sanctuary and their Conservation Status

S.No	Common Name	Scientific Name	Status		
			IUCN Category	CITES Appendix	IWPA Schedule
01	Kashmir Markhor	*Capra falconeri*	**NT**	I	I
02	Kashmir Musk Deer	*Moschus cupreus*	**EN**	I	I
03	Himalayan Brown Bear	*Ursus arctos*	LC	II	I
04	Asiatic Black Bear	*Ursus thibetanus*	LC	I	II
05	Kashmir Gray Langur	*Semnopithecus ajax*	**EN**	I	II
06	Rhesus Macaque	*Macaca mulatta*	LC	II	II
07	Gray Wolf	*Canis lupus*	LC	I	I
08	Golden Jackal	*Canis aureus*	LC	III	II
09	Red Fox	*Vulpes vulpes*	LC	III	II
10	Common Leopard	*Panthera pardus*	**NT**	I	I
11	Leopard Cat	*Prionailurus bengalensis*	LC	I	I
12	Jungle Cat	*Felis chaus*	LR	UL	II
13	Himalayan Palm Civet	*Paguma larvata*	LC	III	II
14	Yellow-throated Marten	*Martes flavigula*	LC	III	II
15	Siberian Weasel	*Mustela sibirica*	LC	III	II
16	Mountain Weasel	*Mustela altaica*	**NT**	III	II
17	Himalayan Stoat	*Mustela ermine*	LC	III	II
18	Grey Mongoose	*Herpestes edwardsii*	LC	III	II
19	Eurasian Otter	*Lutra lutra*	**NT**	I	I
20	Royle's Pika	*Ochotona royeli*	LC	III	IV
21	Kashmir Flying Squirrel	*Eoglaucomys fimbriatus*	LC	III	UL
22	Indian Crested Porcupine	*Hystrix indica*	LC	III	IV

EN=Endangered; NT=Near-Threatened, LR=Low Risk, LC=Least Concern; UL=Un-listed

Markhor *(Capra falconeri)*

Markhor is a 'Near Threatened 'species as per the IUCN categorization, under their Red List (IUCN 2014). It is also listed in the Appendix I of the CITES and the Schedule I of the Indian Wildlife (Protection) Act, 1972. A total of 25 markhor were seen in 2004 in the sanctuary by a survey team led by MK Ranjitsinh who at that time observed that this sanctuary may hold 40-50 individuals. (Ranjitsinh et al. 2005). Hirpora Wildlife Sanctuary is one among a very few PAs which supports the last remnant populations of Markhor. The others in Jammu & Kashmir being the Kazinag National Park, the Limber & Lachpora Wildlife Sanctuaries and the Naganari Conservation Reserve. The Hirpora Markhor population can be regarded as the southern most population of the sub-species of Markhor found in this part of the world.

Ranjitsinh & his team in 2004 autumn saw two groups of Markhor in *Zaznar* area, two in *Dunali*, one group in *Teli* and another in *Rata Teli* area of the sanctuary. Ten groups of Markhor were sighted during the spring season of 2005 (Ahmad., Personal Observation). These groups were sighted in *Sotchal Pathri, Begum Pathri, Lakut Sathran, Bod Sathran, Yangnad* and *Laid*. Markhor presence was also reported from *Kamal Kot* and *Mian ka Bela.*

The main threat prevalent in the area that negatively affects the Markhor is the impact by the migrant grazing flocks on the alpine pastures which form the prime habitat of the wild goat. The disturbance caused due to the Mughal Road which runs right through the sanctuary may also have affected the animal and its movements.



Figure 2.15: Kashmir Markhor *(Photo: Riyaz Ahmad)*

Kashmir Musk Deer *(Moschus cupreus)*

Originally a sub-species of the Alpine Musk Deer (*Moschus chrysogaster*), the Kashmir Musk Deer is now treated as a separate species (Groves et al., 1995 & Grubb, 2005). This is an 'Endangered' species under the IUCN Red List (IUCN 2012) and also included in the Appendix I of the CITES & Schedule I of the Indian Wildlife (Protection) Act, 1972.

Presence of Kashmir Musk Deer in Hirpora Wildlife Sanctuary is well established but the distribution is limited to the sub-alpine forests and alpine scrub areas only making it very difficult to sight. The threats include poaching and habitat degradation.



Figure 2.16: Kashmir Musk Deer *(Photo: Intesar Suhail)*

Himalayan Brown Bear (*Ursus arctos)*

Presence of the Himalayan Brown Bear in the Hirpora Wildlife Sanctuary although very well known, was recently confirmed by camera trap images obtained from *Begumpathri* area of the sanctuary. A schedule I species as per the Indian Wildlife (Protection) Act, 1972, the Brown Bear occurs in the sub-alpine and alpine regions (3000-5000m) and the sightings are usual during summers. They often come into conflict with the nomadic graziers (*Bakarwals)* and cause damage to their flocks. Recently conflict incidents involving Brown Bear have been reported from the fringe villages situated at considerably lower elevations. Threats include retaliatory killings by nomads.

Asiatic Black Bear (*Ursus thibetanus*)

Black Bear is the smaller of the two bears found in the Hirpora Wildlife Sanctuary and inhabits lower to middle altitudes confining to within the forested areas. Of late, the valley has seen a rise in man-bear conflicts and although not much conflict is witnessed within the sanctuary, there are some high conflict areas in close proximity.



Figure 2.17: Himalayan Brown Bear *(Photo: Syed Mustahsen)*



Figure 2.18: Asiatic Black Bear *(Photo: Intesar Suhail)*

Kashmir Gray Langur *(Semnopithecus ajax)*

Formerly considered as a sub-species of the Himalayan Gray Langur, *Semnopithecus entellus* (Molur et al. 2003), it is now treated as a separate species. This primate has been classified as 'Endangered' under the IUCN Red List and is an Appendix I species as per CITES categorization. In Hirpora the troops of Kashmir Gray Langur is a common sight around *Patandoban* and *Dobjan* areas. No prominent threats have been recorded for the species from the sanctuary.

Common Leopard *(Panthera pardus)*

The Leopard is known to inhabit the lower forested habitats of the sanctuary. Encounters are common around Hirpora, *Dobjan* and *Sukhsarai* areas. Leopard is also involved in the human-wildlife interface and is responsible for considerable damage to the domestic livestock in and around the sanctuary. Threats mainly include retaliatory killings and diminishing natural prey base.

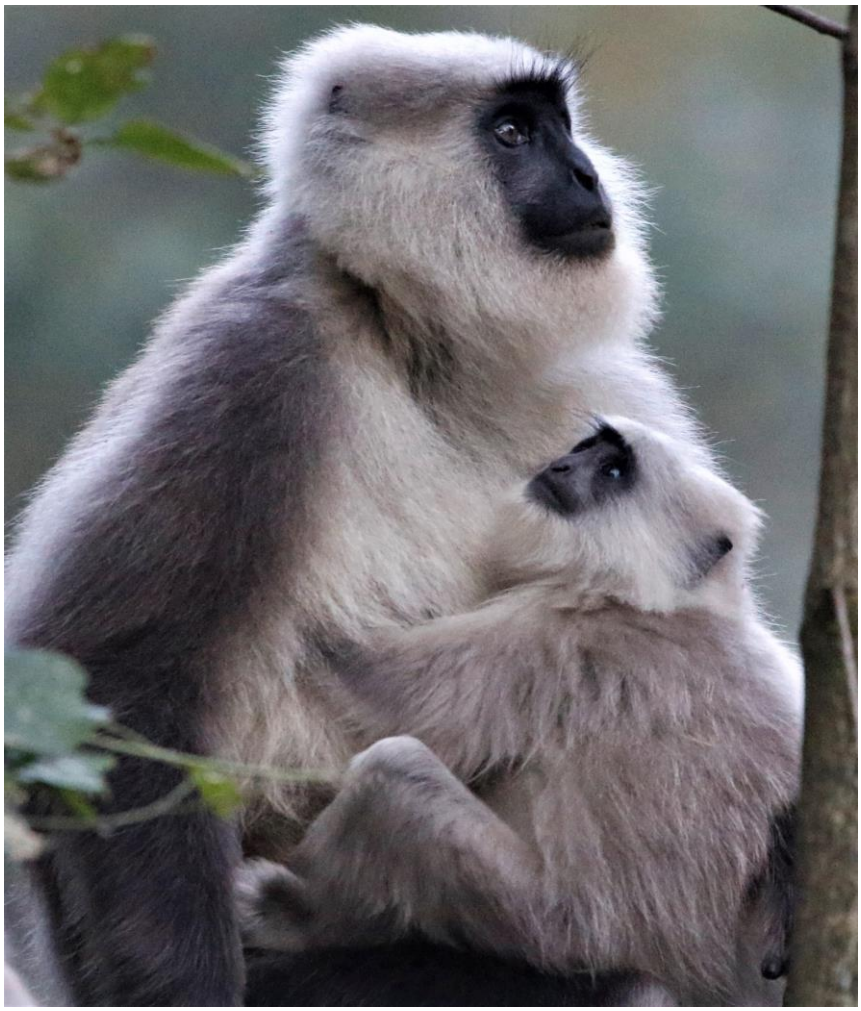


Figure 2.19: Kashmir Grey Langur *(Photo: Syed Mustahsen)*



Figure 2.20: Common Leopard *(Photo: Intesar Suhail)*

Macro-invertebrates

Macro-invertebrates of the Hirpora Wildlife Sanctuary and its adjacent areas comprised only arthropods (Insecta and Amphipoda). The major insect families are Ephemeroptera, Trichoptera, Diptera and Coleoptera (*Anonymous,* 2007).

Ichthyofauna

From the waterbodies situated in Poonch, presence of twenty fish species has been reported as per a study conducted in connection with the EIA/EMP of the Mughal Road (*Anonymous,* 2007). However, complete absence of the taxa belonging to Schilbeidae, Ophiocephalidae and Mastacembelidae was also recorded.

Avifauna

Around a hundred and twenty-five species of birds have been documented from Hirpora Wildlife Sanctuary which include an impressive assemblage of Galliformes, raptors, and passerines. Owing to the presence of high-altitude mountain passes and alpine lakes, the sanctuary is known to be an important transit for a number of migratory species on passage between their summer and winter destinations. Notable among the bird species are:

Vultures: Four species of vultures are found in Hirpora Wildlife Sanctuary (*Rahmani* et al. 2012), out of which three are enlisted as threatened under the IUCN Red List. These include Himalayan Griffon, *Gyps himalayensis* (Near Threatened), Bearded Vulture or Lammergeier, *Gypaetus barbatus* (Near Threatened), Egyptian Vulture, *Neophron percnopterus* (Endangered) and Eurasian Griffon, *Gyps fulvus*.



Figure 2.21: Himalayan Vulture *(Photo: Intesar Suhail)*

Galliformes: The species found in the sanctuary are Chukar Partridge *(Alectoris chukar),* Himalayan Monal (*Lophophorus impejanus*), Koklass (*Pucrasia macrolopha*) and the Himalayan snowcock (*Tetraogallus himalayensis*).



Figure 2.22: Himalayan Snowcock *(Photo: Intesar Suhail)*

Passerines: As a group, passerines outnumber all others and include a number of endemic and restricted range species like Orange Bullfinch *(Pyrrhula aurantiaca)*, Kashmir Nuthatch (*Sitta cashmirensis*), Kashmir Nutcracker (Nucifraga multipunctate) and the globally threatened Kashmir Flycatcher (*Ficedula subrubra*).



Figure 2.23: Orange Bullfinch *(Photo: Intesar Suhail)*

Others: Other important bird species found in the protected area are: Raptors like Golden Eagle *(Aquila chrysaetos),* Eurasian Hobby *(Falco Subbuteo*) and Tawny Owl *(Strix aluco)*; Woodpeckers including Himalayan Woodpecker *(Dendrocopos himalayensis),* Brown-fronted Woodpecker *(Dendrocopos auriceps)* and Scaly-bellied Woodpecker *(Picus squamatus*); Corvids like Eurasian Jackdaw (*Corvus monedula*), Red-billed Chough *(Pyrrhocorax pyrrhocorax)* and Yellow-billed Chough *(Pyrrhocorax graculus)*; Thrushes including Chestnut Thrush (*Turdus rubrocanus*), Tickell's Thrush *(Turdus unicolor*) and Black-throated Thrush (*Turdus atrogularis*) and Accentors including Altai Accentor *(Prunella himalayana*), Rufous-breasted Accentor (*Prunella strophiata*) and Black-throated Accentor *(Prunella atrogularis*). The complete checklist of the birds documented in Hirpora Wildlife Sanctuary is given in index (See Appendix)



Figure 2.24: Scaly-bellied Woodpecker *(Photo: Intesar Suhail)*



Figure 2.25: Red-billed Chough *(Photo: Syed Mustahsen)*



Figure 2.26: Black-throated Thrush *(Photo: Intesar Suhail)*



Figure 2.27: Black-throated Accentor *(Photo: Intesar Suhail)*

CHAPTER-3

Management: Past and Present

3.1. History of Management

Prior to its establishment in 1987, the Hirpora Wildlife Sanctuary formed a part of the Rambiara Block of Shopian Forest Range within the Shopian Forest Division. The Shopian Forest Division was constituted out of Haripora (now Hirpora) and Shopian Ranges of Pir Panjal Forest Division in 1919.

The first regular and scientific working plan for Pir Panjal Division, including the Rambiara Block was prepared by B. Sher Singh in 1925. The working plan advocated silvicultural practices with a view to making the then low-rated fir pay as a timber. The first revision of the plan was prepared by R.L. Khajuria, that retained the broad outlines of the previous plan. The second revision of the plan was prepared by Habib Khan and it remained operative till 1964. The main feature of this plan was the replacement of Conversion to Uniformity by Indian Selection System in respect of Fir. A third revision of the Pir Panjal Working Plan was entrusted to P.N. Pandita, whose plan came into force from April 1965 and was extended up to 1977. The main feature of this Working Plan was a switch over to the metric system in consonance with the National policy and that the total enumerations were proposed to be conducted in both the regulated and selection working circles. The next Working Plan for the Pir Panjal Division was prepared by B.L.Ticku in 1977. Though the management prescribed in the previous plan had not been materially changed, the new Plan did introduce certain important innovations. The old method of evaluating stocks by enumerating the trees had been given up in favour of more scientific, economical and less cumbersome point sampling method. Special stress was laid on pasture land development and the new Plan also regarded sub-alpine and alpine blanks as culturable areas. Ticku (1977) also described the complication of the grazing problem according to its socio-economic as well as socio-political nature and suggested detailed surveys, ecological studies and researches on the regeneration of forage species and large-scale application of mitigation measures.

With the notification of Hirpora Wildlife Sanctuary in 1987, the need to have a detailed wildlife specific management plan for the PA was felt. In 1991, the Wildlife Division, South was created, with headquarter at Anantnag and the Hirpora Wildlife Sanctuary was brought under the administrative jurisdiction of this newly created Division. The sanctuary continued to be managed as a Range (Pir Panjal Wildlife Range) of South Division till 2008. In 2008, the Government of Jammu & Kashmir by virtue of a Government Order (G.O) launched the 'Markhor Recovery Project' and the first wildlife specific plan titled, "Species Recovery Programme for Markhor" formulated in 2007 in

compliance with the directions of the hon'ble Supreme Court of India began to be implemented to manage the area. This document, treating Markhor as a flagship species outlined in detail various management interventions to be undertaken for the next five years to conserve the endangered wild goat and associated faunal species along with their habitat. In 2009 the government with another G.O created the Shopian Wildlife Division and Hirpora Wildlife Sanctuary came under the administrative control of this division and continues to be as such (See Appendix). The first management plan for Hirpora operative from 2015 to 2020), was an improved version of the previous one.

3.2 Present Management

3.2.1 Administrative set up, Organizational Structure & Human Resource

The sanctuary is under the administrative control of Wildlife Division Shopian. There is one Forest Range, namely the Pir Panjal Wildlife Range and one Forest Block, the Hirpora Block that administratively manages the whole sanctuary area (Figure 3.1). The sanctuary area comprises of 11 compartments of Rb (Rambiara) series namely Rb-06, Rb-07, Rb-08, Rb-09, Rb-10, Rb-11, Rb-12, Rb-13, Rb-14, Rb-15 & Rb-16. Of these compartments Rb-06 and Rb-16, although notified, are yet to be taken over by the Wildlife Protection Department and continue to be under the administrative control of the Shopian Forest Division (Territorial). This Plan recommends creation of two additional Forest blocks under the Pir Panjal Wildlife Range for the Hipora Wildlife Sanctuary (See 5.4).

The frontline staff exclusively deployed to manage the sanctuary comprises of just 11 individuals which is grossly inadequate to protect, monitor and manage its 341 sq. km. area. Current position of staff in Hirpora sanctuary is given below;

Table 3: Current position of staff in HWLS

S. No.	Designation	Sanctioned	Posted (as on 01.06.2021)	Remarks
2	Range Officer	1	0	
3	Forester	1	1	Working as I/c Range Officer
4	Forest Guard	14	4	One of them working as I/c Forester
5	Watcher/Helper	5	3	
6	Field worker	1	1	
7	Rehbar-e- Junglat	-	2	

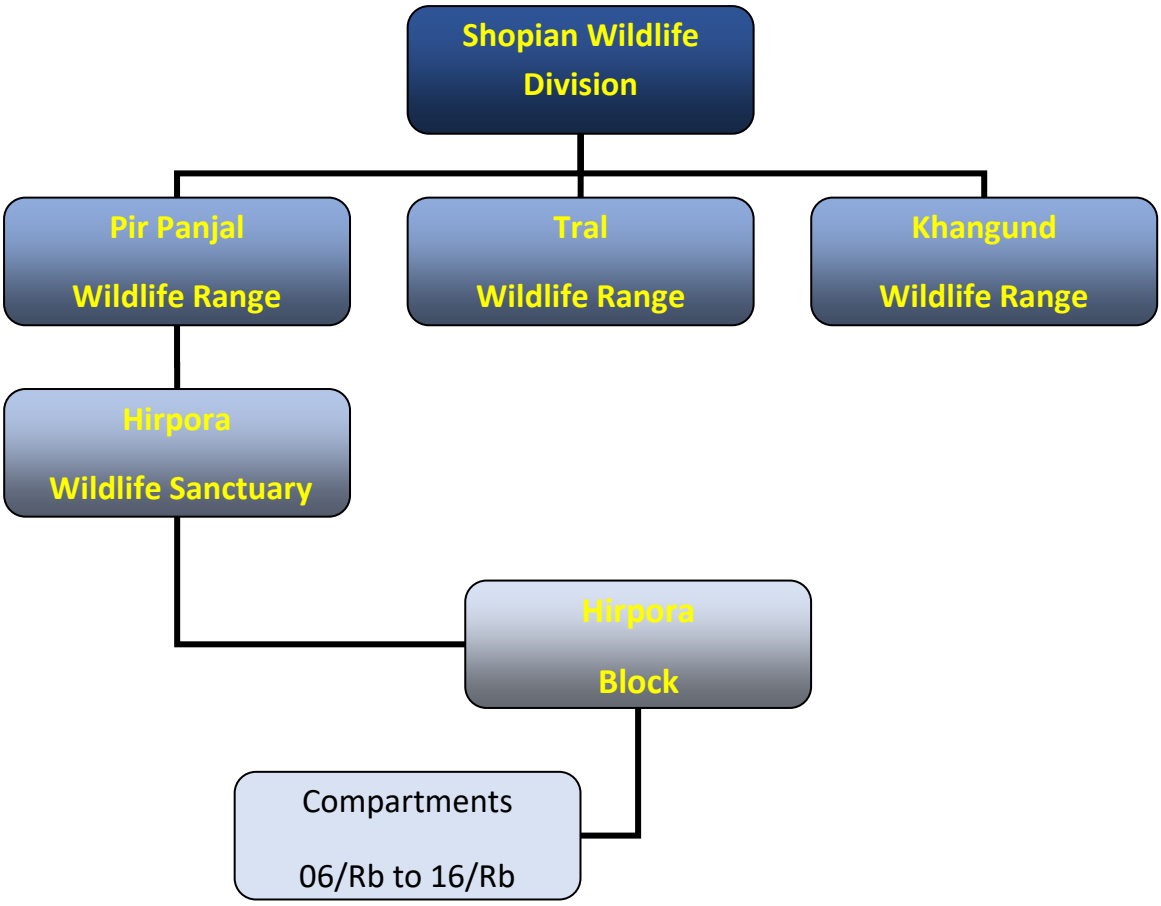


Figure 3.1: Administrative Setup

3.2.2 Present Management Practices

a) Habitat Management: Currently and in terms of the previous management plans the habitat management practices followed mainly include consolidation of boundaries by way of fencing, augmentation of natural regeneration by way of formation of closures (closed areas), plantations, soil and water conservation measures and pasture development.

b) Protection & Surveillance: The forest compartments of the sanctuary have patrolling units or beats that are regularly patrolled by the frontline staff. The areas that are vulnerable to offences like timber smuggling and poaching and include locations like Dobjan, Kachalmaidan, Sarbal and Patandoban. are regularly patrolled. In summer areas like Pir ki Gali and Zaznar are also patrolled. Anti-poaching camps are seasonally established inside the sanctuary for surveillance and protection against poaching and other wildlife offences. Data containing information about the wildlife offences committed in the PA is maintained at Range level and updated and submitted to the Division office (Wildlife Warden) on a prescribed format on monthly basis. The boundary of the PA has been demarcated recently and is under the process of consolidation by way of fencing.

c) Eco-development: Hirpora is the only village on the fringes of the wildlife sanctuary and consists of about1500 families. The inhabitants depend upon the sanctuary resources for firewood collection and grazing. The previous management plans have envisaged a few eco-development activities targeted at the local communities, some of which like free distribution of LPG connections and solar lighting systems to reduce the dependence on firewood have been carried out in collaboration with Non-Government Organizations like the Wildlife Trust of India (WTI).

d) Eco-tourism: Although a draft Eco-tourism Plan has been developed for the sanctuary in the past but it has not been implemented. Few eco-tourism activities like nature & trekking tours for students and local youth have been organized.

e) Research and monitoring: Some Wildlife research studies, mostly in collaboration with independent research organisations like the WTI and the Sher-I-Kashmir University of Agriculture Science & Technology, Kashmir (SKUAST-K) have been conducted in the PA and a few are still in progress. The WTI has been working in the area for last ten years to produce a baseline information on the threatened species and impact of nomadic grazing whereas the SKUAST has recently taken up a research study on vultures.

f) Awareness & Publicity: The different awareness and publicity activities that the previous management plans envisaged and are being implemented regularly include awareness programmes & workshops for stakeholders; publishing of publicity material like posters, pamphlets, brochures and calendars; installation of signages & hoardings and organization of programmes in connection with the observance of the 'Wildlife Week'.

3.2.3 Eco Sensitive Zone

The Eco Sensitive Zone (ESZ) for Hirpora Wildlife Sanctuary has been notified vide S.O. 2406(E), dated: 18.06.2021 and covers an area of 120.56 sq km. The extent of the ESZ around the sanctuary varies from zero to one kilometre (Table:4).

Table 4: Extent of Eco Sensitive Zone around Hirpora Wildlife Sanctuary

Direction	Extent (km)
North	01
North-East	0.5
East	01
South-East	01
South	01
South-West	01
West	01
North-West	00

The digitized mapping of the ESZ (Figures 3.2, 3.3, 3.4 & 3.5) has been completed and the maps form an annexure to the ESZ notification.

