

Management Plan

of

Renukaji Wildlife Sanctuary

Himachal Pradesh

(2020-21 to 2029-30)

Prepared By: Wildlife Division Shimla

Commissioned By: Wildlife Wing, Himachal Pradesh Forest Department

Authors: Anita Bhardwaj HPFS (ACF Wildlife)
&
Rajesh Sharma HPFS (DFO Wildlife)

Under the supervision of: Sh Anil Thakur IFS (CCF Wildlife Shimla)

Under the overall Guidance of: Dr. Savita, IFS (PCCF Wildlife cum Chief Wildlife Warden, Himachal Pradesh)

Acknowledgements

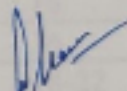
Renuka Wildlife Sanctuary is situated in Shivalik region in district Sirmour of Himachal Pradesh. Sanctuary is spread over 4.02 km² area. It provides home to a variety of endemic flora and fauna. The Government of Himachal Pradesh declared it as a Wildlife Sanctuary and final Notification under wild life (Protection) Act, 1972 was issued On 23rd Oct, 1999, to this effect, taking into consideration it's ecological, faunal, floral, geomorphologic, natural and zoological significance.

This management plan is the revision of the previous plan which was valid upto 2012- 13 and has been prepared for a period of 10 years w.e.f. 2020-21 to 2029-30. The emphasis has been on the protection and improvement of the habitat with a view to conserve the rich biodiversity existing in the Sanctuary. The prescription of the management plan has been made keeping in view the requirements of the native fauna. Different measures have also been proposed to eliminate the decimating and the limiting factors specially the biotic pressure. Emphasis has also been laid for educating the people and making them aware about the significance of conserving the wildlife. Research and training has also been given due priority for the better management of the Sanctuary and also providing learning opportunities to the field staff.

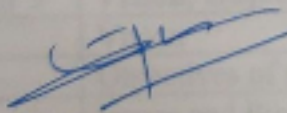
This management plan would have been incomplete without the valuable suggestions, guidance and words of advice from Dr. Savita, IFS PCCF(Wildlife) cum Chief Wildlife Warden Himachal Pradesh and Sh. Anil Thakur, IFS CCF (Wildlife Headquarters).

I would like to place on record the efforts put in by Smt. Anita Bhardwaj, ACF wildlife for writing this document. Efforts done by field staff of Renuka Wildlife Range in general and Smt. Kamlesh Forest Guard in particular, for providing valuable inputs are also appreciated.

This management plan will definitely contribute towards achieving the long terms goal of maintaining viable wild populations in the Renuka Wildlife Sanctuary.


Rajesh Sharma, HPFS
Divisional Forest Officer
Wildlife Division, shimla

Authenticated


Pr. Chief Conservator of Forests (WL)
and Chief Wildlife Warden H.P. Shimla

PARA	CONTENTS	PAGE
	Acknowledgement	
Chapter 1	Introduction of the Protected Area	1-3
1.1	Name, Location, Constitution and the Extent of Area	1
1.2	Notification	1
1.3	Map of the Protected Area	1
1.4	Approach and Access	2
1.5	The Statement of Significance	2
Chapter 2	Background Information and Attributes	4-13
2.1	Boundaries	4
2.2	Geology, Rock and Soil	4
2.3	Terrain	4
2.4	Climate	4
2.5	Water Sources	5
2.6	Range of Wildlife, Status Distribution and Habitat	5
2.7	Major changes in habitat, if any	13
Chapter 3	History of Management and Present Practices	14-17
3.1	General	14
3.2	Timber operations including bamboo and firewood harvest	14
3.3	Non wood forest produce (NWP) collection	14
3.4	Leases	14
3.5	Other programmes and activities	14
3.6	Forest protection	15
3.7	Tourism	15
3.8	Research and Monitoring & Training	16
3.9	Wildlife conservation strategies their evaluation	16
3.10	Administrative Setup	16
3.11	Communication	16
3.12	Summary of threats to wildlife	16
Chapter 4	The Protected Area and Interface Landuse Situation	18-22
4.1	The existing situation in the zone of influence	18
4.2	The development programmes and conservation issues	19
4.3	Stakeholders in the landscape and forest resource dependency	20
4.4	Eco sensitive zone	20
4.5	Forthcoming major projects/ land-use change, if any within the landscape	21
4.6	Status of Corridor linkages	22
Chapter 5	Vision, Objectives, Issues and Problems	23-26
5.1	Vision	23
5.2	Objectives of management	23
5.3	Issues and Problems	23
Chapter 6	The Strategies	27-34
6.1	Management Philosophy	27
6.2	Management Strategy	27
6.3	Boundaries	28
6.4	Theme Plans	29
Chapter 7	Tourism, Interpretation and Conservation Education	35-38

7.1	Tourism	
7.2	Interpretation	
7.3	Conservation Education	35
Chapter 8	Management of Human Interface	36
8.1	Philosophy of Interaction with Human Population	37
8.2	Formation of Co-ordination Committees	39-40
8.3	Eco-development Programme	39
8.4	Involvement of Local People in Conservation Activities	39
Chapter 9	Research, Monitoring and Training	40
9.1	Research Priorities	40
9.2	Wildlife Population Monitoring Programme	41-46
9.3	Training of Sanctuary Staff	41
Chapter 10	Organisation and Administration	41
10.1	Structure and responsibilities	45
10.2	Staff amenities	47-48
10.3	Human Resource and Training Level	47
Chapter 11	Budget	48
11.1	Expenditure in Previous years	49
11.2	Proposed Budget	49
	Annexures	49
1	Final Notification under Wildlife (Protection) Act in 1999	50
2	Eco-Sensitive Zone Draft Notification	51-52
3	Area Statement of Wildlife Sanctuary	53-74
4	Sanctioned posts in the Wildlife Sanctuary	75
5	List of Survey of India Toposheets covering the Wildlife Sanctuary	75
6	List of Perennial Natural Water Source	76
7	List of Artificial Water Sources	76
8	Average monthly rainfall (mm) at Renuka	77
9	List of plantations in the Sanctuary from 2013-14 to 2018-19	77
10	List of Mammals Found in Sanctuary	78
11	List of birds of Renuka Wildlife Sanctuary	79
12	List of Plants found in Renuka Wildlife Sanctuary	84
13	Prominent Invasive Alien Species in the WL Sanctuary	89
14	List of Forest Nurseries	89
15	List of Villages in Buffer Zone of the Sanctuary with Human Population, Cattle population and Agriculture Area	90
16	List of persons Holding Firearm License within 10 km of the Sanctuary	90
17	Offence Cases of last five years	
18	List of Roads and Paths	91
19	List of Fire lines	91
20	List of Watchtowers	92
21	List of Building in Renuka Wildlife Sanctuary	92
22	List of Field Equipment	93
23	List of Vehicle	93
24	Format for recording field observation	93
25	Control Forms	95
		105-131

Form 1	Creation of New Artificial Water Bodies	105
Form 2	Maintenance of Water Bodies: Natural	106
Form 3	Maintenance of water Bodies: Artificial	107
Form 4	Restoration of Habitat: Weed Control, Initial Operations	108
Form 5	Restoration of Habitat: Weed Control, Subsequent operations	109
Form 6	Restoration of Habitat: Control of Regeneration of Woody Species in Grasslands	110
Form 7	Restoration of Habitat: Prescribed Burning	111
Form 8	Restoration of Habitat: Soil Conservation Measures- Initial Operations and Subsequent Maintenance	112
Form 9	Restoration of Habitat: Planting, Sowing etc.	113
Form 10	Animals: Measuring Trends in Population	114
Form 11	Animals: New Records	115
Form 12	Animals: Mortality other than that attributable to Poaching or act of an Offence	116
Form 13	Animals: Mortality Attributed to Poaching or an act of Vandalism	117
Form 14	Animals: Killing of Human by Wildlife or Injury Caused	118
Form 15	Plants: New Records	119
Form 16	Plants: Disease and Mortality	120
Form 17	Construction/ Maintenance of Infrastructure: Roads and Bridges	121
Form 18	Construction/Maintenance of Infrastructure: Building (Existing/New)	122
Form 19	Development/Maintenance of Infrastructure: Building (Existing/New)	123
Form 20	Developing Infrastructures: Construction of Boundaries, fences etc. (Existing/New)	124
Form 21	Developing Infrastructure: Fire lines (Existing/New)	125
Form 22	Tourism	126
Form 23	Eco-tourism: Visitors Aspirations	127
Form 24	Outbreaks of Fires	128
Form 25	Offence Cases detected	129