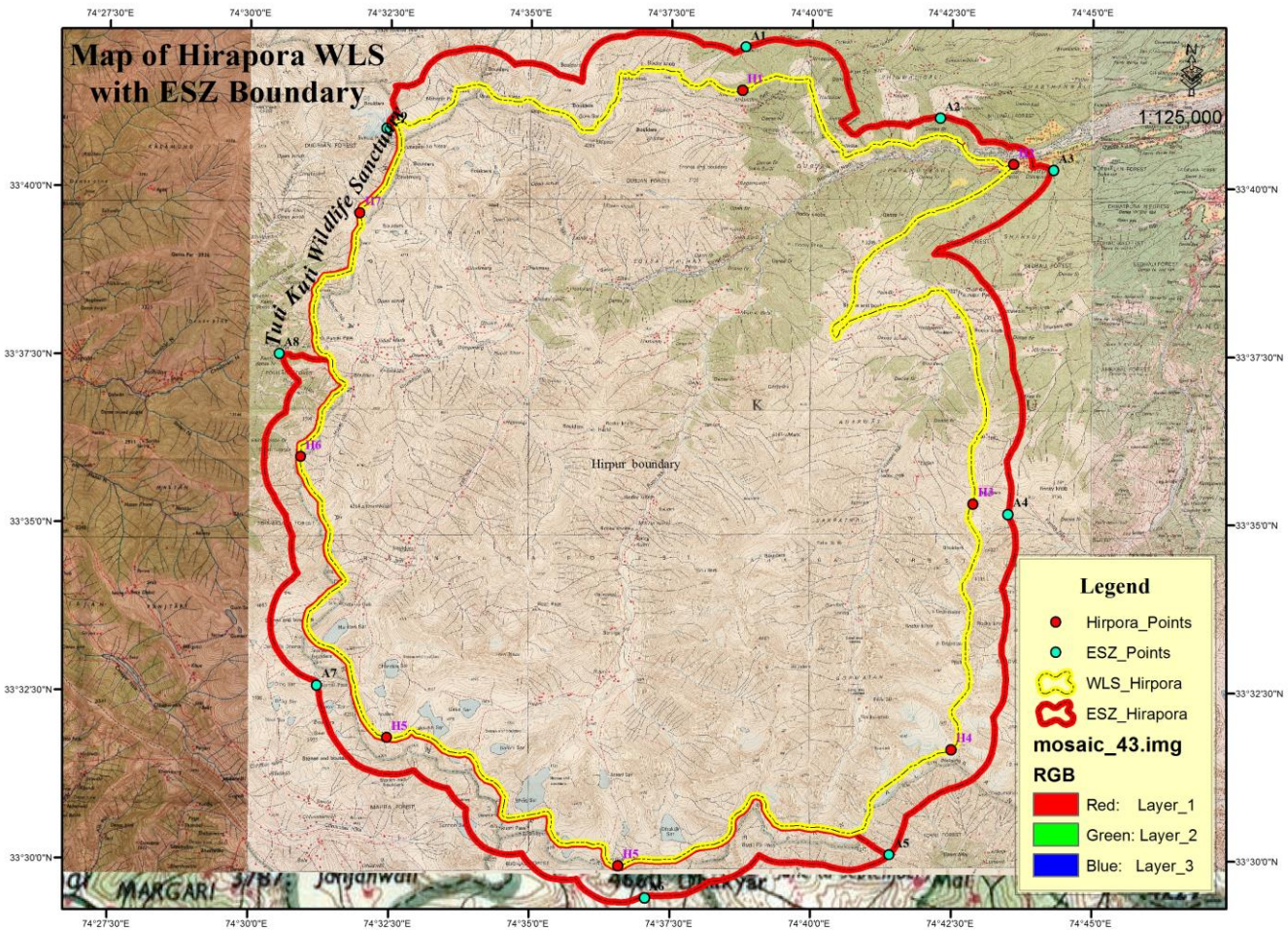


Figure 3.2: Eco Sensitive Zone of Hirpora Wildlife Sanctuary (GT Sheet)

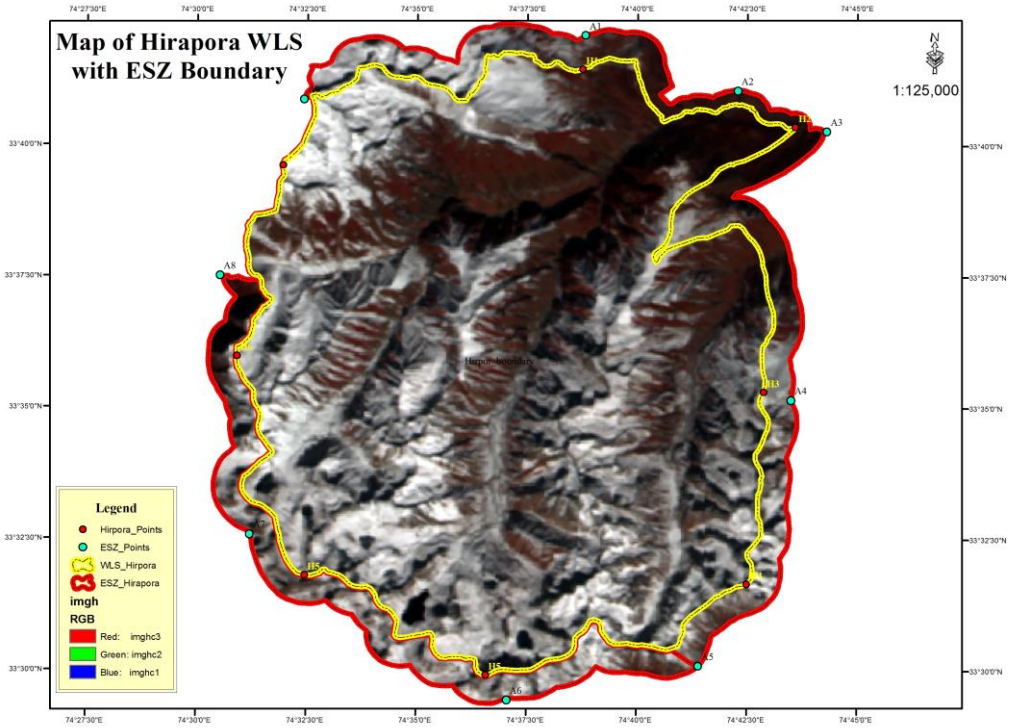


Figure 3.3: Eco Sensitive Zone of Hirpora Wildlife Sanctuary (Satellite Imagery)

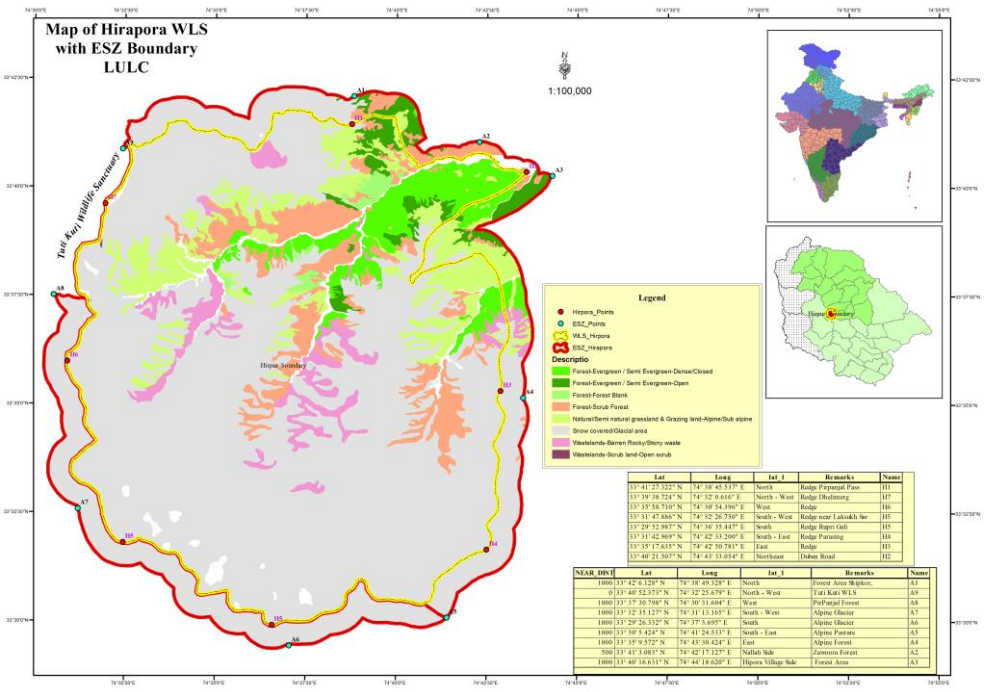
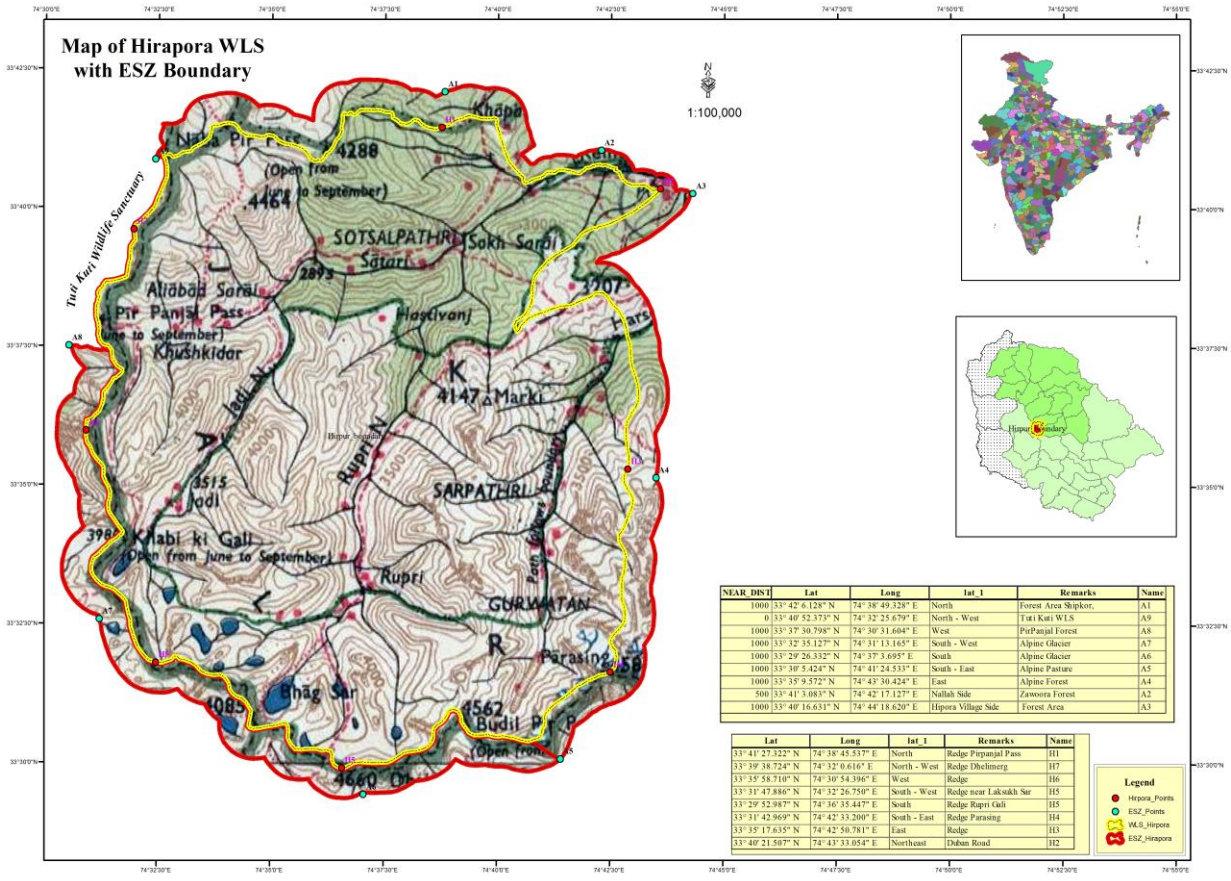


Figure 3.4: Eco Sensitive Zone of Hirpora Wildlife Sanctuary showing land cover details



NEAR_DIST	Lat	Long	Int_1	Remarks	Name
1000	33° 42' 6.128" N	74° 38' 49.328" E	North	Forest Area Shipkor,	A1
0	33° 40' 52.373" N	74° 32' 25.679" E	North - West	Tuti Kuti WLS	A9
1000	33° 37' 30.798" N	74° 30' 31.604" E	West	PirPanjal Forest	A8
1000	33° 32' 35.127" N	74° 31' 13.165" E	South - West	Alpine Glacier	A7
1000	33° 29' 26.322" N	74° 37' 3.695" E	South	Alpine Glacier	A6
1000	33° 30' 5.424" N	74° 41' 24.533" E	South - East	Alpine Pasture	A5
1000	33° 35' 9.572" N	74° 43' 30.424" E	East	Alpine Forest	A4
500	33° 41' 3.083" N	74° 42' 17.127" E	Nallah Side	Zawoora Forest	A2
1000	33° 40' 16.631" N	74° 44' 18.620" E	Hipora Village Side	Forest Area	A3

Lat	Long	Int_1	Remarks	Name
33° 41' 27.322" N	74° 38' 45.537" E	North	Redge Pirpanjal Pass	H1
33° 39' 38.724" N	74° 32' 0.616" E	North - West	Redge Dhelimerg	H7
33° 35' 58.710" N	74° 30' 54.396" E	West	Redge	H6
33° 31' 47.886" N	74° 32' 26.750" E	South - West	Redge near Laksakh Sar	H5
33° 29' 52.987" N	74° 36' 35.447" E	South	Redge Rupri Gali	H5
33° 31' 42.969" N	74° 42' 33.200" E	South - East	Redge Parasing	H4
33° 35' 17.635" N	74° 42' 50.781" E	East	Redge	H3
33° 40' 21.507" N	74° 43' 33.054" E	Northeast	Duban Road	H2

Figure 3.5: Eco Sensitive Zone of Hirpora Wildlife Sanctuary with details of boundary location points

The ESZ notification requires the government to take specific measures with respect to the following attributes for giving effect to its provisions:

- Land Use
- Natural water Bodies
- Tourism or Eco-tourism, Natural Heritage & Man-made Heritage Sites
- Noise Pollution & Air Pollution
- Discharge of Effluents, Solid Wastes Bio-medical wastes
- Plastic, Construction & Demolition Waste Management
- E-waste Management
- Vehicular Traffic & Pollution
- Industrial Units
- Protection of Hill Slopes

The Notification also provides a list of activities to be prohibited or regulated within the ESZ (See Appendix)

The preparation of the Zonal Master Plan (ZMP) for the ESZ, as envisaged in the above notification has been initiated in consultation with the relevant specified departments viz Environment, Forest, Agriculture, Revenue, Urban Development, Tourism, Rural Development, Irrigation & Flood Control, Pollution Control Board, Panchayati Raj and Public Works Department and is expected to be completed within the stipulated time of 2 years.

3.3 Problems in Management

Historically, illicit tree felling and smuggling of timber has been a serious issue in Hirpora as elsewhere in the Pir Panjal Division (Ticku 1977). Rambiara Block (presently in Hirpora Wildlife Sanctuary) was mentioned as one of the priority areas to focus attention on this aspect. However, much of this is now under control, particularly so, after the declaration of the sanctuary. The recent developmental activities like the revival of the Mughal Road and the construction of power transmission line have however created new challenges. The construction of road has given rise to unprecedented vehicular traffic and unregulated tourism whereas the constructions related to the power transmission line have affected the landscape and impacted the habitat.

Domestic livestock grazing is a problem which is being faced across the whole alpine landscape of Kashmir and Pir Panjal is no exception. Recent surveys have shown that uncontrolled livestock grazing in the Sanctuary is a major threat to markhor as livestock occupies most of the potential markhor habitats (Ahmad *et al.,* 2011, 2018).

Hirpora Wildlife Sanctuary is pre-dominantly a high-altitude area with the majority of land under alpine grasslands. There are no permanent settlements within the sanctuary although the village Hirpora is adjacent to the boundary of the sanctuary.

Specific problems faced by managers are discussed as under:

3.3.1 Domestic Livestock Grazing:

Hirpora Wildlife Sanctuary lies at the gateway of the Kashmir Valley. The mountain passes through the sanctuary area, particularly the Pir ki Gali or the Pir Panjal Pass has been traditionally used by the nomadic grazing tribes like Gujjars, Bakerwals and Banyaris to enter Kashmir along with their livestock and graze them in the alpine pastures and meadows spread across the mountains of the valley. The annual migration of the nomadic herders from the warmer plains of Jammu commences in late

spring, when the passes just open up and the return migration from the colder areas of the valley concludes in late autumn, when the first snows are about to close the passes. Hirpora Wildlife Sanctuary being at the gateway of the valley is subjected to immense grazing pressures both from the herders that remain within its limits throughout the grazing season and from those who use it as a transit to travel to other destinations in Kashmir. Besides, resident Gujjars and shepherds also take their livestock to the pastures in summer.

Although the old Mughal track that passes through the sanctuary is the traditional route being used by the herders since ages, the development of Mughal Road has made their travel all the more convenient.



Figure 3.6: Nomadic herders with their livestock near Pir Ki Gali ***(Photo: Riyaz Ahmad)***

A survey of herders revealed that over 500 households reside in the sanctuary during summer along with their flocks and dogs (Ahmad et al 2011). The livestock strength exceeds 70,000 heads which include sheep, goats, buffalos and horses.

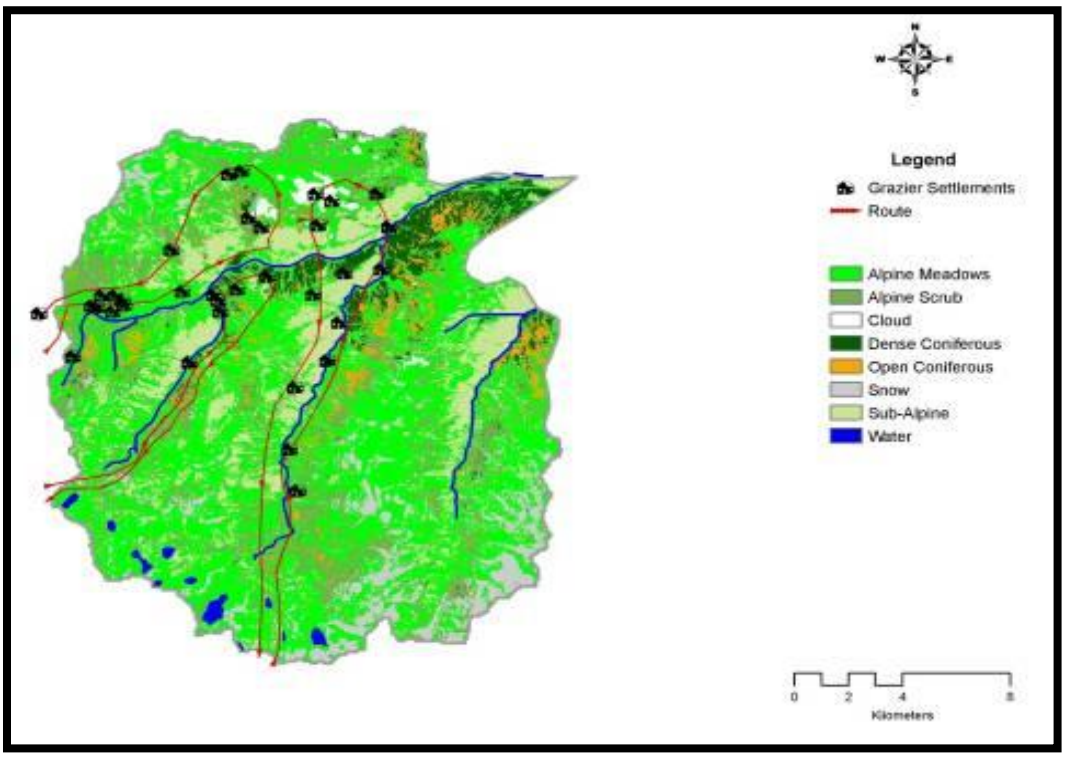


Figure 3.7: Main routes used by nomadic herders in Hirpora Wildlife Sanctuary

In addition to the resident families, several others including thousands of livestock transit in the sanctuary to access other alpine grasslands in the valley. One of the reasons for sharp increase in livestock numbers in Hirpora during last one decade is that the traditional herders using the pastures since generations have allowed non-traditional or "non-bonafide" herders inside the sanctuary (Ahmad et al. 2011).

The extent of grazing in Jammu & Kashmir is far beyond the production capacity of the pasture lands and is adversely affecting the natural regeneration of the forests (Seth, 1994). Uncontrolled grazing degrades the ecology, hindering the natural plant succession and facilitating colonization of unwanted hard/spiny species like *Euphorbia, Ephedra, Polygonum, Artemesia* etc. (Ahmedullah, 1997). According to Ticku (1979), the greatest problem in Pir Panjal Division in the 1970's and 1980's was the unlimited, unrestricted, uncontrolled and unscientific grazing. The excessive movement of the livestock played havoc with the sprouting and also rendered the clayey soil so hard through trampling that regeneration became difficult to obtain. In the entire Pir Panjal Division, total pastureland available for grazing was estimated at 759.6 km^2 (Ticku 1977). In comparison to the available grazing area the incidence of grazing included 6.85 lac animal heads in all, that visited the division at one time or the other in the 1970's, whereas the carrying capacity as per the Indian

Grassland and Forage Research Institute was only 1.5 lac sheep or goat heads, thus resulting in gross over use of the pastures.

Hirpora has about 150 km^2 of alpine grasslands and going by these figures, the alpine grasslands can support no more than 30,000 livestock for the four-month period. The numbers using Hirpora grasslands thus far exceeds its capacity. The resident livestock grazing in the area number more than 70,000, and added to this the figure of the transients, whose number too is significant, these alpine areas are being grossly over used. The effects of this could be a change in the species composition of the grasslands themselves with resulting impacts on wild herbivores like the Markhor. About 50% of the livestock comes from the non-traditional herders and the non-traditional ways of herders (Ahmad et al 2011). Those "Bonafide" or traditional herders who no longer own large herds themselves, bring huge number of livestock from "landlords" or well-off herders in return of money. Some traditional herders even rent out the pastures traditionally used by their ancestors to other herders for the season.

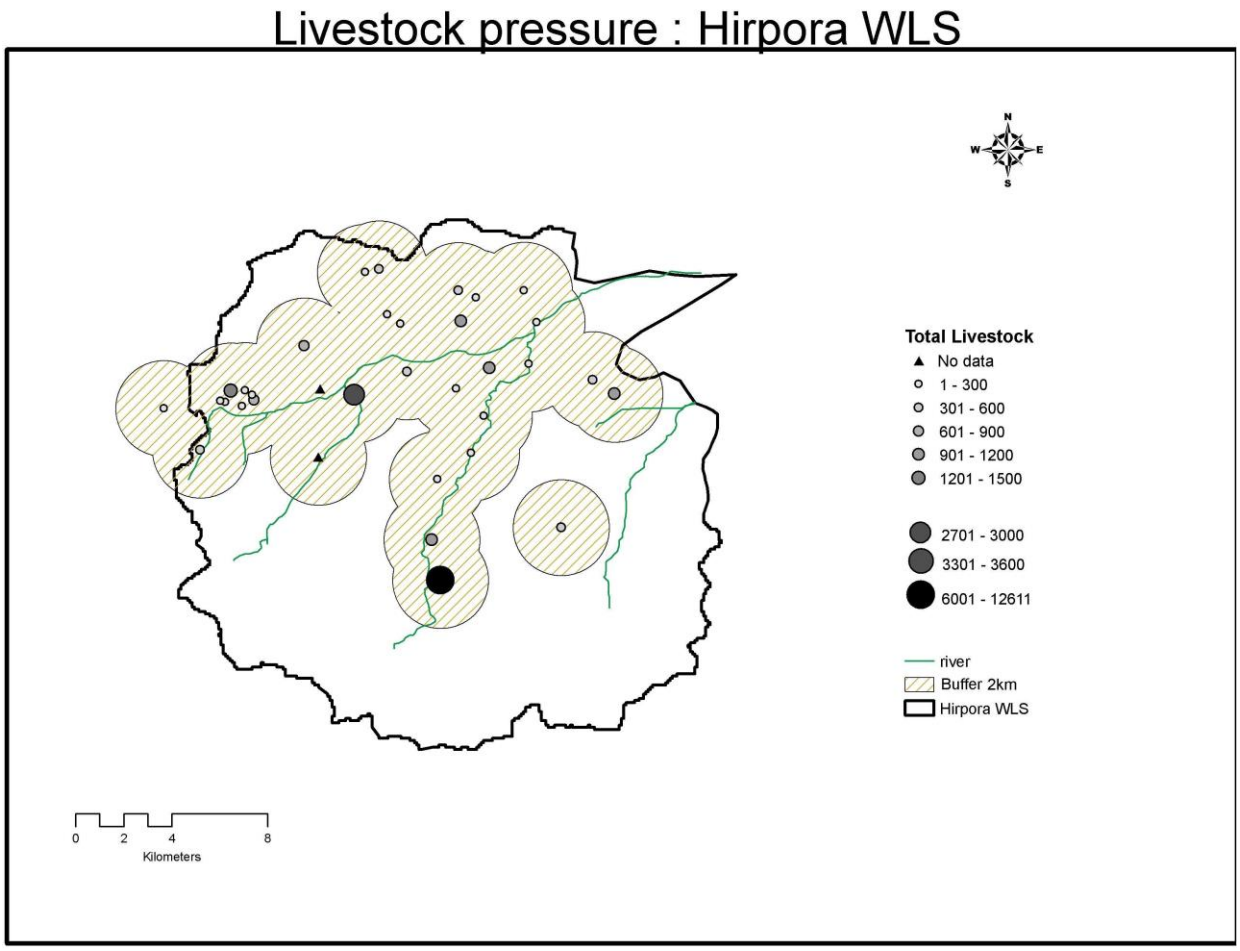


Figure 3.8: Livestock pressure in Hirpora Wildlife Sanctuary (Source: WTI, 2011)

According to a study (Ahmad *et al.* 2010), Markhor show significant differences in habitat use before and during livestock presence- they use areas further away from cliffs before the arrival of livestock and closer to cliffs in presence of livestock. Thus, in areas with high grazing intensity, livestock occupy better areas, pushing markhor to less suitable habitats.