Form 26	Surveys and Monitoring	130
Form 27	Eco-development Programme: Targets and Implementation	131
	References	132

MANAGEMENT PLAN

RENUKA

WILDLIFE SANCTUARY

PART-1

The Protected Area: The Existing Situation

Chapter 1 Introduction of the Protected Area

1.1 Name, Location, Constitution and the Extent of Area

Name and Area - Renuka Wildlife Sanctuary (4.02 km²), Himachal Pradesh

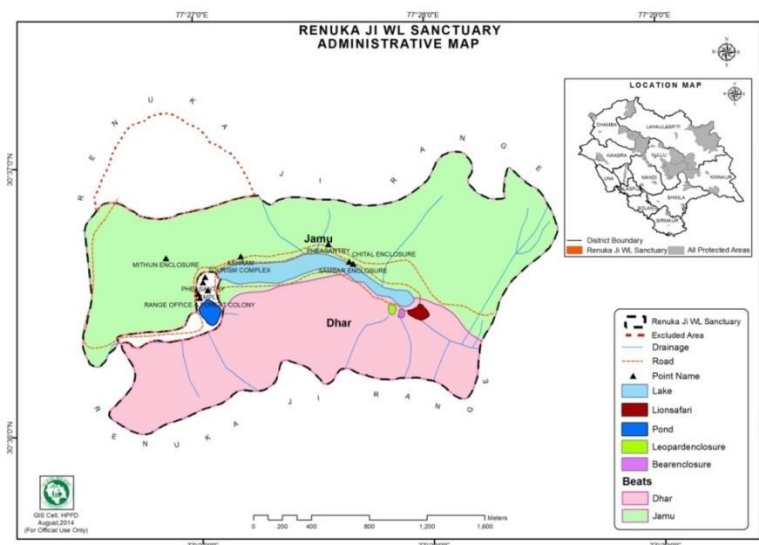
Location - The Renuka Wild Life Sanctuary is situated in Sirmour district in Himachal Pradesh and lies between 35°58' to 37°08' North latitude and between 77°26'34" to 77°28'21" East Longitude.

Constitution and the Extent of Area - The entire Renuka Wild Life Sanctuary comprises only of Renuka reserve forest with a total area of 402.80 Ha. The entire area of this sanctuary has been declared as “Abhayaranya” (Sanctum Santorum) and no rights are recognized in this area.

1.2 Notification

The Renuka Wildlife Sanctuary located in district Sirmour of Himachal Pradesh was first notified as a wildlife sanctuary under the Indian Forest Act 1927 vide H.P Government notification No. Ft. 12-42/59 (M) dated the 22nd July, 1964. The area was again notified vide H.P. Govt. notification No. Ft. (A) 3-6/83 dated 25th March, 1987 and was finally notified vide HP Govt. notification No. FFE-B-F (6) -26/99 dt. 23/10/99 under the Wildlife (Protection) Act. 1972.

1.3 Map of the Protected Area



1.4 Approach and Access

The nearest town Dadahu is about 2 kms from Renuka. The sanctuary is well connected by network of roads. The most common and easy approach is from Nahan, the head-quarter of district Sirmour, which is only 38 km. from Renuka and is connected by all weather road. It can be approached via Nahan from Delhi (302 km), from Ambala (102 km), from Dehradun (129 km), from Chandigarh (128 km) and from Shimla (154 km). Renukaji is also connected by a fair weather road with Paonta Sahib (48 km) via Sataun. Yet another approach to Renuka sanctuary is from Solan via Rajgarh and Nohradhar.

1.5 The Statement of Significance

Renuka Wildlife Sanctuary encompasses Renuka lake, Parshuram Tal and surrounding forests almost up to the ridge line. Renuka wetland is a typical Himalayan oligotrophic wetland with entire area classified as lacustrine habitat. Surrounded by hills from all the directions, the entire area is embanked by concrete walls having a pavement all along its boundary. Fishery is an important component of the wetland which is never been harvested due to its religious value. While taking a walk along the lake boundaries, the lake shows diversity of microhabitats on the basis of its bathymetric and floral diversity.