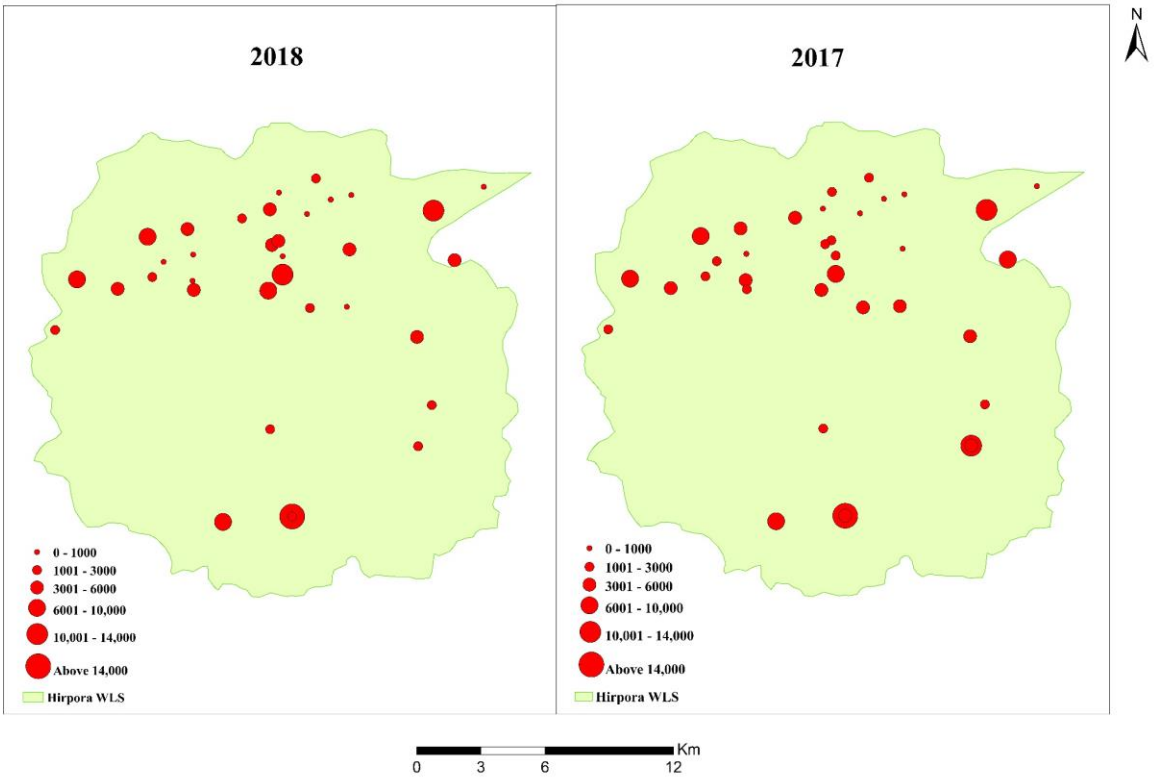


Figure 3.9: Location of seasonal herder settlements in Hirpora Wildlife Sanctuary

Gujjars, Bakerwals and Banyaris, the major communities of pastoralists spread across the sanctuary establish summer camps at convenient locations within the pastures from where they take their flocks for grazing. By plotting a very conservative buffer of 2 km around each migrant camp settlement indicating the area of influence (grazing) of each camp, the study found that over 90% of the sanctuary was seen to be heavily grazed (Figure 3.9).

Table 5: Livestock Holdings, in seasonal Herder Settlements of Hirpora Wildlife Sanctuary

	Pasture	Latitude	Longitude	Elevation (msl)	Livestock (2018)	Livestock (2017)
1	Gunard	33.66913	74.70502	2513	23	25
2	Patandoban	33.66913	74.70502	2513	210	270
3	Pir-gali.	33.63028	74.53394	3456	3860	3857
4	Pir marg	33.63761	74.57041	3373	352	1008
5	Teli marg	33.64816	74.56365	3717	2948	3285
6	Telli nakka	33.65139	74.58041	3554	1464	1718
7	Sokhta sarai	33.665711	74.64931	2627	518	318
8	Sathree	33.39319	74.3864	2610	1281	1500
9	Aliabad sarai	33.6407	74.58285	3001	315	513
10	Dongimarg	33.63125	74.56565	3230	1044	1280
11	Pirpal	33.6263	74.55105	3316	1682	2122
12	Hapat naar				1182	2257
13	Drigga	33.6638	74.6407	2907	110	252
14	Begumpathree	33.67266	74.63443	3577	722	1224
15	Youngnari	33.65774	74.63069	3235	129	309
16	Sarpathree	33.66673	74.61886	3535	404	764
17	Dunari	33.65966	74.61505	3364	1471	670
18	Zaznaar	33.65586	74.60334	3319	1068	2057
19	Jabbad	33.63998	74.62043	3111	390	817
20	Hastwanj	33.63228	74.62043	3367	6089	4171
21	Hathipahaad	33.62555	74.6144	3512	3179	2429
22	Laeed	33.64475	74.61595	2782	1801	992
23	Tunda	33.64638	74.61861	2655	1233	1216
25	Udderwass	33.63833	74.69277	3100	1550	3819
26	Saras peth	33.5775	74.68316	3190	1021	1533
27	Burj	33.56733	74.61518	3421	810	1500

28	Gurwattan	33.56017	74.67741	3384	804	6587
29	Googlemarg	33.60611	74.67694	3311	1254	2259
30	Tickyani	33.56017	74.67741	3384	937	2255
31	Fatu wali padi	33.35643	74.68084	3447	1563	1800
32	Canala	33.53071	74.62444	3557	767	2574
33	Rupri	33.53071	74.62444	3557	14709	17470
34	Mia ka bela	33.61824	74.63193	2981	941	2030
35	Kamalkote	33.64286	74.64855	2707	1414	341
36	Girnardi	33.61873	74.64741	3211	422	2355
37	Hapat khod	33.62967	74.58254		190	2204
38	Namnaad	33.60901	74.52475		663	1237
39	Rineur	33.65916	74.68388	2917	6930	8310
40	Rattiteli	33.625833	74.58305	3838	1581	861
41	handu gali	33.528422	74.595354		3268	3968
42	Baagsar				2565	2565
	TOTAL				72864	96722

3.3.2 Encroachment:

There is only one permanent human settlement (Hirpora village) in the vicinity of the sanctuary but large number of Gujjar and Bakerwal huts, used seasonally, do exist in parts of the sanctuary such as Aliabad, Dholimarg, Pirmarg, Namnad, Zaznar, Hapatnar, Begampathri, Dobjan, Sukhsarai, Jaddi, Rupri, Raineur and Gurwatan. Encroachment of sanctuary land has also happened in Compartment Rb-06 which although notified as part of the sanctuary continues to be under the administrative control of the Shopian Forest Division (Territorial). With the revival of Mughal Road, encroachment in the form of make-shift shops seasonally erected at a few places has also become a problem.

3.3.3 Forest fires:

Man-made fires: As a result of human activities inside the sanctuary particularly due to presence of the livestock herders, the risks of man-made fires are high. As mentioned, Hirpora is one of

the main routes for the migratory herders and during autumn when they return to their wintering areas, the apprehensions of bush fires are very high.

Natural fires: Owing to the long spells of dryness during the summer and autumn season (August to November), the dried up, coarse grass species like *Chrysopogon spp.* and *Themada anathera* are prone to fires which may cause severe damage to the forest and wildlife. The spread of bush fires to the standing conifer forest patches is aided by the huge volumes of dry, decaying fallen timber accumulated on the forest floor over the years due to natural causes like heavy snowfall and wind storms.



Figure 3.10: Dry, fallen trees in Hirpora Wildlife Sanctuary are prone to forest fires *(Photo: Intesar Suhail)*

3.3.4 Fire Wood & Fodder Collection:

Although only a single village is found in close proximity of the sanctuary, the harsh winters and use of conventional methods of cooking and heating make the locals considerably dependent on sanctuary resources.

Over 500 households reside in the sanctuary pastures temporarily during summer and in the absence of wood in the highland pastures, most of them extract and use Juniper for fuel wood. The herders whose camps are close to the conifer forests use pine and fir as fuel wood. As per a study

conducted by the WTI, the herder families (n=183), on an average have been found to consume about 220 to 250 kgs of fuel wood per month. Assuming a five month stay in the area (May to September), the total fuel wood extracted per season for 500 households using the area, works out to be about 587.5 metric tons.



Figure 3.11: Local women fetching fuelwood *(Photo: Sameer Dar)*

The villagers also resort to the stocking of firewood, which is collected from the forest mostly by the womenfolk. The villagers also extract grasses from the sanctuary areas and store them as dried up stacks to feed their cattle during winter.

3.3.5 Pathological Problems:

The domestic cattle and sheep harbor many of the same parasites and diseases that attack deer and may even introduce other ailments to which the deer are not normally exposed (Whitehead, 1950). In 1977 a captive Hangul in Dachigam National Park died of the Johne's disease, which had affected some sheep of the Dachigam breeding farm (Kurt, 1978). The outbreak of foot and mouth disease in 2018 killed hundreds of sheep and goats in and around Hirpora WLS, thus posing a serious threat of infection to the wild fauna, especially Markhor.

A pathological problem was also noticed in the fir trees in compartment Rb-08 in 2008, which resulted in drying-up of the fir stands in a patch. The disease however, has remained restricted to the area affected and has not spread across.

3.3.6 Lack of Human Resource & Administrative Units:

Administratively, Hirpora Wildlife Sanctuary is a single unit. It comprises of one Wildlife Range, the Pir Panjal Wildlife Range, administered by a Range Officer and one Wildlife Block, the Hirpora Block, looked after by a Block Forester. Having an area of 341 sq km spread over a wide altitudinal gradient, comprising of varied land formations, the inadequate number of administrative sub-units below the Range level (Blocks and Beats) poses a serious management problem.

Presently, the sanctuary has a permanent staff strength of only 11 officials which includes one Block Forester, working as in charge Range Officer, 04 Wildlife Guards, 03 Wildlife Watchers/ Helpers and 02 Rahbar e Janglat. This is grossly inadequate.

3.3.7 Lack of infrastructure & Equipment:

Being a high-altitude mountainous area facing harsh weather and climatic conditions for almost half of the year, Hirpora Wildlife Sanctuary requires adequate and specialized forms of movable and immovable infrastructure. Although some infrastructure has been created during the previous plan tenures, the availability falls well short of the actual requirement (Table 6).

Equipment like field gears (tents, sleeping bags, ruck-sacks, water bottles), survey gadgets (binoculars, telescopes, GPS devices, range finders, night vision devices, camera traps), photographic equipment (cameras, lenses), rescue equipment (cages, tranquillizing guns, nets, ropes, ladders, search lights), fire-fighting equipment (extinguishers, fire-costumes, helmets, fire beaters) and communication devices (cell phones, wireless sets) are also not sufficiently available.

Table 6: Existing & Required Infrastructure in Hirpora Wildlife Sanctuary

S.No	Type of Infrastructure	No. Required	No. Existing	Remarks
01	Staff Quarter	05	03	02 out of the 03 existing require repair & upgrading
02	Range Office	01	01	
03	Nature Interpretation Centre	01	00	
04	Guard Hut	03	01	Existing ones require repairs
05	Watch Tower	04	00	
06	Shelter Shed	05	00	
07	Check Post	02	00	
08	Inspection Hut	02	01	
09	Entry Gate	02	01	Existing one requires repair
10	Rescue Van	02	01	
11	Field Vehicle	01	00	
12	Motor Bike	05	01	
13	Snow Mobile	01	00	

3.3.8 Human-Wildlife Conflict:

Conflict between humans and the wildlife inside the sanctuary occurs when Brown Bear, Black Bear, Wolf or Leopard attack and kill livestock owned by the nomadic herders. Alternatively, conflicts also occur when wild animals stray into the villages and are encountered by humans. These encounters then lead to a negative interaction between the wild animal and the humans giving rise to the human-wildlife conflict.

Inside the sanctuary, although a few sporadic incidents of livestock depredation by Brown Bear have come to fore, no case of human death or injury in wildlife attack has been reported in last ten years. Most of the human-wildlife conflict incidents are reported from near human habitations outside the boundaries of the sanctuary, largely where the forest forming the catchment is not a wildlife protected area. The data from last ten years shows that there has been a steady increase in the number

of incidents reported but proportionately the number of human causalities has shown a decline, suggesting an improvement in departmental response (Table 7).

During last ten years (2011-12 to 2020-21) there have been 946 incidents of human-wildlife conflict, mostly involving Black Bear, Leopard and Brown Bear in Shopian district. These incidents have resulted in four human deaths and 52 human injuries. During these years, 793 times, the frontline staff have been successfully able to save the wild animals involved in the conflict, which include 114 rescues of animals stuck in human inhabitations during such incidents. Six wild animals have however been killed in retaliation by the people.

Table 7: Human-wildlife conflict incidents and human causalities in Shopian district for last ten years

Year	No. of Incidents	Human Injuries	Human Deaths
2011-12	69	06	01
2012-13	87	09	00
2013-14	101	06	01
2014-15	90	06	00
2015-16	93	10	01
2016-17	52	10	00
2017-18	88	08	00
2018-19	95	07	01
2019-20	129	05	00
2020-21	142	05	00

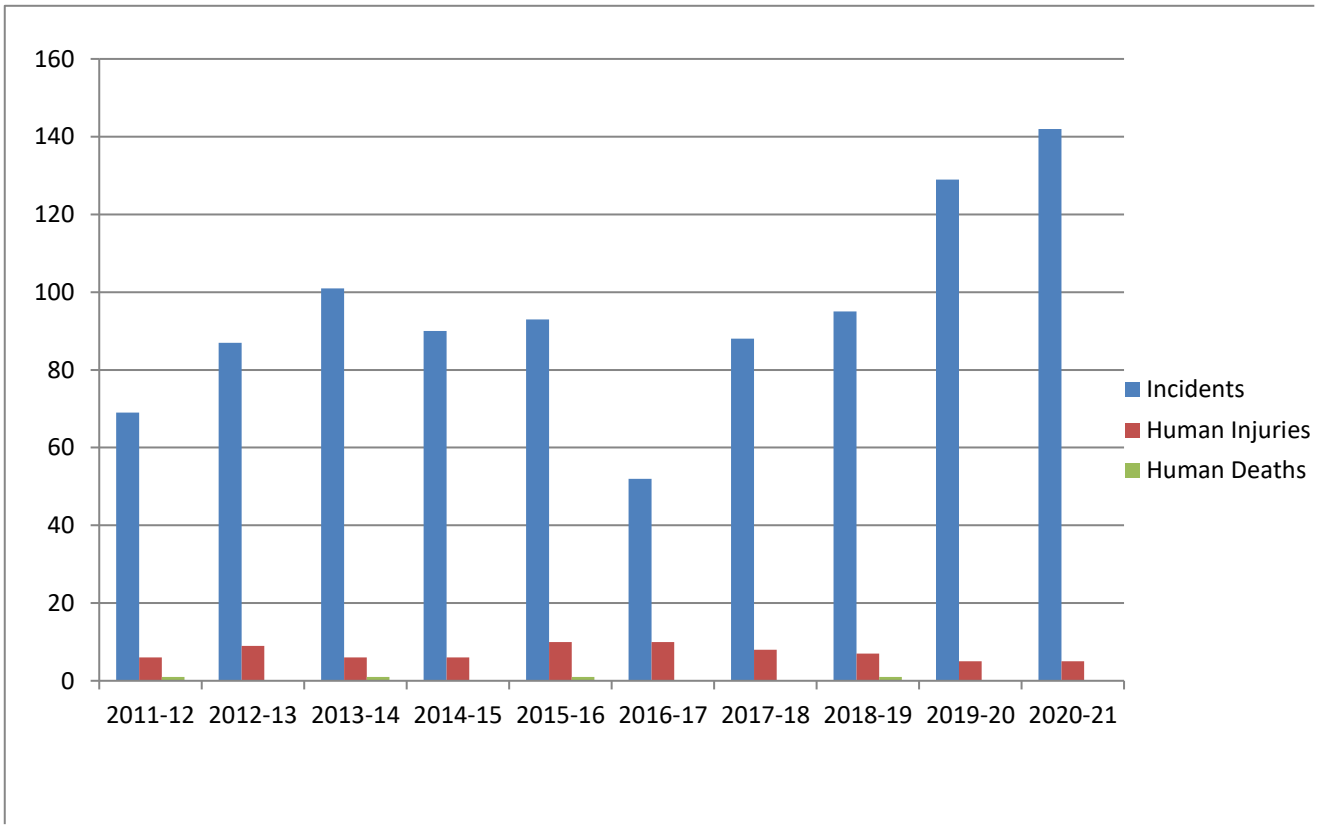


Figure 3.12: Graph showing year-wise conflict incidents & human injuries & deaths caused

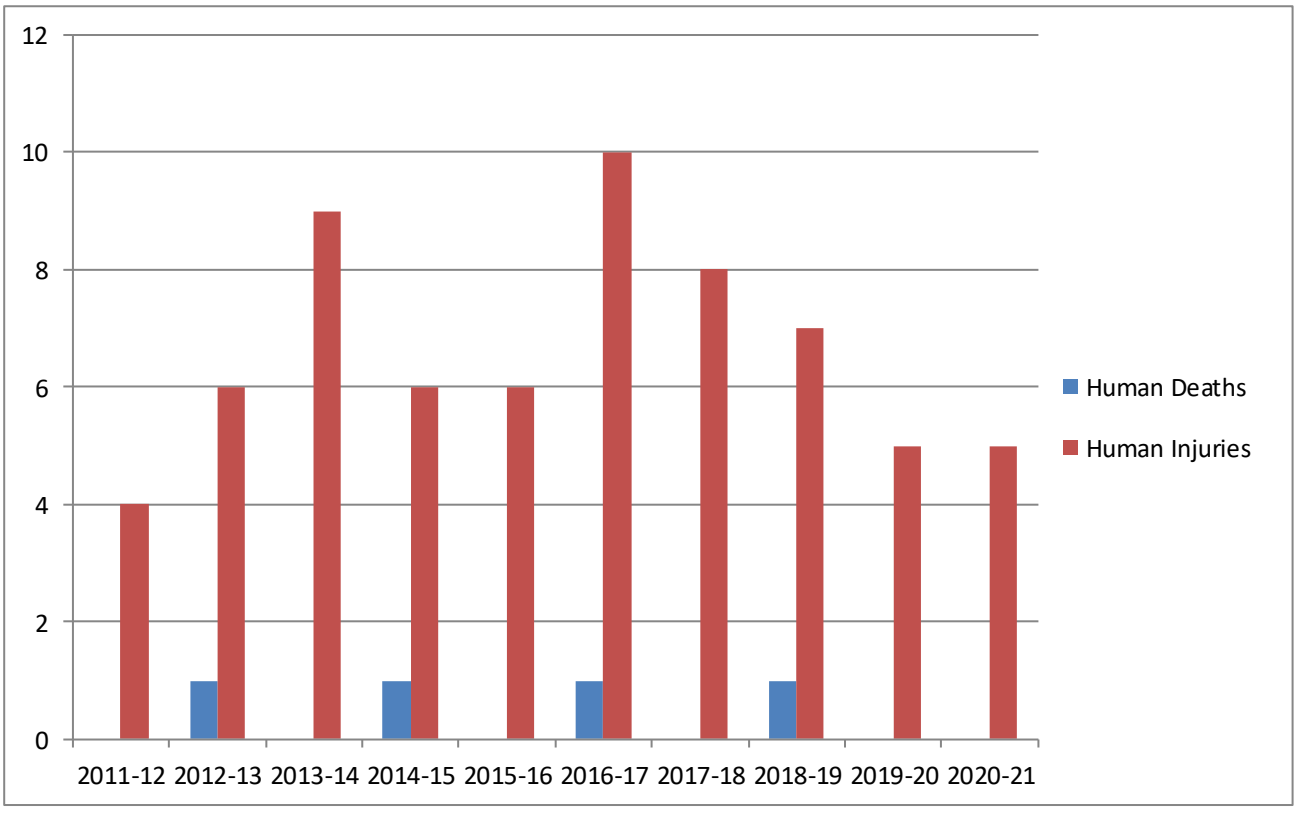


Figure 3.13: Graph showing number of human deaths and injuries during last ten years

The Department has established two control room in Shopian district, one in the divisional office and another in Sedaw village. The control rooms, equipped with manpower and equipment are suitably located to timely respond to the calls from across the whole district and work 24x7. The manpower manning these control rooms comprises mostly of casual and need-based workers who form Rapid Response Teams (RRTs) to attend to the calls received. The control rooms although well equipped with required rescue equipment like tranquillizing guns, capture & transport cages, nets, ladders, snake tongs, self-protective gears, search lights need to be refurbished regularly. There is a need to replenish the control rooms with more of such equipment. Dearth of regular/permanent staff is a constrain in allowing posting of suitable and trained officials to the control rooms and therefore there is an urgent need for capacity building of the casual manpower to enable them to play an effective role in the mitigation of the conflict.

A scheme to compensate human causalities due to human-wildlife conflict is in place whereby ex-gratia is provided to the victims (in cases of injury) and to the next of the kins (in case of a death). During last ten years the department has disbursed an amount of Rs 33.64 lacs as ex-gratia to such victims. However, as of now there is no provision for ex-gratia against livestock and crop damage, which also occur to a considerable extent. (See 5.8)

3.3.9 Soil Erosion:

Construction activity in connection with the Mughal Road has caused large scale scarring of the landscape along its alignment. The side slopes, particularly at some locations like the Dobjan curve have experienced soil erosion and are yet to stabilize. Other avalanche prone locations like Zaznar have also been exposed resulting in landslides and degradation of the land cover.



Figure 3.14: Soil erosion due to the construction of Mughal Road *(Photo: Riyaz Ahmad)*

3.3.10 Pollution:

Due to the revival of Mughal Road the area is now easily approachable from Srinagar and Jammu, which has resulted in tremendous inflow of tourists. Noise and air pollution due to the vehicular traffic has become a source of disturbance to the wildlife during summer months. Large scale littering of solid, non-biodegradable waste at a few spots frequented by tourists like the Pir Ki Gali and Dobjan is also a concern.

PART II

PROPOSED MANAGEMENT

CHAPTER-4

The Vision, Objectives & Issues

4.1. The Vision



Figure 4.1: Markhor is the flagship species around which the management of the PA is centered *(Photo: Riyaz Ahmad)*

Hirpora Wildlife Sanctuary, a repository of rare and charismatic Himalayan flora and fauna, harbours certain animal species that are excellent flagships for conservation of high-altitude Western Himalayan ecosystems. Species such as Markhor, Brown Bear and Kashmir Musk Deer are glamorous and have the public appeal to serve as symbols of conservation. In fact, the sanctuary is one of the few strongholds of the endangered Kashmir Markhor and thus must be preserved at any cost.

The Sanctuary has a distinction of holding some of the largest fresh water lakes found in the Pir Panjals. These high-altitude glacial water bodies act as water reservoirs and feed a number of streams down below that not only act as a source of fresh, clean drinking water to the human population in the lower plains, but also irrigate the vast expanses of their agricultural and horticultural

lands. Protection of the Hirpora landscape and safeguarding of its glacial and water resources is thus imperative for the wellbeing of the local populace.

The breathtaking landscapes of Hirpora Wildlife Sanctuary offer an extremely high potential for nature tourism. Presence of archaeological monuments in the area adds to its historical value. Conservation of the area along with the sites of historical importance shall ensure the preservation of its ecological and cultural values.

This plan hence envisions a scenario where the rare and endangered flora and fauna of the area along with its ecological and cultural attributes is conserved while allowing sustainable benefits to the local populations.

Vision

Conservation of the Ecology including Flora & Fauna of the area along with its Cultural Attributes for long term Sustainable Benefits to the local populations.

4.2. Management Goals

The present management plan aspires to conserve the unique assemblage of flora, fauna along with the alpine and subalpine landscape in the Hirpora Wildlife Sanctuary over the next ten years in order to ensure flow of ecosystem services for sustainable benefits of local populace in the region. The Hirpora Wildlife Sanctuary will be managed as a repository of natural processes and wild flora and fauna of Pir Panjal. The present management plan intends to address the ecological concerns of the sanctuary for conserving its processes and components in general and threatened flora, fauna in particular. In the process it will also protect and conserve the habitats and populations of carnivores, herbivores and threatened wildlife against all threats, natural and otherwise.

The management goals largely aim at contributing towards meeting the following Goals of India's National Wildlife Action Plan (2017-31);

- Conservation of threatened species
- Control of poaching and timber smuggling
- People's participation in wildlife conservation
- Development of human resources
- Strengthening research and monitoring

4.3. Objectives of Management

To meet the management goals following objectives have been stipulated for the ten-year plan period (2021-2031):

- To monitor the status and threats to the key wildlife species, such as Markhor, Musk Deer, Brown Bear and plan management interventions
- To assess the status and threats to rare medicinal plants & forage species of Markhor and plan their restoration
- To reduce anthropogenic pressure especially the livestock grazing and restore the fragile high-altitude ecosystems as viable Markhor habitats
- To understand the human-wildlife conflict and put management suggestions to avoid retaliatory killings of problem animals
- To undertake eco-development activities in fringe areas for reducing the dependence of people on natural resource of the sanctuary
- To provide incentives & amenities to traditional and bona-fide herders and involve them in conservation
- To prevent encroachments and take measures to stop non-compatible land-use in the eco-sensitive zone
- Protect high altitude wetlands from pollution.
- To ensure capacity building of the frontline staff and to implement staff welfare measures
- To improve infrastructure and human resource to strengthen protection and surveillance
- To facilitate and undertake long-term and short-term basic and applied field research by coordinating with various local and national institutions/organisations.

4.4. Issues in Achieving the Management Objectives

Key limiting factors, which restricts the desirable pace of implementation of management practices, are as below:

- Inadequate staff & infrastructure to implement management activities
- High pressure of unsustainable livestock in almost all parts of the sanctuary
- Mughal Road & associated 'developmental' issues
- Lack of trained staff
- Weak intelligence network.
- Demarcation of external boundaries of the sanctuary (partially completed)
- Internal boundaries such as block, compartment, beat zonation (not well defined)
- Zonal Master Plan (ZMP) of the Eco-sensitive zone (ESZ) (under formulation)

4.5. SWOT Analysis

The **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats pertinent to the management of Hirpora Wildlife Sanctuary have been worked out as below:

Strengths

- Biodiversity rich area
- Harbors one of the two viable populations of Markhor
- No permanent human settlements within the sanctuary hence comparatively low human dependence
- Contiguity of landscape with other wildlife rich areas such as Tattakuti WLS

Weaknesses

- Disturbance and interference due to Mughal Road
- Inadequate enforcement due to shortage of staff and lack of skills
- Traditional route to migratory herders for ages
- Harsh climatic conditions in extended winters

Opportunities

- Save a viable Markhor population from local extinction
- Conserve some of the finest and largest alpine meadows
- Conserve some ecologically significant high-altitude wetlands
- Ensure peoples participation in conservation

Threats

- Huge grazing pressure on the alpine meadows giving direct competition to the flagship species, Markhor
- Unwise 'developmental' activities
- Pressures from nomadic communities to de-notify some areas

CHAPTER-5

The Management Strategies

Management actions aiming at protection of wildlife against natural and man-made ecosystem stressors such as poaching, resource exploitation, infestation of weeds, grazing, soil erosion etc. would be undertaken. Followings are the key principles of management strategies for the sanctuary.

A) **Restorative strategy:** This shall include the restoration of habitat attributes lost over time, such as revival of meadows, controlling weeds to restore potential of a site, soil conservation works to restore catchment functions, restoration of water bodies etc. The techniques of restoration would be such that it is acceptable on aesthetic, economic, environmental or ecological considerations and as 'near natural' as possible (Sawarkar, 2005)

B) **Compensatory strategy:** It would seek to compensate loss of habitat attributes for various reasons, as in case of the sanctuary: reducing dependence of graziers on meadows, reducing dependence of locals on the sanctuary resources, reducing unsustainable tourism activities. Eco-development measures in the fringe villages, grazing regulation, providing alternate grazing lands, sustainable eco-tourism are some of the other compensatory strategies.

5.I. Habitat Management



Figure 5.I: View of a typical habitat in Hirpora Wildlife Sanctuary *(Photo: Intesar Suhail)*

Objective

Protect, restore and manage habitats of the threatened wildlife in the sanctuary.

Priority actions

5.I.I. Afforestation & Aided Regeneration:

Plantation of indigenous wild plant species including conifer (Fir & Blue Pine) and broad-leaved (Horse chestnut & Oak) and that of un-grafted fruit-bearing species shall be taken up to restore the degraded habitats in the sub alpine zone. A total of 42,000 saplings of conifer, 54,000 saplings of fruit-bearing species including apricot, apple etc, 60,000 dibbles of Horse Chestnut and Oak are proposed at identified suitable locations across the landscape during the ten-year plan period. The plantations shall be protected by way of barbed wire fencing on angle iron posts.

There are some areas in the sanctuary where natural regeneration is high, but these sites are affected due to livestock grazing in the summer season resulting into damage of naturally regenerated saplings. Such areas have been identified in Compartment Rb-6, Rb- 7 and Rb-8 (rich regeneration of both pine and fir) and Sukh Sarai-Begampathri in Compartment Rb-15 & Rb-16 (healthy regeneration of pine). It is proposed to make these areas grazing free by establishing closed areas by way of fencing to aid natural regeneration. Overall, around 16,000 rft of barbed wire enclosures is proposed to be established during the plan period.

5.I.2. Soil Conservation:

Areas prone to soil erosion particularly due to the construction activities related to the Mughal Road as discussed previously under 3.3.9 need to be brought under intensive soil conservation measures. For this a detailed mitigative proposal shall be separately prepared and the required mitigative measures shall be got funded and executed through the Mughal Road Authorities.

Bank scouring by the fast-flowing streams and rivulets is also an issue to be addressed under this component. To prevent the soil erosion and to check the soil run-off, gully plugging by check dams by way of dry rubble stone masonry and crate-wire bunding is proposed to be done in the erosion prone compartments of the sanctuary. Construction of bunds and check dams shall be taken up in compartments Rb-07, Rb-08, Rb-09, Rb-11 and Rb-12. The stretch between Sukh Sarai to Zaznar is highly prone to erosion where crate bunding could be a better option over the simple check dams. A

total of 1860 cums of check dams and 92 Nos of crate wire bunds are proposed for the 10-year plan period.

5.I.3. Pasture Development:

Development of the degraded pastures is important for wild herbivore population in the sanctuary. Degraded pastures in the sanctuary include, Begampthri, Yangnari, Teli, Sathran, Zaznar, Ratiteli, Hathi pahad and Raineure. Restoration of these pastures requires following measures:

- Ground survey to estimate the degree of degradation
- Reduction of grazing by regulation and control to allow recovery and facilitate regeneration of native grasses, herbs and shrubs.
- Artificial seeding of native species in highly degraded pastures where natural recovery through protection does not yield favourable results.

High grazing pressures and lack of adoption of scientific management practices increase infestation of unwanted weed species affecting the herbage production and rendering the habitat quality poor. Rainure, Kamalkote, Zaznar areas in the sanctuary are heavily infested with weed species. Palatable species of grasses and legumes in the pastures are predominantly replaced by noxious weeds like *Rumex, Cirsium*, *Stipa, Sambucus, Sibbaldia, Malva* etc. Management of invasive and unwanted species shall require following measures to be implemented;

- Mapping of the weed infested areas in the sanctuary to know the extent of infestation.
- Study of the Phenology of weed species to decide the time/season for employing control measures.
- Manual de-weeding of unwanted species before flowering with minimal disturbance to the native and palatable species.
- Monitoring of the weed cleared sites before and after the removal operations to assess the success of the de-weeding operation so that based on the results cycles the treatments are decided.
- Plantation of native species in the weed cleared plots

The de-weeding shall be carried out over an area of 200 ha in the present plan tenure. The areas identified include compartments Rb- 07, Rb-08, and Rb-09

5.1.4. Forest-fire Control:

Fires have the capacity to alter habitats and cause direct mortality to wild animals, especially to those species which inhabit fire prone landscapes like grasslands and also to the ground-nesting bird species like pheasants. Forest fires can also cause temporary displacement of a species. Thus, it is extremely important to reduce threats posed by fires and possess the ability to respond quickly to such emergencies.

The conifer forests are prone to fires during the dry season and therefore extra emphasis has been given to manage these forests in the sanctuary in such a way that the outbreak and spread of forest fires in conifer zones is effectively curtailed.

A huge number of fallen trees which includes mortalities due to diseases and damages due to heavy snow-fall and wind-storms has resulted in accumulation of a large quantity of dried, decaying timber on the forest floor in conifer zone of the sanctuary (Compartments Rb-07, Rb-08 and Rb-09), This has made the area highly vulnerable to fire outbreaks and poses a potential threat to the standing green vegetation of the PA. This plan recommends part-removal of this fallen, decaying timber at selected, identified spots to prevent the spread of forest fires. This management intervention is proposed to be under-taken within the ambits of the standing supreme court orders and policy decisions of the Ministry of Environment, Forest & Climate Change and the timber so removed shall be put to in-situ use within the wildlife sanctuary.

The proposal calls for establishment of temporary firefighting squads and creating fire lines in a phased manner, first in the most fire prone parts of the park and later all across. A total of 42 km of fire-lines is proposed to be created during the plan period. 20,000 man-days (MDs) shall be required during the 10-year plan tenure to hire the personnel for establishing fire-fighting squads. Additionally, the following purchase of standard firefighting equipment like fire costumes, helmets, fire extinguishers, fire beaters, axes, hoes etc. is also proposed.

The fire contingency plan for the sanctuary shall also include:

- Mapping of fire prone areas based on past history
- Study of possible causes and sources of fire based on records
- Establishment of fire control rooms: 2Nos, one at Hirpora and another at Sedaw.
- Involvement of locals and tribals in participatory fire management and control
- Awareness generation among fringe communities and tribals through talk shows, street plays and village meets
- Display signages, hoardings and banners at vulnerable locations
- Documentation of fire incidents and their impacts for chalking out future strategies.

5.2. Protection & Surveillance



Figure 5.2: Frontline staff is the key to Protection & Surveillance *(Photo: Intesar Suhail)*

Objective

To strengthen surveillance and protection measures to secure wildlife and their habitat in the sanctuary

Priority actions

5.2.1. Anti-Smuggling Measures:

Timber smuggling, extraction of medicinal plants and other non-timber forest produce (NTFP) and extraction of boulders from Rambiara stream are some of the major wildlife crimes being tackled by the managers in Hirpora Wildlife Sanctuary. Regular patrolling is the most effective tool to combat these wildlife crimes. Below are the steps proposed to be taken:

Patrolling paths: The sanctuary has an extensive network of existing patrolling paths which needs to be maintained for smooth movement of patrolling teams. New patrolling paths at identified locations are proposed to be made. A total of 14 km length of new patrolling paths are proposed to be constructed in the sanctuary during the 10-year plan period.

Anti-smuggling camps: The anti-smuggling camps will be established in Sedaw, Hirpora Dobjan, Chor Gali and Hustvanj. The camps at Sedaw and Hirpora will be permanent and those at Dobjan, Chor Gali and Hustvanj will be temporary (seasonal) and operational during vulnerable periods (spring to autumn).

The anti-smuggling camps shall be equipped with the following logistics:

- Tents for accommodation (temporary camps)
- Sleeping bags, matting, utensils, cooking devices, ruck sacs
- Solar lights
- Communication equipment (cell phones/walkie talkies)
- First-aid box
- Search lights
- Stationery/data collection formats

The anti-smuggling camps shall work 24x7 and a roaster shall be maintained in each camp. The camps will be regularly monitored by the Range Officer.

On-foot Patrolling: A detailed patrolling route map based on the sensitivity of an area to be assessed from past records, shall be prepared and kept handy at the range level. Areas vulnerable to forest damage which include compartments Rb-06, Rb-07, Rb-08, Rb-09, Rb-15 and Rb-16 shall be given a priority. The Range Officer will prepare a patrolling roster to ensure that all areas are effectively patrolled and that the teams will keep on changing their routes on regular basis. The patrolling shall be conducted regularly but at different times of the day to maintain an element of surprise and shall be personally led by the Range Officer. In case of a specific information or a tip off regarding any wildlife crime, the raids and seizure operations shall be led by the Wildlife Warden. This management plan recommends mobile application/ GPS-based patrolling mechanism for the sanctuary for which the frontline staff shall be duly trained to build their capacity.

Six patrolling units, one for each compartment named above shall be constituted. Each patrolling unit will comprise of one Wildlife Guard, two Helpers/Watchers and five additional personnel from among the casual staff. The patrolling teams shall maintain a patrolling register and submit the data to their controlling authorities on weekly basis.

Vehicle patrolling: Vehicle patrolling shall be carried out in the sensitive locations situated along the motorable areas, namely the vulnerable zones of Kachalmaidan and the areas falling from

Dobjan to Pir Ki Gali. Intensive vehicle patrolling during Summer (May to August) and autumn (Sept-Nov) periods is recommended to prevent the forest damage. For the purpose of vehicle patrolling, one No. four-wheel vehicle and two No. motor bikes are proposed to be procured in next ten years.

Communication & Intelligence network: Development of an intelligence network is essential for effective surveillance. It is proposed that reliable and trustworthy persons from among the locals shall be roped in at the range level to act as sources for gathering of information with regard to the wildlife crime. The sources will be paid out of the contingencies.

5.2.2. Anti-Poaching Measures:

Although no incident of poaching has been reported in last five years from the Hirpora Wildlife Sanctuary or its adjacent forests, the seizure of a big haul of illegal wildlife products including Leopard skins, Bear gall bladders and Musk Deer musk pods in January 2021 from the nearby district of Anantnag has made it necessary to put the area under high alert.

Anti-poaching camps: The anti-smuggling camps proposed in Sedaw, Hirpora, Dobjan, Chor Gali and Hustvanj will also function as anti-poaching camps at the time of the year when the area is vulnerable to poaching (May to October). Additionally, the camps at Hirpora will function during the winter months also and special anti-poaching squads will be constituted to patrol the snow bound areas in winters, when the heavy snowfall in the upper reaches forces the animals to come down to lower elevations where they could become easy targets of poachers. Apart from the logistics recommended under 5.2.1, the facilities proposed for anti-poaching camps shall include:

- Warm clothing including jackets and snow shoes
- Snow Mobile (for patrolling snow bound areas)
- Snow Goggles
- Binoculars & Night Vision devices

The anti-poaching camps shall also work 24x7 and a roaster shall be maintained in each camp. The camps will be regularly monitored by the Range Officer.

Registration of licensed arms: It has been noticed that the nomadic herders spending the summers in the meadows of Kashmir along with their livestock often carry licensed arms for self-protection. In order to ensure that the guns carried by the nomads are not misused, it is proposed that a special drive will be conducted whereby all the nomadic families arriving in Hirpora will be surveyed and a detailed profiling of the licensed and un-licensed arms in their possession will be done.

Subsequently the required procedures for registration of the licensed arms with the Chief Wildlife Warden, as provided in the Wildlife (Protection) Act, will be followed.

Intelligence network: Development of an intelligence network as mentioned under 5.2.1 is essential for effective surveillance and is of great help in detecting a serious wildlife crime like poaching. Services of the informers engaged for anti-smuggling operations will also be utilized for information gathering on poaching. They will be specially advised to keep a look out for identified erstwhile shikaris residing in the vicinity of the sanctuary and monitor their movements. The sources will be paid out of the contingencies.

Capacity building: The frontline staff of the sanctuary shall be made to undergo special training sessions, where experts will impart hands on training to improve their skills in information gathering, wildlife crime detection, framing & lodgment of cases and legal procedures leading to conviction. At least one such capacity building programme will be conducted every two years in collaboration with NGOs and research institutions.

Participatory surveillance: In order to bring in some community participation into protection it is proposed that special wildlife surveillance squads comprising of people from the local village communities having a good knowledge of the local wildlife, preferably youth and erstwhile hunters shall be raised whose services would be used for patrolling and monitoring. Such volunteers shall be motivated through awareness programmes, followed by capacity building.

5.2.3. Anti-Grazing Measures:

Domestic livestock grazing as discussed under 3.3.1 is one of the major management problems in Hirpora. Huge livestock presence inside the sanctuary is one the major threats to the habitat, flora and fauna. As a number of other management interventions essentially revolve around the anti- grazing measures to be taken, it becomes absolutely necessary that the issue of grazing is effectively addressed. The present plan proposes a mechanism whereby the incidence of grazing in the sanctuary is gradually and systematically decreased and at least the critical habitats of the flagship species, the Kashmir Markhor are made grazing-free.

Grazing control in Critical Markhor Habitats: The department in collaboration with the Wildlife Trust of India during the previous plan tenure has accomplished a detailed survey of the nomadic herders using the area in summers and arrived at a fairly good idea about the intensity of grazing in the sanctuary. The study has identified the "bonafide" herders, that have been using the area traditionally for generations and those who have started to come there rather recently. It is proposed

that to start with, the "non-bonafide" herders shall be discouraged and made to stay away from the sanctuary. The process has already been initiated in 2018 and has shown encouraging results reducing the overall livestock population in the sanctuary by 24.66% in just one year (Table 5). Continuing with such efforts, the "bonafide" herders shall subsequently be motivated to spare the critical Markhor habitats and restrict their livestock to other areas.



Figure 5.3: Staff & WTI officials carrying out consultations with nomadic herders *(Photo: WTI)*

Anti-Grazing Check-posts: Establishment of two No of anti-grazing check posts is proposed, one at Pir Ki Gali and another at Hirpora. This shall help in checking the nomadic herders and their livestock, particularly when they are in transit on way to their destinations elsewhere in the valley. This shall help in reducing the grazing pressure due to transitory stays by herders.

Temporary Anti-Grazing Camps: On the pattern of the anti-smuggling and anti-poaching camps, seasonal anti-grazing camps shall also be established in areas like Raineur, Dongimarg, Ratta Teli and Hustvanj to monitor the movement of herds and prevent them from entering critical herbivore habitats.

Incentivizing Herders: In order to reduce the pressures on the sanctuary, it is proposed that incentives like solar lights, LPG connections and pressure cookers shall be provided to the nomadic herders. Similarly, facilities like shelter sheds and community toilets shall be established at least at one

location between Dobjan and Pir Ki Gali for the transitory nomads who use the Mughal Road for their annual migration twice a year (Spring & autumn). This shall help in restricting their movement to smaller areas and also in reducing their dependence on sanctuary resources. Additionally, the transportation of the livestock of the transitory herders shall be facilitated by providing them transport facility (Trucks) between Hirpora and Chatta Pani. Funds for the incentives mentioned above shall be sought from relevant welfare sources.

5.2.4. Demarcation & Fencing:

Demarcation of the external as well as internal boundaries of a protected area is always important for its management. The external boundaries viz the sanctuary boundary and the Eco-Sensitive Zone (ESZ) boundary are notified, well defined and mapped. Demarcation on ground of the sanctuary boundary was initiated during previous plan tenures and shall continue during the current plan tenure. Survey and fixing of 100 No. additional boundary pillars for demarcation of the sanctuary boundary is proposed in the present plan. This shall complete the entire pending demarcation. Further, 6000 rft of chain-link fencing is proposed to secure and consolidate the demarcated sanctuary boundaries.

Digitized mapping of internal boundaries such as those of blocks, beats and compartments will be done for the purpose of effective implementation of management actions and monitoring. Demarcation and mapping of tourism zone and patrolling routes inside the sanctuary is also proposed which will help regulating tourism activities in the area.

5.3. Infrastructure Development



Figure 5.4: Dongimarg Inspection Hut *(Photo: Intesar Suhail)*

Objective

To develop and maintain infrastructure for improved management, protection and communication

Priority actions

5.3.1. *Staff Residences:*

The residential facilities presently available for the frontline staff in the sanctuary are not adequate and the existing ones require repair, renovation and maintenance. The present plan proposes creation of four additional residential buildings including two staff quarters, one each at Dobjan and Sarbal and two guard huts, one each at Kachal Maidan and Pir Ki Gali. One inspection hut is also proposed to be constructed at Sarbal for the touring officials.

5.3.2. Foot Bridges

A number of fast flowing glacial steams exist across the Hirpora landscape. At some places these streams crisscross the forest trails, used as patrolling paths by the staff. In summer season due to increased water level and flow it becomes difficult for the patrolling staff to cross these streams and this hinders surveillance. Four No foot bridges are proposed at identified locations viz Kamalkote,

Dongimarg, Khore Pathri and Gattiwali, which shall be constructed on priority within the first four years of the plan period. The bridges are proposed to be constructed by way of in-situ use of the timber from dry, fallen snow/wind-damaged trees in the area.

5.3.3. Shelter Sheds & Watch Towers:

Three No. shelter sheds are proposed, one each at Raineur, Rupri, Addarwas, and Jaddi. These shall provide shelter to the frontline staff against inclement weather in these open meadows. Besides, four watchtowers are proposed to be erected at vantage locations to aid surveillance. Of these, four will be constructed during the first five years of the present plan tenure.

5.3.4. Entry Gates & Check-posts

The sanctuary presently has one entry gate at the Hipora entry point, but one more is required to be constructed at the other entry point near Pir Ki Gali. The proposed gate shall also have a check-post to house the staff for regulation of entries, particularly of the nomadic herders.

5.3.5. Nature Interpretation Centre:

Present day conservation efforts are incomplete without having different means of communication to enhance the understanding of nature among various stake holders. To aid and stimulate the visitors intellectual and emotional connection to nature, a state-of-the-art nature interpretation centre (NIC) with all modern interpretive and communicative facilities like multimedia aids, display panels, life-size faunal sculptures & scenographic exhibits and a mini amphitheatre is proposed to be created for the sanctuary. The NIC shall come up at the Hirpora entry of the sanctuary and is proposed to be completed during the first five-year tenure of this plan.

5.3.6. Equipment:

A wide range of field and office equipment is proposed to be procured during the plan period of ten years, which includes:

i) Office Machinery & Equipment for divisional & subordinate offices:

- Computer hardware (desktops & laptops)
- Computer software & accessories
- Photocopiers
- LED projector

ii) Survey Equipment for frontline staff:

- Binoculars & Night Vision devices
- Telescopes
- Range Finders
- GPS devices
- Drones

iii) Field Gear for field staff:

- Tents
- Sleeping Bags & Ruck Sacs
- Field Uniform & Shoes

iv) Photographic equipment:

DSLR Cameras

Lenses

5.4. Reorganization of Administrative Units

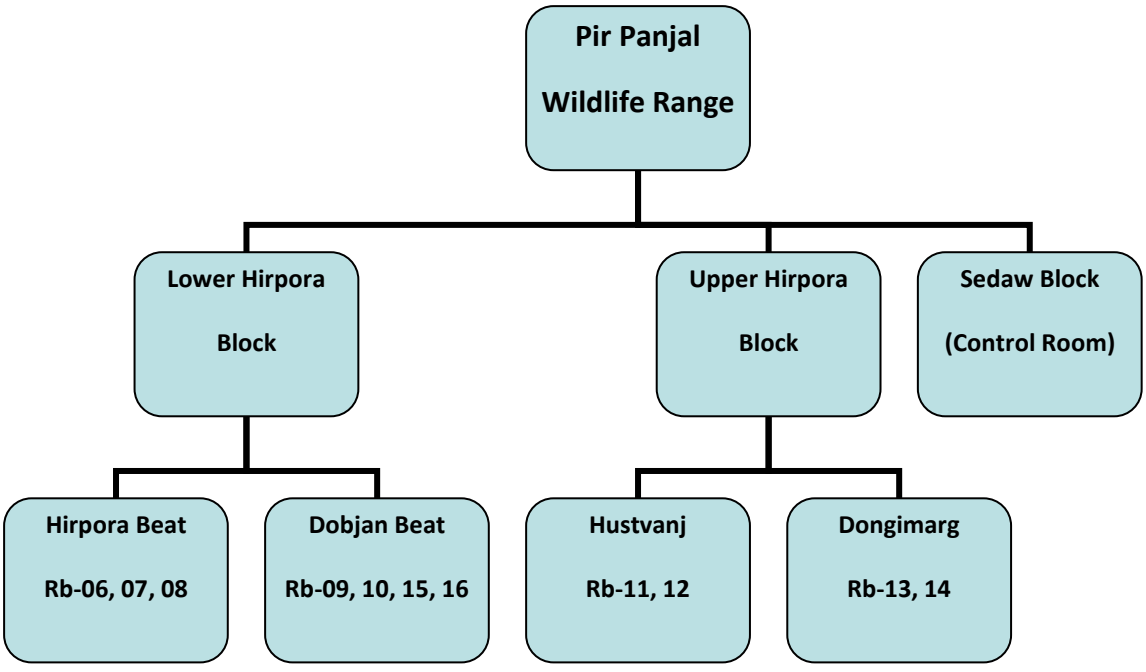


Figure 5.5: Proposed Administrative Units

Objective

To reorganize the existing administrative units viz Blocks, Beats, Compartments to suit the administrative and management requirements of the Sanctuary.

Priority actions

5.4.1. *Reorganization Proposal:*

As already discussed under 3.2.1, the entire sanctuary is comprised only of one range and one forest block and although compartments are well defined, the assignment of compartments to specific blocks and demarcation of beats has not been done. Presently there is one Forest Range, namely the Pir Panjal Wildlife Range and one Forest Block, the Hirpora Block to administer and manage the whole sanctuary area. The 11 compartments of Rb (Rambiara) series from Rb-06 to Rb-16 that constitute the sanctuary, cover a varied range of landscape, vegetation and altitudinal gradient. This plan recommends creation of two additional forest blocks to be headed by Block Foresters, taking the total number of blocks in the range to three. The proposed administrative set up for the Hirpora Wildlife Sanctuary shall be as under:

<table>
<tr><td>Range</td><td colspan="3">Pir Panjal (Headquarter: Hirpora)</td></tr>
<tr><td>Blocks</td><td>1. Lower Hirpora

HQ: Hirpora</td><td>2. Upper Hirpora

HQ: Dongimarg (Apr-Nov)

Hirpora (Dec-Mar)</td><td>3. Sedaw

(Control Room)

HQ: Sedaw</td></tr>
<tr><td>Compartments</td><td>Rb-06, 07, 08, 09, 10, 15 & 16</td><td>Rb-11, 12, 13 & 14</td><td rowspan="3">Whole Sanctuary Area for Anti-poaching, Anti-smuggling, Anti-grazing and Human-Wildlife Conflict operations.</td></tr>
<tr><td rowspan="2">Beats</td><td>Hirpora

HQ: Hirpora

Co: Rb-06, 07 & 08</td><td>Hustvanj

HQ: Dongimarg (Apr-Nov); Hirpora (Dec-Mar)

Co: Rb-11 & 12</td></tr>
<tr><td>Dobjan

HQ: Dobjan (Apr-Nov); Hirpora (Dec-Mar)

Co: Rb-09, 10, 15 & 16</td><td>Dongimarg

HQ: Dongimarg (Apr-Nov); Hirpora (Dec-Mar)

Co: Rb-13 & 14</td></tr>
</table>

Apart from one post of Range Officer, the Block & Beat-wise executive staff strength for different levels proposed for the sanctuary is as under:

Block	NO. of Beats	NO. of Compartments	Staff			
			Block Forester	WL Guard	WL Watcher	Helper
Lower Hirpora	02	07	01	04	07	07
Upper Hirpora	02	04	01	04	04	04
Sedaw (CR)	-	-	01	02	03	03
Total	04	11	**03**	**10**	**14**	**14**

The ministerial staff for the Range is proposed as under:

S.No	Post	Proposed Strength
01	Camp Clerk (Jr. Asstt.)	01
02	Computer Operator	01
03	Driver	01
04	Chowkidar	02
04	Orderly	01

5.4.2. *Zonation*

Since it is difficult to design a standard management practice to be implemented throughout the landscape, it would be practical to adopt zone and theme approach of management. Following three zones are proposed: Conservation zone; Eco-development Zone; Eco-tourism Zone and Eco-sensitive Zone.

Conservation Zone: The zone would cover the entire sanctuary area except the Eco-tourism zone.

Eco-development Zone: The zone would be outside the boundary of the sanctuary within 5 km of the sanctuary boundary.

Eco-tourism Zone: A tentative Eco-tourism zone for the sanctuary has been demarcated (See 5.9) and shall be finalized when the current eco-tourism draft plan is updated in consonance with the National Eco-tourism Policy.

Eco-sensitive Zone: The zone has already been notified (See 3.2.4)

5.4.3 Taking over of pending notified compartments:

Of the eleven compartments namely Rb-06, 07, 08, 09, 10, 11, 12, 13, 14, 15 & 16 notified as Hirpora Wildlife Sanctuary, two compartments viz Co Rb-06 & Rb-16 have not been taken over by the Wildlife Protection Department and continue to be under the administrative control of the Forest Department (Shopian Forest Division) right since the inception of the sanctuary in 1987. Over the years these two compartments have been managed as any other reserved forest with little PA-specific management interventions in place. Compared to the rest of the sanctuary area, the quality of forest and ecosystems in compartments Rb-06 and 16 have undergone a noticeable degradation. Being in close vicinity of human habitation, these compartments experience greater anthropogenic pressures and have even been subjected to encroachments.

However, since the compartments Rb-06 and 16 legally form a part of the Hirpora Wildlife Sanctuary, it is imperative that they are managed in accordance with the requirements of wildlife and management interventions specific to the wildlife and its habitat are implemented. This plan therefore proposes the take over of these compartments from the forest department after carrying out the following exercises:

- A detailed survey of the area to determine presence & absence of wild animal and bird species
- Survey to determine Vegetative/ Tee Cover, Tree Density, Shrub Cover
- Inventorying of forest damage
- Inventorying of encroachments
- Inventorying of existing assets

5.5. Research, Survey, Census



Figure 5.6: Scientific field research forms a basis of effective management *(Photo: Intesar Suhail)*

Objective

To carry out departmental and collaborative field research for better, scientific management of the PA

Priority actions

The present management plan proposes undertaking applied field research that could help in effective scientific management of the sanctuary. The research will be carried out through the departmental Research Wing as well as in collaboration with universities and research organizations of repute. Research studies will be conducted in a project mode and the topics will be decided by the research committee of the department in consultation with the managers and keeping in view the requirements and priorities in the field.

Following research topics are suggested to be accomplished during the management plan period:

a. Status, Ecology and Distribution of Threatened Ungulates

b. Identification, Characterization and Mapping of the Alpine Pastures with special reference to the habitat requirements of Markhor

c. Impact of Livestock Grazing on Mountain Ungulates

d. Impact of Mughal Road and Power Transmission line on Ecology and Behavior of Key Wildlife Species.

Periodic census/survey to understand the population dynamics of key wildlife species including Markhor, Musk Deer, Brown Bear and vulture species shall be conducted. This will not only be helpful in assessing the populations but also in gauging the response of animal populations to the management interventions.

Procurement of survey & field equipment like binoculars, range finders, GPS units, camera traps, computers and computer software are also proposed.

5.6. Conservation of Medicinal Plants



Figure 5.7: The sanctuary is rich in medicinal plants & herbs *(Photo: Intesar Suhail)*

Objective

To preserve & restore important medicinal plant assemblages in suitable areas of the sanctuary

Priority actions

The Hirpora Wildlife Sanctuary is enormously rich in medicinal and aromatic plant wealth. Over 100 species of medicinal plants are reported to be found in the Pir Panjal range of which some like *Saussurea sp.*, *Podophyllum* sp., *Atropa belladonna*, *Inula* sp. & *Digitalis* spp. have been extracted commercially for use in medicine industry. Prior to its notification as a wildlife sanctuary, the

extraction was also allowed in the Hirpora forests. There is a need to conserve and propagate this natural wealth of medicinal plants and herbs still abundant in different areas of Hirpora Wildlife Sanctuary. This is proposed to be achieved through:

A) **Facilitating natural regeneration**

- Rati Teli, Jaddi, Nandan Sar, Rupri, Kalsar, Zaznar, Kokar pud, Patandoban, are some of the best sites for natural regeneration of medicinal plants. Other sites suitable for natural regeneration of medicinal plants shall be identified and prioritized after a systematic survey.
- Local shepherds and migratory herders shall be taken into confidence and motivated to spare important sites from livestock grazing and other anthropogenic pressure to allow natural regeneration of medicinal plants and herbs.

B) **Assisted regeneration**

- Identification of sites for plantation of important medicinal plant species which are threatened due to over-extraction
- Establishing temporary medicinal plant nursery
- Plantation and post-plantation care as per the operational schedule.

5.7. Eco-Development Activities



Figure 5.8: Subsidized LPG connection distribution among locals *(Photo: Sameer Dar)*

Objective

To promote eco-development activities in fringe areas for reducing the dependence of people on natural resource of the sanctuary

Priority actions

The modern approach to wildlife conservation demands involvement of local communities, especially the stakeholders in the efforts. Local communities form an integral part of the entire Himalayan landscape. The present plan thus proposes the conservation initiatives to be oriented in such a way that without depleting the natural resources available, the local community is benefited. To ensure the community participation, a two-way approach is advocated— development of fringe areas and providing of livelihood support. Participatory Rural Appraisals (PRA) would help to decide and identify the priorities and generation of awareness in the local communities and other stakeholders would help to generate support for conservation.

5.7.1 Constitution of eco-development Committees:

Eco-development committees (EDCs) shall be constituted in the villages within 5 km from the sanctuary boundary. Forest Guard of the respective area would be the ex-officio Member Secretary of the EDC. Representation of various ethnic and social groups including women shall be ensured in each of the EDCs. The committee will act as a bridge between the sanctuary management and fringe communities, besides providing institutional support to implement the eco-development activities.

5.7.2 Reducing Fire Wood & Fodder Dependency of Communities:

Hirpora and its neigbouring villages experience cold climates for over six months and in the absence of alternative heating arrangements the dependence on sanctuary resources for firewood is huge. Firewood is extracted and used to serve two other purposes –cooking of food and water heating, especially during winters. In the villages around the sanctuary, space heating is usually not practiced and instead charcoal, made by burning of twigs is used in the *Kangris* (fire pots).

Initiatives to reduce the dependence of the local communities on firewood by way of provision of alternate sources of energy like LPG connections and solar lights and solar water heaters and also that of heat-efficient challahs (stoves) and cooking utensils such as pressure cookers, rice cookers etc. is proposed. Similarly, provision for supply of fodder for the bonafide use by the locals by allowing harvesting from the closed areas is also proposed.

5.7.3 Village community facilities:

For the facility of the villagers and as a good will gesture to generate support for conservation, the following community facilities are proposed to be created in the fringe village of Hirpora:

Community Hall	1 No
Toilet Blocks	2 No
Street Solar Lights	15 No
Garbage Bins	20 No

5.7.4 Livestock Vaccination:

Livestock vaccination tours led by departmental veterinary wing are proposed to be conducted inside the sanctuary area as well as around the adjoining villages so that the risks of transfer of disease to the wildlife are minimized. Collaborating with the relevant departments such as the Department of Animal Husbandry and the Department of Sheep Husbandry, J&K would be required to easily meet this objective. Further, a seasonal livestock vaccination post is proposed to be established each year for the vaccination of the nomadic herds that enter the valley from outside.

5.7.5 Livelihood Support

To reduce the dependence of fringe communities on sanctuary resources, it is imperative to alleviate their economic condition. This will also help in generating a good will and achieving local support for conservation efforts. The social and economic alleviation of the fringe and nomadic communities can be brought about by providing them some financial, but mostly technical support in small-scale or self-help entrepreneurship.

This plan proposes livelihood support to the local entrepreneurs through vocational trainings to be imparted through expert instructors and skill developers. The target population shall be the local fringe communities of Hirpora and adjacent villages as well as the "bonafide" migratory herder communities. Financial support to the skilled local youth, particularly women for encouraging them to set up small scale units of handicrafts and handlooms is also proposed which shall be taken up in collaboration with the Social Welfare Department.

Besides, training and capacity building of local unemployed, educated youth to act as professional nature guides to the tourists is also proposed.

5.8. Mitigation of Human-Wildlife Conflict



Figure 5.9: A problem bear trapped in a cage *(Photo: Mohammad Yousuf)*

Objective

To reduce losses due to human-wildlife conflict in and around the sanctuary by adopting a proactive approach.

Priority actions

Whereas, it is difficult to completely arrest the occurrence of human-wildlife conflict incidents, the negative impacts of such incidents can be reduced by good and timely management:

a. ***Analyzing the human-wildlife conflict scenario:*** The department has maintained a rich data-base on human-wildlife conflict for last ten years and all the important parameters like date, time & exact locations of the incidents, animals involved, nature of damage caused and compensation paid to the victims are well recorded. The mapping of this data shall enable identifying conflict hot spots and in turn help in understanding the reasons behind frequency of such incidents at particular spots. Sight specific mitigative measures can accordingly be planned.

b. *Preventive measures:*

- Sensitization of people in high and medium conflict areas is proposed on priority, whereby the sanctuary management in partnership with other organizations will organize awareness camps to make the villagers, herders and other stakeholders aware about causes of conflict and preventive measures.
- In high conflict areas a network of volunteers shall be developed and named as Primary Response Team (PRT) whose job would be to take immediate actions to avoid encounters of people with the wild animals, help providing the wild animal a safe passage and relay information to Wildlife Protection Department for further action. Regular training of the PRTs on these aspects shall be done, and the sanctuary management shall monitor their activities.

c. *Reactive measures:*

- Putting in place a Rapid Response Team (RRT) at two control rooms located at divisional headquarters and Sedaw village. The control rooms shall have a defined jurisdiction and the conflict prone areas and hotspots shall be suitably divided between the two. In view of the dearth of regular staff (most of whom have to be given management assignments inside the sanctuary area), the RRTs shall comprise of the casual and need-based workforce supervised by at least one to two from among the regular staff and under the overall command of the Range Officer, Hirpora.
- The RRTs on receiving a call shall immediately rush to the spot along with the required equipment and act as per the situation. The response protocol recommended for a typical human-wildlife situation is as shown in figure 5.10, 5.11 & 5.12

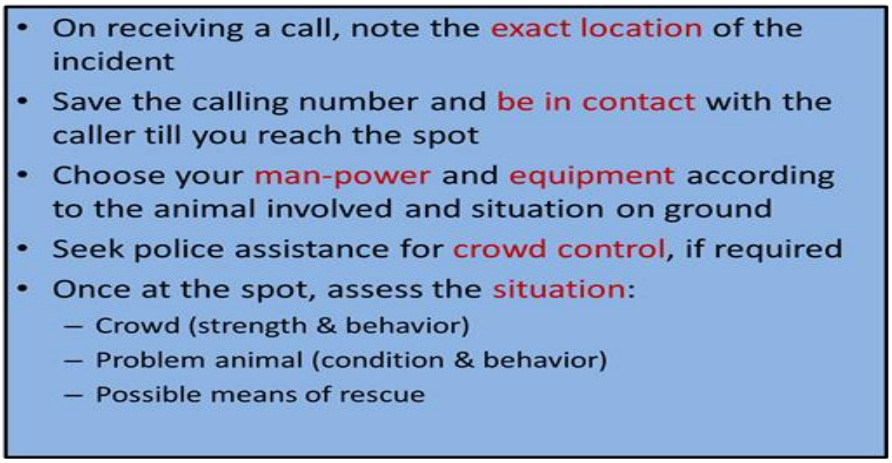


Figure 5.10: Protocol for response to a human-wildlife conflict situation (A)

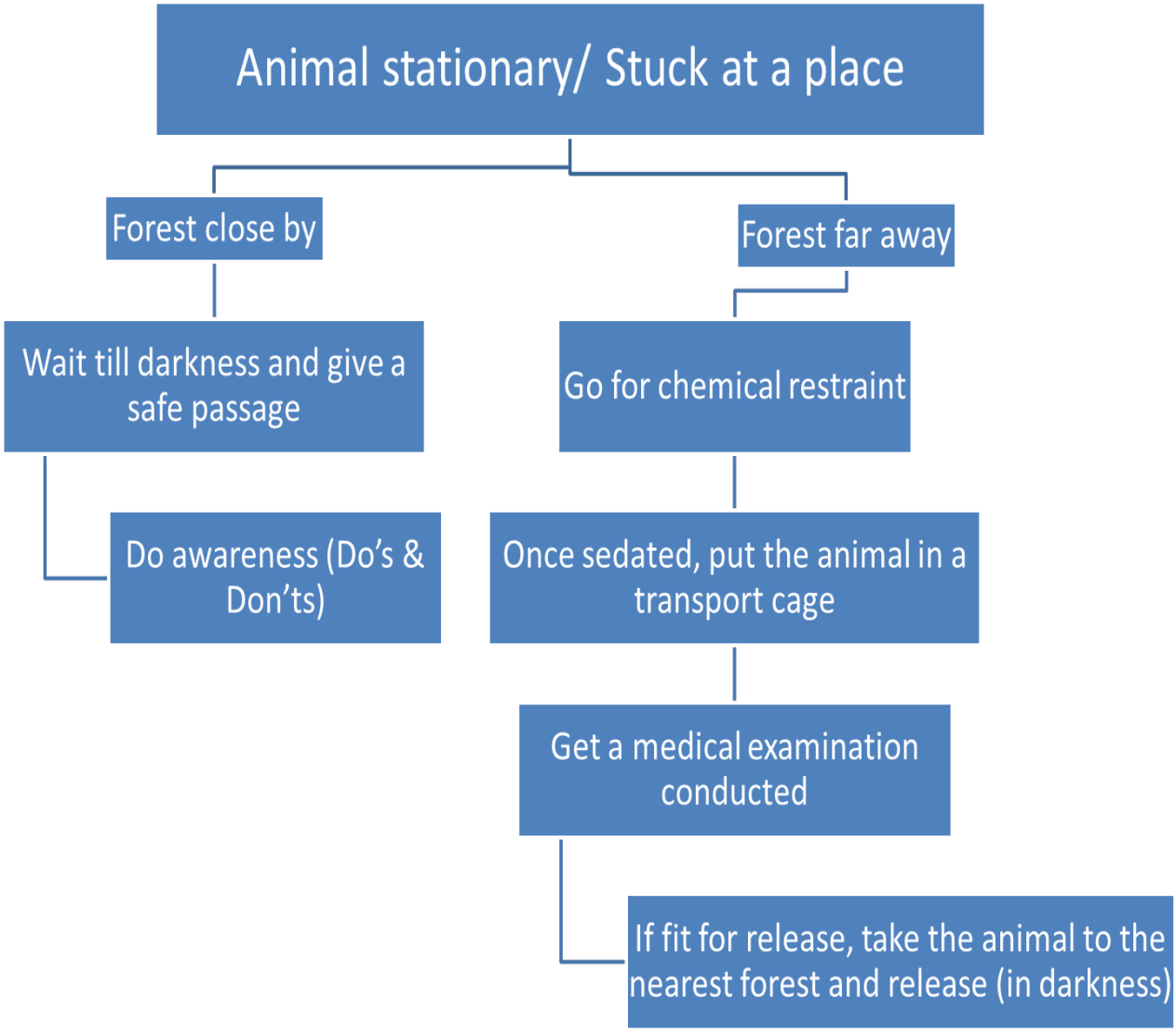


Figure 5.11: Protocol for response to a human-wildlife conflict situation (B)

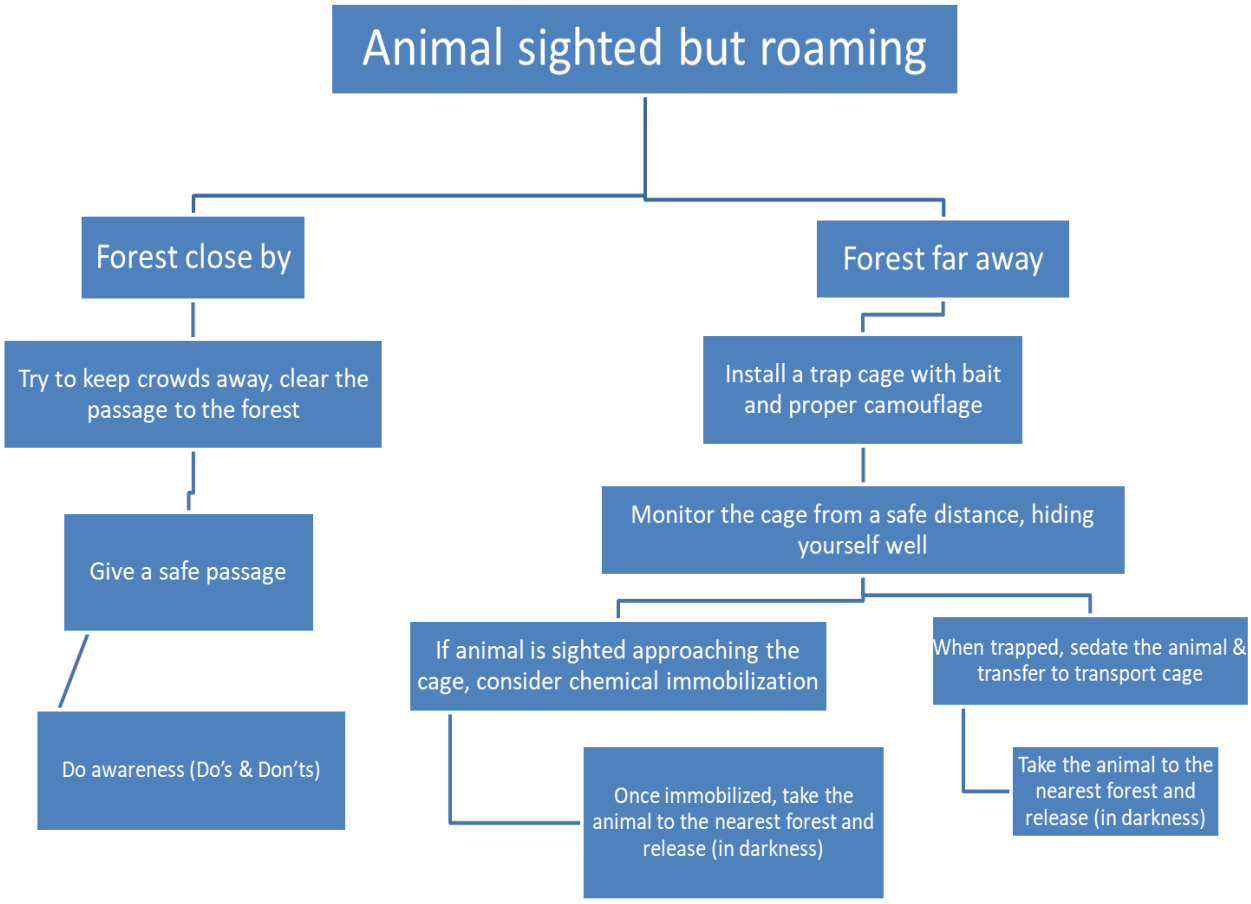


Figure 5.12: Protocol for response to a human-wildlife conflict situation (B)

- In case of a confirmed human mortality, particularly a minor, due to a leopard attack extra caution has to be observed and the response shall have to be prompter and more methodical. The protocol recommended for such situations is enumerated in figure 5.13.

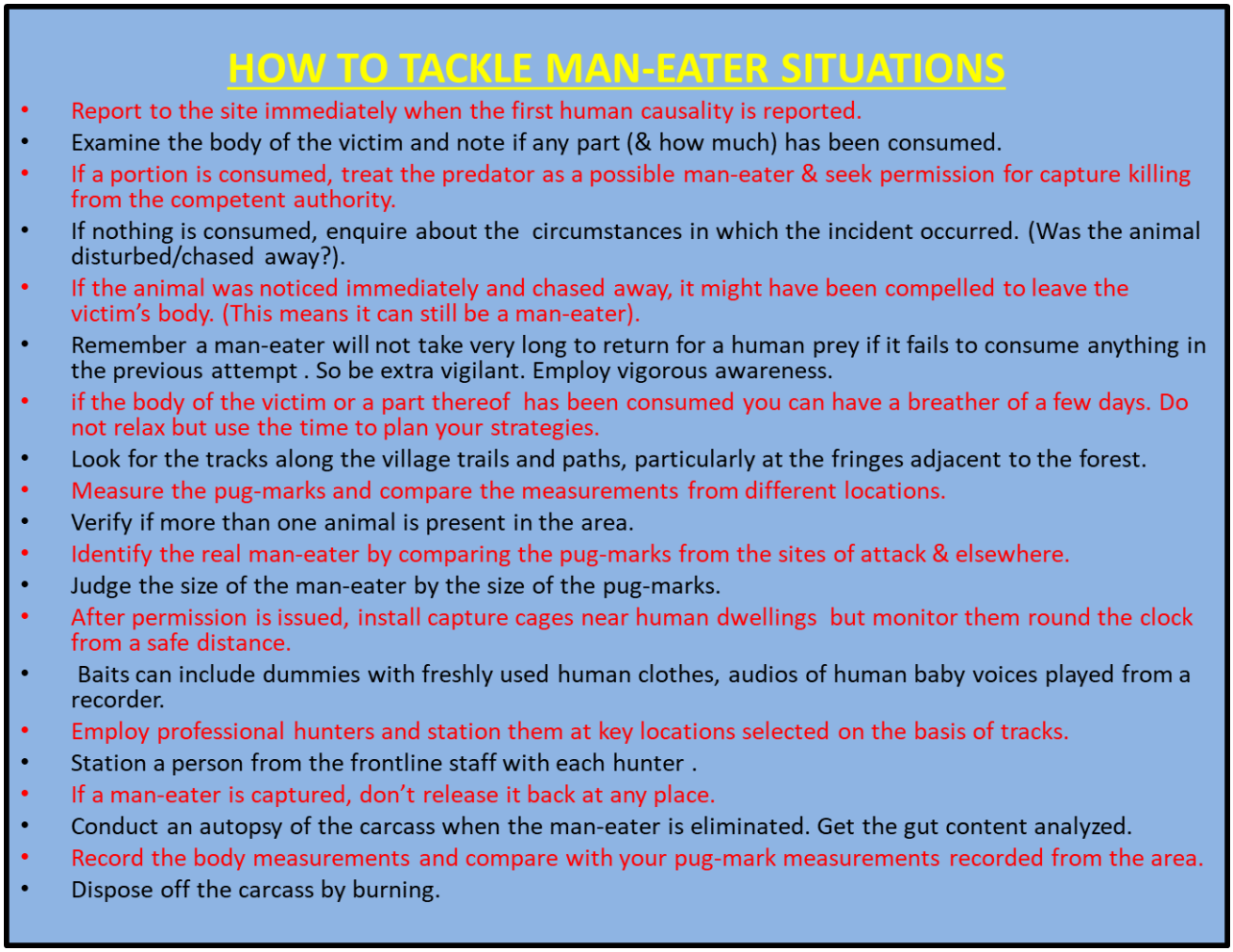


Figure 5.13: Protocol for response to a man-eater situation

d. *Equipping the Control Rooms:*

This plan proposes a regular replenishment of a state-of-the-art equipment to the control room staff. This includes equipment for capturing of the problem animals by chemical immobilization as well as by physical restrain and also the rescue and personal protective gadgets:

- Tranquillizing Guns & Accessories
- Immobilizing & Recovery Drugs
- Nets & Net Guns
- Species-specific Capture Cages, Treatment Cages & Transport Cages
- Ladders, Ropes & Harnesses
- Wildlife Repellants and Crackers
- Search Lights
- Self-Protecting Armor & Baffle Boards

- Animal Rescue Vans
- Motorbikes
- Camping Gear

e. ***Relief Measures:***

Presently, the ex-gratia scheme for the victims of the human-wildlife conflict is limited to the payment of compensation for human deaths and injuries only, with no provisions for crop and livestock damage. In case of a human death in human-wildlife conflict situations, ex-gratia of Rs 3.00 lacs is provided to the next of the kins of the victim and same amount is paid if a victim suffers permanent incapacitation. In the cases of injuries due to wild animal attacks a compensation of up to Rs 1.00 lacs is given.

This plan proposes a fast-track mechanism to process the cases of ex-gratia under which the victims shall be compensated within shortest possible time. It shall be mandatory for the concerned beat guard to personally visit the family of a victim within 24 hours of the incident and advise them about the procedures involved in filing a compensation claim. In case of a death, as per norm, 33% of the principal amount of ex-gratia shall be disbursed within 48 hours.

Proposal for enhancement of the ex-gratia rates is under consideration of the authorities. It is also recommended that a proposal for ex-gratia for livestock and crop (particularly apple) damage be prepared at the divisional office level for submission to the competent authorities for consideration. Alternatively, a proposal for initiation of a scheme for livestock and crop insurance against wild animal damage is also proposed to be developed, which can be submitted to the competent authorities for consideration.

5.9. Eco-Tourism



Figure 5.14: A departmentally developed Campsite in 2012 *(Photo: Intesar Suhail)*

Objective

To encourage sustainable tourism in identified areas

Priority actions

Ecotourism is an enlightening, participatory travel experience, both natural and cultural, that ensures the sustainable use, at an appropriate level, of environmental resources at the same time producing viable economic opportunities for the tourism industry and host communities. Ecotourism may include cultural tourism (a cross cultural experience), nature tourism (upholding conservation programs) and a little bit of soft adventure, all benefiting the wellbeing of local communities and indigenous people

Sustainability of the forests and forest resources has been accepted as the main principle of the forestry and wildlife management for a long time. Sustainable development or sustainable resource management has become an attractive idea for resource managers and in the development of the concept of sustainable development, it has been recognized that there is a need to link conservation of resources with the development needs of local population dependent on the resources. In other words,

ecotourism is a responsible travel to natural areas that conserves the environment and improves the wellbeing of local people.

As per the guidelines for ecotourism in and around Protected Areas, issued by the Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India, those who implement and participate in ecotourism activities should practice the following:

- Adopt low-impact tourism that protects ecological integrity of wilderness areas, secures wildlife values of the destination and its surrounding areas.
- Highlight the heritage value of wilderness and Protected Areas.
- Build environmental and cultural awareness and respect.
- Facilitate the sustainability of ecotourism enterprises and activities.
- Provide livelihood opportunities to local communities.
- Use indigenous, locally produced and ecologically sustainable materials for ecotourism activities.

It has been envisaged in the guidelines that the Chief Wildlife Warden must ensure that each Protected Area (PA) prepares an ecotourism plan, as part of the management plan which is to be approved by the state government. A draft plan for development of ecotourism in Hirpora WLS had previously been prepared as per the guidelines issued by the MoEFCC, Government of India and shall be updated during the present management plan period and submitted to the government for approval. However, under the present plan some basic ecotourism initiatives are proposed to be initiated during the first five years of the plan tenure.

Historical Importance:

The old Mughal Road connecting the Kashmir valley to the Rajouri and Poonch districts of Jammu region passes right through the sanctuary. The route that crosses the Pir Panjal range of Himalayas at the famous mountain pass of Pir Ki Gali (3500m), was used by the erstwhile Mughal caravans to travel from the plains of India to the Kashmir valley. Two important halting points of the erstwhile Mughal caravans namely the Sukh Sarai and the Aliabad Sarai (inns) still stand to tell the tale of the Mughal grandeur. Both of these structures are visible from the newly developed Mughal Road and occur within the limits of the Hirpora Wildlife Sanctuary.

Ecotourism Potential in Hirpora Wildlife Sanctuary:

Hirpora Wildlife Sanctuary falls in the distributory range of the Markhor, *Capra falconeri,* a schedule I species & a member of the IUCN's Red Data Book. The distribution of Markhor in India is restricted only to a few pockets in the valley including Hirpora in the south and Limber/ Lacchipora area in the north. Hirpora Wildlife Sanctuary along with Limber/Lachipora (Kajinag area) has a distinction of harboring major part of the remaining viable population of this rare species.

Being the close vicinity of Aharbal Falls one of the most visited tourist destinations of Kashmir, and being situated on the Old Mughal Road the Hirpora wildlife sanctuary has a great scope of promotion as an eco-tourism spot. The tourist visiting Aharbal can be attracted towards the sanctuary provided it possess the necessary facilities and basic infrastructure required for an eco-tourist.

The sanctuary and the surrounding areas have a potential to offer the following eco-tourism activities to a visiting eco-tourist:

Ecotourism Activity	Immediate Potential	Future Potential
Bird Watching/Animal Viewing & Nature Photography	✓	X
Trekking & Nature Walks	✓	X
Heritage Tourism	✓	X
Mountain Biking	X	✓
Rock Climbing	X	✓
Wilderness Camping	✓	X
Botanical Tours	✓	X
Pilgrimage Tourism	X	✓
Paragliding/Para-sailing	X	✓
Pony Riding/Horse Safari	✓	X
Village Cultural Events	✓	

Ecotourism Activity Zonation and Site Selection:

Based on suitability for a particular ecotourism activity, various spots have been identified in and around Hirpora WLS and based on the location of these spots the following Ecotourism Zones (EZs) were identified and shall therefore be delineated for undertaking the said activities:

S.No	Name of the Ecotourism Zone	Activity Covered
1.	Hirpora Village	Village Cultural Events, Pony Riding/Horse Safari
2.	Dobjan	Wilderness Camping, Pony Riding/Horse Safari, Botanical Tours, Trekking & Nature Walks
3.	Aliabad, Sukhsarai	Heritage Tourism, Wilderness Camping
4.	Patandoban	Bird Watching/Animal Viewing & Nature Photography, Botanical Tours, Trekking & Nature Walks, Wilderness Camping
5.	Raineur	Trekking & Nature Walks, Wilderness Camping

Proposed Developmental Plan:

It is proposed that to begin with the ecotourism activities of immediate potential, as enumerated in the table above, will be taken up. Under the present plan the following developmental programmes aimed at creating/developing the necessary infrastructure and facilities for the said activities are proposed:

1. **Souvenir Stall Facility:** At the entrance of the sanctuary at Hirpora, a Souvenir shop/stall is proposed to be developed where souvenirs and memorabilia related to the PA and the flora and fauna therein shall be kept available for purchase by the visiting tourists. The souvenirs shall include Logo/Image Caps, T-Shirts, Posters, Picture wall hangings, Mugs etc.

2. **Nature Trails:** Some already existing forest trails need to be repaired and developed as nature trails for the purpose of nature walks. Such trails shall be developed in Dobjan and Patandoban ecotourism zones.

3. **Wilderness Camp Facilities:** Wilderness or nature camping facilities shall be developed at Dobjan and Patandoban ecotourism zones during the current plan period. Suitable arrangements for proper sanitation and disposal of wastes shall be made at the camping sites. Further, procurement of camping gear like lodging tents, toilet tents, sleeping bags, haversacks, solar lanterns etc is also proposed for renting out to the campers. Purchase of binoculars and telescopes is also proposed for catering to the needs of the bird watchers and wildlife lovers.

4. **Publicity/Awareness/Nature-Education:** For the purpose of nature awareness and education of the visitors, print material like brochures, stickers, posters, post-cards, pamphlets, maps, tourist guide books, manuals and calendars shall be prepared and kept available at the Souvenir Stall. Further, for the sake of publicity and marketing, sign boards and hoardings shall be installed at key locations like airports, railway stations, highways and tourist reception centers. Launching of a website is also proposed for dissemination of information and marketing of the ecotourism site.

5. **Signages and Instruction Boards:** Signages and instruction boards help the tourists in interpretation, understanding and appreciation of the ecology and environment. Elaborate, catchy and pictorial sign boards and guide-line notice boards are proposed to be installed at strategic locations along the ecotourism zones. The signages will be so designed as to blend with the environs.

6. **View Points:** Viewpoints are needed for the tourists to have a better and comfortable view of the scenery and landscape. Three No. such viewpoints are proposed to be constructed alongside the Mughal Road at suitable locations.

7. **Restoration/Repair of Heritage structures:** Restoration and repairs of the existing Sukhsarai and Aliabad Sarai Mughal monuments is proposed to make them more tourism worthy. The restoration works are recommended to be carried out in due consultation with experts and the Department of Archaeology. Landscaping/ground-leveling of the premises of Aliabad Sarai monument is also proposed.

8. **Home Stays:** The Gujjar & Bakerwal communities shall be encouraged to develop their Kothas (seasonal dwelling log sheds) into home stays for adventure seeking nature tourists. For this some incentives like furniture, furnishing and crockery is proposed to be provided.

9. **Capacity Building:** Training and capacity building of front-line staff in fundamental aspects of hospitality, nature interpretation and eco-guiding is required to suit to the requirements of an

eco-tourist. Educated local youth to be engaged as eco-guides shall also be imparted such trainings. Orientation programmes shall be required to be conducted where services of experts from the fields of Hospitality, Tourism, Wildlife and Ornithology shall be sought.

Community Participation:

Community participation, directly benefiting the local populace is an essential component of any ecotourism package. Resources generated from ecotourism, apart from being used for protection and conservation are to be utilized for local livelihood development. The following table enumerates the potential of community participation and local livelihood development in the ecotourism planning of Hirpora WLS:

Activity	Facility/Service	Participant Beneficiaries
Bird Watching/Animal Viewing & Nature Photography	Eco-guides	Local Educated Youth
Trekking & Nature Walks	Transportation/Carriage	Local Porters & Pony Owners
Pony Riding/Horse Safari	Ponies/Horses	Local Pony and Horse Owners
Village Cultural Events	Cultural Shows/Performances	Local Cultural Artists

Implementing Agency:

The ecotourism activities will be managed in a society mode to ensure flexibility and to enable raising of funds (both for infrastructure development and working capital) and ploughing back the profits into the programme. The inherent flexibility will facilitate incorporation of changes in response to local needs and experiences. The ecotourism society will be constituted under the J&K Societies Registration Act and will form the lower most site-specific component of the three-tier structure of the proposed "Jammu & Kashmir Ecotourism Development Board". The society will be subordinate to the Governing Body and the Executive Committee of the said board.

Composition of the Ecotourism Society for Hirpora WLS:

Wildlife Warden Shopian	-Chairman
Divisional Forest Officer Shopian	-Member
Sarpanch of concerned Gram Panchayat	-Member
3-5 representatives from amongst local inhabitants	-Members
Local NGO/Environmentalist representative if any	-Member
One Range Officer to be nominated by DFO Shopian	-Member
Range Officer, Pir Panjal Wildlife Range	-Convener

The Society will have its own by-laws formulated by the Wildlife Protection Deartment and would undertake to abide by the policy guidelines on ecotourism as formulated/modified by the Government from time to time.

Implementation:

After approval and sanctioning of the Ecotourism Plan the implementation shall be carried out in following phases:

1. **Preparatory Phase:** This phase would include making enabling provisions wherever required in policy & law and communicating the same to all the stakeholders in the intention of promoting ecotourism as an activity that is ancillary to the objective of conservation of the PA. Role clarity will be defined through MOUs and agreements which will be arrived at in a participatory manner. This will prepare the local populace, the local tour operators and the PA staff for owning up the project after reaching clear understanding of the mutual obligations, duties and responsibilities. Detailed work plans for creation of tourist facilities as well as the standard operation procedures for use and management of these facilities and ancillary services will be clearly spelt out in documents that will be arrived at in a participatory manner.

2. **Training Phase:** In this phase trainings will be organized for various field level actors/participants of different stakeholder sectors. These trainings will lead to capacity building and the effectiveness of the capacity building exercise will determine the long-term sustainability of the project.

3. **Work Execution Phase:** In this phase physical infrastructure and facilities will be created. This will be the principal responsibility of the Wildlife Protection Department. However, consultations with allied agencies like Tourism Department can be done in a participatory manner so as to achieve the best results.

4. **Operational Phase:** This is the phase when the tourist flow would start coming to the PA. The group size and frequency of the tourist flow will be decided by the PA managers according to the carrying capacity of the area to be determined through systematic, scientific procedures.

Monitoring:

Monitoring of tourist response and impact of ecotourism activities on the PA habitat shall be carried out periodically. Tourist response can be judged from regular feedbacks. A predetermined set of indicators is to be developed with the help of baseline data with respect to the condition of the habitat during the preparatory phase. These indicators will be used for measuring and monitoring the impacts and success of the project.

Expected Outcomes:

The present plan if sanctioned and implemented successfully is expected to show following results:

- Tourist inflow in and around Hirpora Wildlife Sanctuary, at present negligible, will increase.

- Commissioning of the Mughal Road has thrown open the area hitherto out of bound to a common tourist, which can result in over-exploitation of its tourism potential. An organized, regulated and planned ecotourism project shall ensure a sustainable use of this potential with little or no impact on the environment and natural resources.

- Generation of revenue on account of gate receipts, which as per the guidelines of the MoEFCC shall be collected by the Wildlife Department (and would not go to the government exchequer), shall be utilized for the benefit of the PA and the wildlife therein.

- Significant benefits including generation of livelihood opportunities shall flow to the local communities.

Risks & Uncertainties:

- Legal and institutional changes required for affecting enabling provisions in policy & law to make the project operational may not be forthcoming. There are specific court orders and government directives which may prohibit or restrict the scope of activities of this project.

- Local communities and stakeholders including tour operators may not be convinced of the viability of the project and therefore may impede its progress.

- In view of the present economic scenario, the tourist response expected may not arrive.

5.15. Wildlife Health Management



Figure 5.10: Medically examining a Leopard before release *(Photo: Nisar Ahmad Zargar)*

Objective

To monitor & manage the health of wild animal populations

Priority actions

- Construction of animal rescue & treatment centre
- Disease investigation & monitoring through fecal samples.
- Vaccination of domestic livestock of nomadic herders to prevent disease transfer to wild animal populations.
- Procurement of drugs & medicines
- Fabrication of treatment equipment like stretchers, treatment/squeeze cages, veterinary surgery table & instruments.

5.16. Awareness & Publicity



Figure 5.11: An awareness even in Hirpora village *(Photo: Nisar Ahmad Zargar)*

Objective

To spread awareness about the conservation values of the sanctuary

Priority actions

The ignorance and lack of awareness about the importance of wildlife can sometimes be the cause for deterioration of wildlife. For the promotion of the conservation value of the sanctuary and to

make the people aware about the socio-cultural and ecological importance of the area, a comprehensive extension and awareness strategy is proposed to be undertaken through various means which shall comprise of:

A) **Printing of publicity material:** Print material like brochures, pamphlets, pocket guides & booklets, posters, calendars and stickers in English and Urdu languages shall be developed that shall highlight the floral, faunal, cultural, scenic and historical attributes of the area and shall be kept readily available for public distribution.

B) **Developing a dedicated website for the sanctuary:** A site specific website for Hirpora Wildlife Sanctuary is proposed to be developed which shall be maintained and updated regularly. The website apart from showcasing the natural attributes of the area shall also keep updated information regarding the various activities being under taken by the department in respect of the sanctuary.

C) **Hoardings and Signages:** Informative bill boards and hoardings depicting faunal diversity of the area and communicative sign boards designed to assist a visitor are proposed to be erected at vantage spots within the sanctuary. In addition to this large size hoardings displaying information about the PA are proposed to be installed at key locations like airport, bus stands, road-crossings and public places.

D) **Observing important days & weeks:** Hirpora Wildlife Sanctuary came into being through a government notification dated 19th March, 1987. It is proposed that henceforth, this day shall be observed as the "foundation day" of the sanctuary and every year special events with participation of various stakeholders, particularly students and youth are proposed to be organized. Further, on the occasion of wildlife week celebrated every year from 2nd to 8th October, various programmes and activities in collaboration with educational institutions and NGOs are also proposed to be organized annually.

E) **Guided Nature Tours for students:** Guided awareness tours of the sanctuary area are proposed to be conducted every year in which students from various schools, colleges and educational institutes of the district shall be invited. These tours shall be led by expert guides for in-field communication with the participants.

F) **Equipping the NIC:** The Nature Interpretation Centre proposed for the sanctuary shall be provided with state of the art informative and communicative facilities like multimedia aids, display panels, life-size faunal sculptures & scenographic exhibits.

THE BUDGET

CHAPTER-6

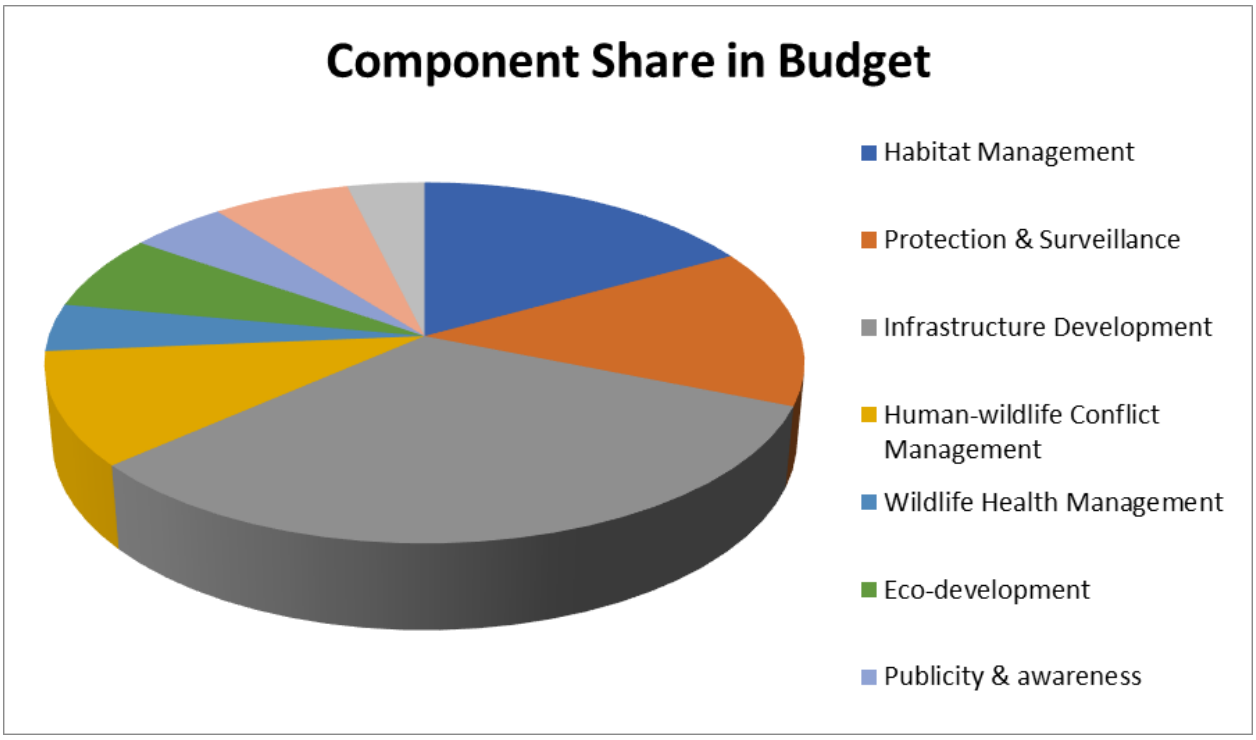
The Budget

Funds for development of Hirpora Wildlife Sanctuary are broadly received under following government schemes in vogue presently:

S. No	Name of the Scheme	Sector
01	Compensatory Afforestation Fund Management and Planning Authority (CAMPA)	State /UT
02	Integrated Development of Wildlife Habitats-Centrally Sponsored Scheme (IDWH-CSS)	Central
03	State Capital Expenditure (CAPEX)	state

This management plan proposes a total budget of INR 1477.00 lacs for Hirpora Wildlife Sanctuary for the ten-year plan period (2021-31), with a mid-term budgetary review after five years. An activity-wise micro-plan for first five years has been proposed, which shall be later extended for next five years after the mid-term review which shall take into account possible rate escalations over the time.

The budgetary proposals recommended in this plan are based on rates mentioned in the approved schedules of rates currently in vogue in the Forest and Public Works Department and shall be subject to amendments that may take place in the said schedules during the plan period.



I. S. II. No	Activity	Budget for 10 Year Plan Tenure (Amount in INR Lacs)												
		1st Year	2nd Year	3rd Year	4th Year	5th Year	Total 1st 5 Yrs	6th Year	7th Year	8th Year	9th Year	10th Year	Total 2nd 5 Yrs	Grand Total	% of Grand Total
01	Habitat Management	29.00	24.00	24.00	24.00	24.00	125.00	29.00	0.24	24.00	24.00	24.00	125.00	250.00	16.92%
02	Protection & Surveillance	20.00	20.00	20.00	20.00	20.00	100.00	30.00	20.00	20.00	20.00	20.00	110.00	210.00	14.22%
03	Infrastructure Development	41.00	59.00	62.00	49.00	28.00	239.00	41.00	59.00	62.00	49.00	28.00	239.00	478.00	32.36%
04	Human-wildlife Conflict Management	15.00	15.00	15.00	15.00	15.00	75.00	15.00	15.00	15.00	15.00	15.00	75.00	150.00	10.16%
05	Wildlife Health Management	4.50	9.50	9.00	3.50	5.00	31.50	4.50	9.50	9.00	3.50	5.00	31.50	63.00	04.27%
06	Eco-	10.00	10.00	10.00	10.00	10.00	50.00	10.00	10.00	10.00	10.00	10.00	50.00	100.00	06.77%

	Development														
07	Publicity & Awareness	10.00	5.00	10.00	5.00	5.00	35.00	10.00	5.00	10.00	5.00	5.00	35.00	70.00	04.74%
08	Research & Monitoring	10.00	10.00	10.00	10.00	10.00	50.00	10.00	10.00	10.00	10.00	10.00	50.00	100.00	06.77%
09	Eco-tourism	6.00	5.00	6.00	5.00	6.00	28.00	6.00	5.00	6.00	5.00	6.00	28.00	56.00	03.79%
Total		**145.5**	**157.5**	**166.0**	**141.5**	**123.0**	**733.5**	**155.5**	**157.5**	**166.0**	**141.5**	**123.0**	**743.5**	**1477.0**	**100%**

Micro-Plan for First Five Years of the Plan Tenure

1. HABITAT MANAGEMENT

Micro activity	Unit	Rate (Rs.)	Year-wise Physical & Financial Targets (Amount in Rs Lacs)											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
A. Raising of Plantations														
1. Plantation of Fruit-bearing Species	No	23.17	7000	1.60	5000	1.16	5000	1.16	5000	1.16	5000	1.16	**27000**	**6.24**
2. Plantation of Conifer saplings	No	29.34	5000	1.50	4000	1.17	4000	1.17	4000	1.17	4000	1.17	**21000**	**6.18**
3. Dibbling of Horse Chestnut, Oak	No	7.18	15000	1.00			15000	1.00						**2.00**
4. Formation of Barbed Wire Enclosures on Angle Iron Posts	Rft	215	2000	4.30	1500	3.22	1500	3.22	1500	3.22	1500	3.22	**8000**	**17.18**
B. Soil Conservation														
1. Check dams in DRSM	Cum	1099	240	2.65	230	2.55	230	2.55			230	2.55	**930**	**10.30**
2. Crate Wire Bunds	No	9760	20	1.95					26	2.55			**46**	**4.50**
C. Pasture Development		LS		2.00		2.00		2.00		2.00		2.00		**10.00**
D. Fire Control														
1. Making of New Fire lines	Km	29250	05	1.50	03	0.90	05	1.50	03	0.90	05	1.50	**21**	**6.30**
2. Deployment of Fire-fighting Squads	MD	225	2000	4.50	2000	4.50	2000	4.50	2000	4.50	2000	4.50	**10000**	**22.50**
3. Provision for part-removal of fallen, dried, decaying timber to control fire outbreak & spread		LS		2.00		2.00		2.00		2.00		2.00		**10.00**
3. Procurement of Fire-fighting Equipment		LS		2.00		2.00		1.00		2.00		2.00		**09.00**
4. Running of Fire-fighting Control Rooms (logistics & Staff Amenities)		LS		1.50		1.50		1.40		1.50		1.40		**7.30**
E. Food & Water supplements														

1. Providing of Supplementary Food during Leans		LS		1.00		1.00		1.00		1.00		1.00	**5.00**
2. Providing of salt/mineral licks		LS		0.50		0.50		0.50		0.50		0.50	**2.50**
3. Making of Water Holes	No	50000	02	1.00	03	1.50	02	1.00	03	1.50	02	1.00	**6.00**
				29.00		**24.00**		**24.00**		**24.00**		**24.00**	**125.00**

2. PROTECTION & SURVEILLANCE

Micro activity	Unit	Rate (Rs.)	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		**Total 5 Yrs**	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	**Phy**	**Fin**
1. Consolidation of Boundaries by Chain-link Fencing	Rft	1040			800	8.32	600	6.24	800	8.32	800	8.32	**3000**	**31.20**
2. Demarcation of PA boundaries (Survey & fixing of Boundary Pillars)	No	5500	10	0.55			20	1.10	20	1.10			**50**	**2.75**
3. Construction of Patrolling Paths	Km	36971	03	1.11			02	0.74			02	0.74	**07**	**2.59**
4. Deployment of Seasonal Labors to assist the staff in Surveillance	MD	225	3000	6.75	3000	6.75	3000	6.75	3000	6.75	3000	6.75	**15000**	**33.75**
5. Procurement of Protection/Surveillance Equipment (Binoculars, Search Lights, Field Gear, Tents, Sleeping Bags)		LS		1.25		2.50		3.00		2.00		2.50		**11.25**
6. Mobility (Motor-bikes/Snow-mobiles) for Patrolling	No	70000/ 900000	00/01	9.00	01/00	0.70			01/00	0.70			**02/01**	**10.40**
7. Running of Anti-poaching/Anti-grazing Camps) & Contingencies				1.00		1.50		1.75		0.75		1.50		**6.50**
8. Law Charges & Documentation				0.34		0.23		0.42		0.38		0.19		**1.56**
				20.00		**20.00**		**20.00**		**20.00**		**20.00**		**100.00**

3. INFRASTRUCTURE DEVELOPMENT

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Nature Interpretation Centre	No.	LS			0.5	25.00	0.5	25.00						**50.00**
2. Inspection Hut	No.								0.5	20.00	0.5	20.00		**40.00**
3. Entry Gate	No.				01	07.00								**07.00**
4. Staff Quarter	No.	LS	01	22.00			01	22.00						**44.00**
5. Guard Hut	No.	LS			01	15.00			01	15.00				**30.00**
6. Watch Tower	No.	LS	01	07.00					01	07.00				**14.00**
7. Shelter Shed	No.	LS	01	05.00	01	05.00					01	05.00		**15.00**
8. Check-post	No.	LS					01	08.00						**08.00**
9. Foot Bridge	No.	LS	01	4.00	01	4.00	01	4.00	01	4.00				**16.00**
10.Equipment (Office/Field/Photographic)		LS		03.00		03.00		03.00		03.00		03.00		**15.00**
				41.00		**59.00**		**62.00**		**49.00**		**28.00**		**239.00**

4. HUMAN-WILDLIFE CONFLICT

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1. Procurement of equipment for chemical restrain (Tranquillizer Guns, Accessories, Drugs)				2.00		5.50		2.50		2.70		2.50		15.20
2. Procurement of equipment for physical restrain (Cages, Nets, Ladders, Deterrents, Ropes, Search Lights, Night Vision)				2.55		1.00		3.00		2.55		3.00		12.10
3. Mobility (Rescue Van, Motor-bikes)				0.70										0.70
4. Provision for Fuel for Rescue Vehicles				1.00		0.75		1.00		1.00		1.00		4.75
5. Provision for hiring of private transport for attending man-wildlife Conflict situations				1.00		0.50		0.75		1.00		0.75		4.00
6. Deployment of personnel to assist the regular staff in tackling man-wildlife conflict	MD	225	3000	6.75	3000	6.75	3000	6.75	3000	6.75	3000	6.75		33.75
7. Running of Control Rooms/Camps (Provision for logistics)				1.00		0.50		1.00		1.00		1.00		4.50
				15.00		**15.00**		**15.00**		**15.00**		**15.00**		**75.00**

5. WILDLIFE HEALTH MANAGEMENT

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Disease investigation & collection of baseline data		LS		3.00				2.00				2.00		**7.00**
2. vaccination of domestic livestock of nomadic herders		LS				2.00				2.00				**4.00**
3. Procurement of Drugs & Medicines		LS		0.50		0.50		2.00		0.50		2.00		**5.50**
4. Procurement of treatment equipment & instruments		LS		1.00		2.00				1.00		1.00		**5.00**
5. Construction of Animal Rescue & Treatment Centre		LS				5.00		5.00						**10.00**
				4.50		**9.50**		**9.00**		**3.50**		**5.00**		**31.50**

6. ECO-DEVELOPMENT

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Distribution of fuel efficient devices in the fringe villages (LPG connections, Solar lights, Pressure cookers)		LS		4.00		4.00		4.00		4.00		4.00		**20.00**
2. Livelihood development		LS		3.00		3.00		3.00		3.00		3.00		**15.00**
4. Conducting of awareness & Capacity Building workshops in fringe communities		LS		3.00		3.00		3.00		3.00		3.00		**15.00**
				10.00		**10.00**		**10.00**		**10.00**		**10.00**		**50.00**

7. AWARENESS & PUBLICITY

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Provision for Equipping the NIC		LS		4.00				4.00				4.00		**12.00**
2. Guided Tours & Awareness Workshops for Students/ Locals		LS		1.00		4.00		1.00		4.00		1.00		**11.00**
3. Printing of Publicity material (Pamphlets, Posters, Calendars, Souvenirs, Stickers, pocket books)		LS		2.00		1.00		2.00		1.00		1.00		**7.00**
4. Observation of Foundation Day & Wildlife Week		LS		1.50		1.50		1.50		1.50		1.50		**7.50**
5. Hoardings & Signages		LS		4.00				4.00						**8.00**
				12.50		**6.50**		**12.50**		**6.50**		**7.50**		**45.50**

8. **RESEARCH & MONITORING**

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Survey/Census of Key Wildlife Species		LS		4.00				4.00				4.00		**12.00**
2. Procurement of Survey/Census Equipment (Binoculars, GPS, Soft & hard Computer ware, Range Finders, Camera Traps)		LS		6.00		4.00				4.00				**14.00**
				10.00		**04.00**		**04.00**		**04.00**		**04.00**		**26.00**

9. ECO-TOURISM

Micro activity	Unit	Rate	Year-wise Physical & Financial Targets											
			Year 1		Year 2		Year 3		Year 4		Year 5		Total 5 Yrs	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1. Training of Local Youth as Nature/Eco-guides		LS				2.00				2.00				**4.00**
2. Procurement of Camping Gear (High end Tents, Sleeping Bags)		LS		2.00		4.00						3.00		**9.00**
3. Construction of Souvenir Stall									01	10.00				**10.00**
3. Construction of View Points using locally available environment friendly material		LS	01	6.00			01	6.00			01	6.00		**18.00**
				8.00		**6.00**		**6.00**		**12.00**		**9.00**		**41.00**

ACTIVITY MONITORING FORMATS

I i. Restoration of Habitat: Weed Control, Initial Operation

Sr. no	Location & name of site	Year	Extent of area(ha)	Species of weed	Operation	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9

Note:

Location: By compartment, site name or land feature
Operation: Uprooting, cutting, burning, ploughing, manual or by using animals or machinery
Remarks: Measure of success and/or problem faced.

I. ii. Restoration of Habitat: Weed Control, Subsequent Operation

Sr. no	Location & name of site	Year	Extent of area(ha)	Complete or partial coverage	Species of weed	Operation	Total cost	Cost per ha	Remarks
I	2	3	4	5	6	7	8	9	I0

Note: Location: By compartment, site name or land feature
Operation: Uprooting, cutting, burning, ploughing, manual or by using animals or machinery.
Remarks: Percent cover of weed/s before operation, problems, if any

I. iii. Restoration of Habitat: Soil Conservation Measures- Initial Operation And Subsequent Maintenance

Sr. no	Location & name of site	Year	Extent of area(ha)	Area treated	Operation	Total cost	Cost per ha	Remarks
I	2	3	4	5	6	7	8	9

Note:

Location:	By compartments, name of site or landmarks.
Extent of area:	Total area identified for such treatment. In case of streams or gullies, the length involved.
Area Treated:	If linear feature then quote length; otherwise, area.
Operation:	Structures involved such as gully plugs, trench-cum-mound, terracing, spurs and bunds etc. quote quantity nos. and cums. of earthwork.
Remarks:	Mention if initial work or maintenance.

I. iv. Restoration of Habitat: Planting, Sowing – Initial Operation

Sr. no	Location	Year	Extent of area(ha)	Species	Planting stock	Spacing	Operation	Total cost	Cost per ha	Remarks
I	2	3	4	5	6	7	8	9	10	11

Note:

Location: By compartments, or landmarks and describe the site factors e.g. vegetation cover, soil, perturbations etc.

Planting Stock: Kind and condition e.g. root shoot, naked root seedling, seedlings in polythene bags, age or average size.

Operation: Mention site preparation if any, crowbar holes, pits and pit size, trench, seed sowing (rate), tussock planting (norms), protection measures.

Remarks: Mention operational problems if any.

I. v. Restoration of Habitat: Response of Plantings, Sowing and Subsequent Operations

Sr. no	Location	Year	Extent of area(ha)	Species	Survival%	Casualty replacement	Operation	Total cost	Cost per ha	Remarks
I	2	3	4	5	6	7	8	9	I0	II

Note:

Location: By compartments, or landmarks.
Casualty replacement: Mention planting stock by species, number & kind (polythene bag, root shoot, rhizome etc.).
Operations: Planting, sowing technique, protection measures.
Remarks: Operational problems, protection problems, any other useful information.
Assess & mention survival percentage & growth before taking up casualty replacement.

I. vi. Restoration of Habitat: Area under Protection/Closure

Sr. no	Location	Year	Extent of area(ha)	Description of site	Regulations or protection measures	Response	Remarks
1	2	3	4	5	6	7	8

Note:

Location: By compartment or landmarks

Description of site: % tree, shrub, ground cover, main species, impact of factors causing perturbations.

Regulations &: Social fencing, power or other kind of fencing, enforced protection by patrolling, protection measures fire protection etc.

Response: To be recorded annually. Consider trend of regeneration, vegetation cover, change in structure and composition, wildlife use index.

Remarks: State problems or any other useful information, including alternatives if area is being used by people for specific purposes.

II. i. Animals: Measuring Trends in Populations (Year)

Sr. No	Species	Population estimation methodology	Adult		Sub-adults		Yearlings	Fawns	Cubs	Total	Remarks
			Male	Female	Male	Female					
1	2	3	4	5	6	7	8	9	10	11	12

Note: Population: e.g. pugmark, line transect, scan, roadside counts etc., area covered, sampling intensity, estimation data treatment, extrapolation where involved. In case of indices of density or dung count mention those figures under the remarks' column; use details as pertinent. Describe age classes for each species.

Remarks: Operational problems, protection problems, any other useful information.
indices of density or dung count details to be recorded here.

II. ii. Animals: New Records

Sr. no	Species	Location	Year	How discovered	Details of age, number, sex	Habitat description	Remarks
1	2	3	4	5	6	7	8

Note: Animals will include vertebrates and invertebrates.

How discovered: Sighting, dead specimen, reliability of sighting, captured specimen, incontrovertible other evidence.

Number, age, sex etc: As applicable to vertebrates.

Habitat description: Broad habitat description such as vegetation, and elements such as water, large old trees, den trees, snags, down log material.
Use microhabitat descriptors only if relevant.

Remarks: Any other useful information.

II. iii. Animals: Mortality other than that Attributable to an Offence

Sr. no	Species	Location	Year	Sex& age	Number	Discovered in what condition	Cause of mortality	Remarks
1	2	3	4	5	6	7	8	9

Note:

Location:	By compartment, landmark etc.
Sex & age:	As per parameters for age class. Sex, if possible to identify.
Discovered in what condition:	Carcass, complete or partial. Skull or any other recognizable remains collected where only some remains of an animal are found.
Cause of mortality:	If known e.g. territorial fight, accident, possible disease (following postmortem results), old age, cause difficult to determine, predation etc.
Remarks:	Any other useful information.

II. iv. Animals: Mortality Attributed to Poaching or an act of Vandalism

Sr. No	Species	Location	Cause of Mortality				Remarks
I	2	3	Number	Sex	Age	Class	5
			4				

Note:

Location: By compartments or landmarks.

Cause of mortality: Whether the animal was intact or remains found, article or trophy to be recorded. Cause if known e.g. animal snared, shot or poisoned etc.

Remarks: Any other useful information, especially matters of illegal trade.

II. v. Animals: Predation on Domestic Livestock by Wild Carnivores

Sr. no	Range	Month	Category of livestock killed	Location	Numbers	Ex gratia payment (Rs.)	Carnivore involved	No. of cases undecided	Remarks
1	2	3	4	5	6	7	8	9	10

Note:

Category of livestock killed: Buffalo, cow, bullock (adult, sub-adult, calf), camel, horse, donkey, sheep, goat, poultry etc.
Location: Comptt. no. or landmark where killed and the village of the owner.
Carnivore involved: Indicate species responsible for the kill if identity is confirmed.
No. of cases undecided: Either in progress or dropped.
Remarks: Record observations like - attended or unattended animal, killed in forest or waterhole or in the pen/shed, field and whether kill was in area closed to livestock trespass.

II. vi. Animals: Killing of a Human by Wildlife or Injury caused

Sr. no	Range	Month	No. of incidents	No. of people killed sex& age	Location circumstances &species	No. of people injured sex& age	Location circumstances &species	Ex gratia payment (Rs.)
1	2	3	4	5	6	7	8	9

Note: Location: Location by compartment No., the village to which the person belongs and a description of the circumstances and activity such as - open grassy patch, cutting grass; or under a mahua tree collecting and species flowers etc. Mention species responsible on proof.

II. vii. Animals: Wildlife Damage to Private or Public Property

Sr. no	Range	Month	The category of property	Extent of damage	Species involved and number	Remarks
I	2	3	4	5	6	7

Note:

Location:	By comptt. no., village survey no., name of village or landmark.
Category of property:	e.g. agriculture field-wheat, huts in a village, any kind of vehicle.
Extent of damage:	Crop damage by area, estimated loss of produce and monetary loss. Similar yardsticks for other items like partial or total destruction of huts and belongings with estimated monetary loss.
Remarks:	Any relevant information or circumstances e.g. a wild elephant was provoked by people.

III. i. Plants: New Records

Sr. no	Family	Species	Years	Location	Habitat	Status	Remarks
I	2	3	4	5	6	7	8

Note: Habitat: Description by vegetation associates at various levels, % canopy closure if relevant, soil/site, microhabitat elements such as higher level of moisture, woody debris or humus etc.
Status: A broad idea on its frequency, national status e.g. endangered, rare, endemic etc.
Remarks: Any specific information.

III ii. Plants: Disease and Mortality

Sr. no	Species	Location	Year	Particulars of disease morbidity and mortality	Area affected	Remarks
I	2	3	4	5	6	7

Note:

Location: By compartment or landmarks.

Particulars of disease: In case of trees, the mortality by diameter classes and number, symptoms, insect pest activity or any other external indicators if visible, none if not seen. No mortality but infestation detected, mention that as morbidity.

Area affected: In hectares.

Remarks: Any specific environmental condition or site factors you may suspect as being related to the problem or any other useful information.

III iii. Plants: Illegal and Legal Collection

Sr. no	Species	Years	Location	Details of material	Habitat	Status	Remarks
I	2	3	4	5	6	7	8

Note:

Location:	By compartments or landmarks.
Details of material:	To include timber, firewood, bamboo, NWPs. Plants collected could be of local significance or of trade significance on a national or international scale. Distinguish between legal and illegal activity in the remarks' column.
Quantity:	In appropriation units.
Trade particulars:	What is traded? Portions, partially processed or processed material and where are the major trade centers, known or suspected to be?
Remarks:	Any other useful information. Legal collection applies to PA, if permitted for research; to TUZ or to the buffer zone.

IV. Grazing Of Domestic Livestock

Sr. no	Grazing unit no.	List of villages in the unit	Village wise listed population of cattle	Capacity of the unit (cattle units) and number of cattle grazed	Total cattle units grazed		Remarks
					Legal	Illegal	
1	2	3	4	5	6	7	8

Note:

Remarks: Mention number of cattle immunized against FMD, RP, anthrax as the case might be and the number of cattle without the prophylactic cover. If grass is allowed to be cut for cattle being stall-fed, mention the village and number of such cattle.

V. i. Inter-Agency Programs: Agencies and Schemes

Sr. no	No. of agency	Central or State	Number and name of scheme operated	Physical and financial targets		Area& Location	Remarks
				Given	Achieved		
I	2	3	4	5	6	7	8

Note: Name of the scheme: To include all activities in the Govt. sector, i.e. construction, use of resources, development processes etc. mention names of schemes, projects or normal operations. This will address all departments in the management area and those activities outside but capable of influencing the management area.

Remarks: Success, adverse impacts, incompatibility with PA management objectives or failures should be mentioned. Detailed notes too go in the PA book.

V. ii. Programs of NGOs

Sr. no	No. of agency	HQ location	Number of schemes operated	Physical and financial targets		Area& Location	Remarks
				Given	Achieved		
1	2	3	4	5	6	7	8

Note: Remarks: Success or adverse impacts, incompatibility with PA management objectives or failures should be mentioned. Detailed notes to go in the PA book. These programs and activities could be within the management area or those that are outside the management area but are capable of influencing the state of the management area - either complementing the efforts or adversely impacting.

VI. i. Construction*/Maintenance* Of Infrastructure: Roads & Bridges

Sr. no	Category	Range	Surface	Name & Number	Length covered (km)	Cross drainage works, bridges or culverts with types	Total costs and status
I	2	3	4	5	6	7	8

Note:

Category of road: National highway, State highway, district road etc. public road, forest road or open only to managers should be stated.
Surface type: Black topped metal, earth etc. Applies to roads.
Name or number: As the case may be.
Cross drainage type: e.g. for culverts - box, hume pipe culverts etc.
Bridge type: Wooden trestle, suspension, metal multi span, masonry arch etc.
Status: Work completed or ongoing. State also the agency responsibility; state whether operational or non-operational.
*Strike out which is not applicable. Use separate forms as required; for construction & for maintenance details.

VI. ii. Construction*/Maintenance* Of Infrastructure: Buildings

Sr. no	Range	Nature of the building	Location	Type of construction	Numbers	Total cost	Status
1	2	3	4	5	6	7	8

Note:

Nature of the building: e.g. residential, office, store, chauki, watch tower, tourist facility, hide, barrier, patrolling camp (temporary or permanent) etc.

Location: By compartment or village or landmark as appropriate.

Type of construction: Masonry (brick/stone), log or wooden, metal, local material etc.

Status: Completed or ongoing.

*Strike out which is not applicable. Use separate forms as required; for construction and for maintenance details.

VI. iii. Development*/Maintenance* Of Infrastructure: Communication

Sr. no	Range	Type of facility	Location	Number	Cost	Advantage gained	Remarks
1	2	3	4	5	6	7	8

Note:

Type of facility: e.g. telephone, wireless.
Location: Staff Hq location, village, landmark etc.
Advantage gained: Area served; staff locations connected etc.
Remarks: Record status - complete, ongoing, functional, non-functional.
*Strike out that is not applicable. Use separate forms as required, for new facility and maintenance.

VI. iv. Development*/Maintenance* Of Infrastructure: Vehicles

Sr. no	Kind of vehicle	Number	HQ if any	Intended use	Cost	Remarks
I	2	3	4	5	6	7

Note:

Kind of vehicle: Jeep, trailer, tractor, truck, minibus, tanker, motorcycle, bicycle, boat (paddle or motor), launch, car, riding elephant, ponies, etc.

Intended use: Management support, patrolling/antipoaching, tourism etc.

Remarks: Any other useful information. Mention written off vehicles, retired or dead animals.

*Strike out the inapplicable. Use separate forms as required to indicate acquisition, maintenance.

VI. v. Development of Infrastructure: Manpower Recruitment*/Existing Manpower*

Sr. no	Category of post	Number	Status		Scale of pay	Intended deployment/deployed as	Remarks
			Recruited	Vacant			
1	2	3	4	5	6	7	8

Note:

Status: Permanent, temporary, contractual.
Intended deployment: State purpose e.g. conservation education, research, antipoaching, etc as applicable.
Remarks: Any other useful information. New recruits within the year should be mentioned. This will also include officers & staff obtained on transfer/ deputation. Likewise changes due to personnel going out on transfer, deputation, retirement, removal, resignation, death should be reflected in this column.
*Strike off that which is not applicable. Accordingly, use additional forms. One for recruitment and one for the existing manpower.

VI. vi. Developing Infrastructure: Construction of Boundaries, Fences, Cpts, Epts, Exclosures, Enclosures

Sr. no	Category of construction	Range	Location	Length (meters)	Number	Specifications	Remarks
1	2	3	4	5	6	7	8

Note:

Category:	Kind of boundary e.g. comptt, block, zone etc. In case of fences: power fence, others.
Location:	By compartment or suitable landmark.
Numbers:	In case of exclosures, enclosures, number of pillars etc. as applicable.
Specifications:	As applicable to the construction: dry rubble, chain link, local material, height, area, depth, width etc.
Remarks:	Any other relevant information.
	*Strike out that is inapplicable. Use a form each for maintenance of existing features and for new features.

VII. i. Tourism: Visitors

Total number of visitors all categories:
Name of complex:
Total revenue earned:

Sr. no	The category of visitors by month & number					Indian			No. day visitors	No. staying overnight and revenue
	Adult			Children	Foreigner	Rural	Urban	Revenue		
	Month	Male	Female							
I	2	3	4	5	6	7	8	9	10	11

Note:

Columns 2 to 5 will be written in three successive lines for the month pertinent, one below the other. First line information pertains to foreign tourists. Put a tick (□) in col. 6. Second and third line details rural and urban tourists respectively. Put a tick (□) in Col. 7, Column 8 as applicable.

VII. ii. Tourism: Use of Tourist Facilities – Lodging

Name of complex:
Class of accommodation:
Capacity (beds):

Sr. no	Month	Month capacity	Occupancy (beds/month)		Total occupancy during the month (beds/month)
			Foreign	Indian	
I	2	3	4	5	6

Note:

Class of accomodation: Classify accommodation as per tariff slabs and if applicable, might include different rate for accommodation structure for the same set viz. for Indians and foreign tourists. The highest class for example will be I for AC rooms, IV for tents etc. Use a fresh form for each class of accommodation.

Month Capacity: Number of days in a month x total number of beds available in that class per night halt.

VII. iii. Eco-Tourism - Partners

Sr. no	Identify of Eco tourism entrepreneur	Infrastructures	Programs	Investment	Kind and extent of benefits to local people	Benefit to PA & resources
I	2	3	4	5	6	7

VII. iv. Eco-Tourism: Visitor Aspirations

Visitor category	Number	Interested in									
Adults Male Female Children Foreigners Male Female Children		Plants	Bird watching	Animal sighting	Photography	Sketching	Scenic place	Cultural/ Historical sites	Pilgrimage	Trekking	Others
1	2	3	4	5	6	7	8	9	10	11	12

Note:

8.4 (A) is for urban population

8.4 (B) is for rural population

Create separate forms 8.4 (A) & 8.4 (B) that are otherwise identical

VIII. Outbreak Of Fires

Sr. No	Range	Location	Extent (ha)	Dates		Reasons	Estimated loss	Remarks
				Detected	Controlled			
1	2	3	4	5		6	7	8

Note:

Location: By compartments

Reasons: Established or suspected

Estimated loss: e.g. number of trees damaged, stacked firewood/timber/bamboo destroyed/damaged by volume and cost, wild animals dead, particulars of sensitive sites affected, other property or life destroyed.

Remarks: State particularly problems encountered in detection and suppression and any other useful information. State also whether the extent of fire has been mapped.

IX. Offence Cases Detected

Sr. No	Range	Category	Numbers	Number of cases decided		Number of cases under process	Number of cases compounded	Remarks
				Successful	Failure			
1	2	3	4	5	6	7	8*	9

Note:

Category: e.g. illegal cutting of trees, illegal firewood, illegal NWP, poaching, encroachment, illegal cattle grazing etc. category should be codified by letters of alphabet.

Remarks: Any other useful information. This should also include the number of cases pending decision with the department.

*The cases under column 8 pertain to area of non PA status under management which do not involve an endangered species (Schedule-I).

X. Incentives and Rewards/Awards

Sr. No.	Range	Number of recipients: incentives/reward for detecting offences	No. of recipients' award for outstanding service	Kind of award	Number of recipients	Remarks
1	2	3	4	5	6	7

Note:

Kind of award: e.g. a medal like the Shaurya Chakra, any other such awards instituted by the State or Central Government. Includes citations, extra increments etc.

Remarks: Any other useful information. If an award carries cash, mention the amount.

XI. i. Research Projects under Implementation Through PA Manpower With Or Without Collaboration With Other Agencies

Sr. No.	Title	Completed	Ongoing	New	Status	Financial outlay (Rs)	Expenditure incurred (Rs)	Remarks
I	2	3	4	5	6	7	8	9

Note:

Completed: State date of completion and the status of the project report.

Ongoing: State since when the project is under operation and expected period of completion.

New: State the date of commencement and duration.

Status: State the progress towards achievement of objectives; or project which has been dropped or held in abeyance etc.

Remarks: Any other relevant information. If the project is in collaboration with any other agency or is a contractual arrangement, state the situation and the name of the collaborating agency. If animal/plant specimens are being collected state authority and where the collections are being housed.

XI. ii. Research Projects under Implementation by Other Agencies

Sr. No.	Title	Completed	Ongoing	New	Status	Financial outlay (Rs)	Expenditure incurred (Rs)	Remarks
1	2	3	4	5	6	7	8	9

Note:

Completed: State date of completion and the status of the project report.

Ongoing: State since when the project is under operation and expected period of completion.

New: State the date of commencement and duration.

Status: State the progress towards achievement of objectives, or project which has been dropped or held in abeyance etc.

Remarks: Any other relevant information. State the name of the agency. If animal/plant species are being collected, state authority and where the collections are being housed.

XII. Survey and Inventories

Sr. No.	Title of survey inventory activity	Completed	Ongoing	New	By PA	By other agency	Remarks
I	2	3	4	5	6	7	8

Note:

Completed: State date of completion of field work and the status of the report.

Ongoing: State since when is it under operation and when is it expected to be completed.

New: State the date of commencement and duration.

By PA personnel: Will include collaboration or contractual arrangement. State the case as relevant.

Another agency: State the name of the agency.

Remarks: If specimen of plants/animals are being collected, state where the collection is being housed and authority. Any other useful information.

XIII. The Monitoring Programme

Sr. No.	Title of the programme	Date of initiation	Responsible agency	Technique	Status of collaboration and analysis of data	Remarks
1	2	3	4	5	6	7

Note:

Technique: e.g. PCQ, belt transect, line transect and plots, pugmarks etc. by the title of the technique.

Status of collaboration: Write only if applicable.

XIV. i. Ecodevelopment Programme and Implementation Year

Sr. No	Nature of the programme	Sector (Central/State) or NGO sponsored	Target set		Achievement		Village (Buffer/ enclaved)	Remarks
			Physical	Financial	Physical	Financial		
1	2	3	4	5	6	7	8	9

Note:

Nature of the programme: e.g. pasture development, fodder plantations, establishing biogas units, livestock improvement, establishment and development of sericulture, revival of local skills such as handicraft, water harvesting systems, adults education etc.

Village: Site where programme is being implemented - whether buffer or inside PA.

Remarks: State problems, state failures and reasons thereof, reasons for not attaining targets, for non-implementation or deviation etc. State whether it is on the right tracks in context of achievement of objectives.

XV. Progress of All Strategies under the Zone and Theme Plans Year

Sr. No	Zone/Theme	Nature of strategy	Target as per schedule of operations/APO*		Achievement		Location	Remarks
			Physical	Financial	Physical	Financial		
1	2	3	4	5	6	7	8	9

Note:

Zone/Theme plan: Mention title.

Nature of strategy: e.g. demarcation of boundary, creation of artificial water source, salt lick, maintenance of water sources (desilting), cutting and burning of Fireline, prescribed burning, weed control, immunization of cattle, maintenance of nature trails, setting up wayside exhibits, recruitment of staff, number of villages translocated, settled on new sites etc.

Location: Where pertinent, mention location e.g. weed control in comptt. 105, 111, 117.

Remarks: State problems, failures and reasons thereof, shortfall and reason, deviations if any and reasons, non-implementation with reasons etc.

*APO: (Annual Plan of Operations). Under Col.4 & 5, each column will have two figures. First the figure as per the schedule of operations in the plan and next to it in the same column the figure as per APO. If they differ it amounts to a deviation.

XVI. A Summary of Allotment of Funds, Revenue and Expenditure Year

Sr. No	Plan/non-plan/any other grant	Sector Central/State/other	Allotment received		Expenditure Incurred		Revenue realised	Remarks
			Non-recurrent	Recurrent	Non-recurrent	Recurrent		
I	2	3	4	5	6	7	8	9

Note:

Explain under expenditure, over expenditure, savings and surrenders. State the extent of demand for the year as per the schedule of operations/APO in the remark's column.

XVII. Connecting Multi-Agency Programs In Landscape Based Planning Partners During Year:

Sr. No.	District	Sector/Central/State/ Other (Specify)	Agency & Work area/speciality	Program coverage	Agreed input and mechanism	Financial implications /investment & source
1	2	3	4	5	6	7

Note:

Col 4: Main agency agenda e.g. livestock production, health, education, irrigation etc.

Col. 5: Indicate by either administrative unit e.g. tehsil, or number of villages i.e. target

Col. 6: what has the agency agreed on to deliver? How? through agency plan/ scheme

XVIII. Monitoring Extent and Quality Of Multi-Agency Programs Year

Sr. No.	District	Sector/Central/State/ Other (Specify)	Agency	Objectives & targets	Achievement & standard	Constraints	Extent of Investment	Remarks
1	2	3	4	5	6	7	8	9

Note:

Col 6. The standard of achievement to be based on (i) verification of targets (ii) perception of satisfaction of people and their own assessment

Col. 7 (i) as reported by agency (ii) as perceived by people concerned

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APPENDICES

Checklist of Birds of Hirpora Wildlife Sanctuary

(Source Intesar Suhail 1999 to 2013)

Phasianidae

Himalayan Snowcock	*Tetraogallus himalayensis*
Chukar Partridge	*Alectoris chukar*
Koklass Pheasant	*Pucrasia macrolopha*
Himalayan Monal	*Lophophorus impejanus*

Ardeidae

Indian Pond Heron	*Ardeola grayii*
Grey Heron	*Ardea cinerea*
Little Egret	*Egretta garzetta*

Falconidae

Common Kestrel	*Falco tinnunculus*
Eurasian Hobby	*Falco subbuteo*
Peregrine Falcon	*Falco peregrinus*

Accipitridae

Black Kite	*Milvus migrans*
Bearded Vulture/Lammergeier	*Gypaetus barbatus*
Egyptian Vulture	*Neophron percnopterus*
Himalayan Griffon	*Gyps himalayensis*
Eurasian Griffon	*Gyps fulvus*
Shikra	*Accipiter badius*
Eurasian Sparrowhawk	*Accipiter nisus*
Golden Eagle	*Aquila chrysaetos*

Charadriidae

Red-wattled Lapwing	*Vanellus indicus*

Scolopacidae

Green Sandpiper	*Tringa ochropus*
Common Sandpiper	*Actitis hypoleucos*

Columbidae

Rock Pigeon	*Columba livia*
Snow Pigeon	*Columba leuconota*
Oriental Turtle Dove	*Streptopelia orientalis*
Eurasian Collared Dove	*Streptopelia decaocto*

Psittacidae

Rose-ringed Parakeet	*Psittacula krameri*
Blossom-headed Parakeet	*Psittacula roseata*

Cuculidae

Eurasian Cuckoo	*Cuculus canorus*

Tytonidae

Barn Owl	*Tyto alba*

Strigidae

Eurasian Eagle-Owl	*Bubo bubo*
Long-eared Owl	*Asio otus*

Apodidae

Common Swift	*Apus apus*
Alpine Swift	*Tachymarptis melba*

Coraciidae

European Roller	*Coracias garrulus*

Alcedinidae

White-throated Kingfisher	*Halcyon smyrnensis*
Common Kingfisher	*Alcedo atthis*
Pied Kingfisher	*Ceryle rudis*

Meropidae

European Bee-eater	*Merops apiaster*

Upupidae

Common Hoopoe	*Upupa epops*

Picidae

Himalayan Woodpecker	*Dendrocopos himalayensis*
Scaly-bellied Woodpecker	*Picus squamatus*
Brown-fronted Woodpecker	*Dendrocoptes auriceps*

Campephagidae

Long-tailed Minivet	*Pericrocotus ethologus*
Scarlet Minivet	*Pericrocotus flammeus*

Laniidae

Long-tailed Shrike	*Lanius schach*

Oriolidae

Eurasian Golden Oriole	*Oriolus oriolus*

Dicruridae

Ashy Drongo	*Dicrurus leucophaeus*

Rhipiduridae

White-browed Fantail	*Rhipidura aureola*

Monarchidae

Paradise-flycatcher	*Terpsiphone paradisi*

Corvidae

Black-headed Jay	*Garrulus lanceolatus*
Yellow-billed Blue Magpie	*Urocissa flavirostris*
Eurasian Nutcracker	*Nucifraga caryocatactes*
Red-billed Chough	*Pyrrhocorax pyrrhocorax*
Eurasian Jackdaw	*Corvus monedula*
Large-billed Crow	*Corvus macrorhynchos*
Common Raven	*Corvus corax*

Paridae

Great Tit	*Parus major*
Green-backed Tit	*Parus monticolus*
Rufous-naped Tit	*Parus rufonuchalis*
Spot-winged Tit	*Parus melanolophus*

Hirundinidae

Barn Swallow	*Hirundo rustica*
Wire-tailed Swallow	*Hirundo smithii*
Eurasian Crag Martin	*Ptyonoprogne rupestris*
Northern House Martin	*Delichon urbicum*

Alaudidae

Crested Lark	*Galerida cristata*
Eurasian Skylark	*Alauda arvensis*

Pycnonotidae

Himalayan Bulbul	*Pycnonotus leucogenys*
Black Bulbul	*Hypsipetes leucocephalus*

Sylviidae

Plain Leaf Warbler	*Phylloscopus neglectus*
Tickell's Leaf Warbler	*Phylloscopus affinis*
Lemon-rumped Warbler	*Phylloscopus chloronotus*
Greenish Warbler	*Phylloscopus trochiloides*
Large-billed Leaf Warbler	*Phylloscopus magnirostris*
Lesser Whitethroat	*Sylvia curruca*

Timaliidae

Variegated Laughing-thrush	*Garrulax variegatus*
Streaked Laughing-thrush	*Garrulax lineatus*

Zosteropidae

Oriental White-eye	*Zosterops palpebrosus*

Troglodytidae

Winter Wren	*Troglodytes troglodytes*

Sittidae

Kashmir Nuthatch	*Sitta cashmirensis*
Wallcreeper	*Tichodroma muraria*

Certhiidae

Bar-tailed Treecreeper	*Certhia himalayana*

Sturnidae

Common Myna	*Acridotheres tristis*
European Starling	*Sturnus vulgaris*

Turdidae

Himalayan Whistling Thrush	*Myophonus caeruleus*
Tickell's Thrush	*Turdus unicolor*
Eurasian Blackbird	*Turdus merula*
Mistle Thrush	*Turdus viscivorus*
Blue Rock Thrush	*Monticola solitarius*
Black-throated Thrush	*Turdus atrogularis*

Muscicapidae

Bluethroat	*Luscinia svecica*
White-tailed Rubythroat	*Luscinia pectoralis*
Orange-flanked Bush Robin	*Luscinia cyanura*
Black Redstart	*Phoenicurus ochruros*
Blue-fronted Redstart	*Phoenicurus frontalis*
Plumbeous Water Redstart	*Rhyacornis fuliginosa*
White-capped Water Redstart	*Chaimarrornis leucocephalus*
Little Forktail	*Enicurus scouleri*
Spotted Forktail	*Enicurus maculatus*
Common Stonechat	*Saxicola torquatus*
Pied Bushchat	*Saxicola caprata*

Grey Bushchat	*Saxicola ferreus*
Desert Wheatear	*Oenanthe deserti*
Blue Rock Thrush	*Monticola solitarius*
Kashmir Flycatcher	*Ficedula subrubra*
Ultramarine Flycatcher	*Ficedula superciliaris*
Slaty-blue Flycatcher	*Ficedula tricolor*
Asian Verditer Flycatcher	*Eumyias thalassinus*

Cinclidae

White-throated Dipper	*Cinclus cinclus*
Brown Dipper	*Cinclus pallasii*

Passeridae

House Sparrow	*Passer domesticus*
Russet Sparrow	*Passer rutilans*

Prunellidae

Alpine Accentor	*Prunella collaris*
Rufous-breasted Accentor	*Prunella strophiata*
Black-Throated Accentor	*Prunella atrogularis*

Motacillidae

Yellow Wagtail	*Motacilla flava*
Citrine Wagtail	*Motacilla citreola*
Grey Wagtail	*Motacilla cinerea*
White Wagtail	*Motacilla alba*
Upland Pipit	*Anthus sylvanus*

Fringillidae

Brambling	*Fringilla montifringilla*
Yellow-breasted Greenfinch	*Carduelis spinoides*
European Goldfinch	*Carduelis carduelis*
Common Rosefinch	*Carpodacus erythrinus*
Orange Bullfinch	*Pyrrhula aurantiaca*
Black-and-yellow Grosbeak	*Mycerobas icterioides*

Emberizidae

Crested Bunting	*Melophus lathami*
Rock Bunting	*Emberiza cia*

Plant species of Hirpora Wildlife Sanctuary

s.no	plant species
1	*Achillea millefolium*
2	*Aconogonum alpinum*
3	*Alium spp.*
4	*Anaphalis spp.*
5	*Anaphalis triplinervis*
6	*Androsace primuloides*
7	*Androsace sempervivoides*
8	*anemone spp.*
9	*Arabidopsis spp.*
10	*Arabis spp.*
11	*Arenaria bryophylla*
12	*Artemesia dubia*
13	*Artemesia spp.*
14	*Aster diplostephioides*
15	*astralagus*
16	*Athyrium schimperi*
17	*Beeran*
18	*Berberis*
19	*Berjenia*
20	*Bistorta spp*
21	*Bupleurium spp.*
22	*Capsellbursa pastas*
23	*Caragana versicolor*
24	*Carex nivularis*
25	*Carex spp.*

26	*Cerastium spp.*
27	*Chorisiphera spp.*
28	*Cortia depressa*
29	*Cortusa brotheri*
30	*Corydalis spp.*
31	*Coryspira spp.*
32	*Cyanoglossum spp.*
33	*Datua like*
34	*Dipsacus inermis*
35	*Discorea deltoidea*
36	*Dryopteris spp.*
37	*euphorbia*
38	*Euphrasia spp.*
39	*Fragaria nubicola*
40	*Galium aparine*
41	*Ganodilus spp.*
42	*Garhadeiolus spp.*
43	*Gentiana cachemirica*
44	*Geranium wallichianum*
45	*Geum elatum*
46	*Geum spp.*
47	*Gypsophila cerastioides*
48	*Hackelia uncinatae*
49	*indigofera*
50	*iris spp.*
51	*Juncuc spp.*
52	*Juniperus squamata*

53	*Jurinia dolomiaea*
54	*Lagotis cashmeriana*
55	*Leontopodium himalayanum*
56	*Leontopodium jacotianum*
57	*Leontopodium spp.*
58	*Lindelofia longiflora*
59	*Lonicera myrtillus*
60	*Lotus corniculata*
61	*Lycophis spp.*
62	*Lycopus spp.*
63	*Malva neglecta*
64	*Mentha arvensis*
65	*Myosotis spp.*
66	*Nepeta spp.*
67	*Nettle*
68	*Orchid spp.*
69	*Oxyria digyna*
70	*Oxytropis spp.*
71	*Paraquilegia microphylla*
72	*Pedicularis oederi*
73	*Pedicularis spp.*
74	*Phalaris specosus*
75	*phlomis rotata*
76	*phlomis*
77	*Picrorhiza kurroa*
78	*Plantago lanceolata*
79	*Pleurospermum candollei*

80	*Poa spp.*
81	*Podophyllum hexandrum*
82	*polygonum affine*
83	*Polygonum amplexicaule*
84	*Polygonum spp.1*
85	*Polygonum spp.2*
86	*Polygonum spp.3*
87	*Potentila eriocarpa*
88	*Potentilla spp.*
89	*Primula macrophylla*
90	*Pseudomertensia moltkioides*
91	*Ranunculus minealis*
92	*Ranunculus palmatifidus*
93	*Ranunculus pulchellus*
94	*Ranunculus spp.*
95	*Reum*
96	*Rhapiridealris spp.*
97	*Rhodiola wallichiana*
98	*Ribes orientale*
99	*Roriphoria spp.*
100	*Rosa webbiana*
101	*Rumex nepalensis*
102	*salix*
103	*Salvia hians*
104	*Sambucus edulis*
105	*Saxifraga jacquemontiana*
106	*Saxifraga sibirica*

107	*Saxifraga spp.*
108	*Saxifraga stenophylla*
109	*Sedum ewersii*
110	*Sedum spp.*
111	*Selinum tenuifolium*
112	*Senecio jacquemontianus*
113	*Sibbaldia cuneata*
114	*Sibbaldia spp.*
115	*sorbus*
116	*Stellaria decumbens*
117	*Stellaria melee*
118	*Stipa sibirica*
119	*Tancetum*
120	*Taraxacum officinale*
121	*Thymus linearis*
122	*Trifolium repens*
123	*Verbascum*
124	*Veronica spp.*
125	*Vertica spp.*
126	*Viola biflora*