Biodiversity Values

The Renuka Wildlife Sanctuary covers an area which marks the northern boundary with old natural Sal forest where Sal is found mixed with all its major associates. The area, therefore gains significance in maintaining the biodiversity of the fragile ecosystem and in concerning the gene pool of Sal and its associates along with mixed miscellaneous species like beil, khair, amaltas, shisham, kachnar, anzir etc. The area also supports a good population of Sambar and Barking deer. The lake has rich diversity of fishes, including Tor tor (Mahaseer), Labeo calbasu, Channa sp. and Bagarius sp. A total of 443 species of 26 faunistic groups from microscopic Protozoa to mammals has been recorded by ZSI (2000). In all, 24 species of mammals, 103 species of birds, 14 species of reptiles, 9 species of amphibians and 19 species of fishes among vertebrates, and 225 species of insects and 49 species of other invertebrates have been listed from the wetland and surrounding area of the sanctuary as per study conducted by ZSI.

Natural Values

Renuka Lake is the largest natural freshwater lake in Himachal Pradesh. It has been preserved over the years largely due its religio-cultural significance. The lake formed after tectonic activity thousands of years ago and has since been an important lake habitat for freshwater species as well as for the sal(*Shorea robusta*) and associated species in its catchment.

Economic Values

The area is famous for the lake and its temples. Religious activities associated with temples and religious tourism forms the bane of economics apart from subsistence agriculture. This provides livelihood to many in the region in form of shops in temple premises, odd jobs, and mainly during the annual fair and festival. Over the year this religious gathering has taken over the cultural mantle also. People from the hills and plains mingle freely with each other without any consideration of caste and creed. They come to Renukaji wearing their traditional costumes and present a memorable spectacle. The Renuka forests not only provide very amicable environs for this religious-cum-cultural congregation but also forms the catchment which forms the source of providing clear water to Renukaji lake and Parshuram Tal.

Cultural Values

However, the area is commonly recognized by its religious and cultural values. Renuka is the abode of temples of mother and son duo of Renukaji and lord Parshuram. Mythology is that Renukaji, an incarnation of goddess Durga, was wife of Rishi Yamdagini. Parshuram believed to be the sixth incarnation of lord Vishnu, was the youngest of the five sons of the couple. Once, to obey the order of his father, Parshuram had to sever the head of his mother. After killing the mother, however, begged his father to infuse life in his mother, which the Rishi did. Renukaji was extremely beautiful and Sahastarvahu the emperor wanted to marry her and once when Parshuram was away, he killed Rishi Yamdagini and the four elder sons in order to forcibly marry Renukaji. To escape the clutches of the emperor and unable to bear the grief of the death of her husband and four sons, Renukaji jumped into a small pond known by the name of the Ramsarovar at that time, and disappeared into it. It is believed that as soon as Renukaji jumped into the pond, it swelled into large lake taking the shape which resembles the lady in sleeping posture. Parshuram, on learning about these sad happenings, vowed to kill Sahastarvahu. When Parshuram returned to Renuka after killing Sahastarvahu, Renukaji emerged from the lake, greeted him and promised to come every year on the same day. It is on this day of Dawadshi, which falls 10 days after Diwali, that thousands of pilgrims along with their respective deities, converge at Renuka to greet the meeting of the mother and the son.

Educational Values

Renuka, being an important wetland and lake has been of educational importance to scientists. Not only biologist but also geologist, chemists and hydrologists have gained knowledge and experience here. Tectonic activity of the past that created Renuka lake is of interest to scientists from many disciplines which makes this place of immense educational significance.

Chapter 2 Background Information and Attributes

2.1 Boundaries

As per the Govt. of HP notification No.FFE-B-F(6)-26/99-DATED 23/10/99, the boundaries of this sanctuary are as follows:

- East: Cultivated land and Shamlat forest of Khala-Kyiar Village.
- West: Jogger Khud.
- North: Shamlat land of Jammu Latyana and Kathal village, Jammu Dhar.
- South: Giri River, Shamlat forest of Dhar Taran & Chuldiya & Dadal
 Shamlat

2.2 Geology, Rock and Soil

The entire area of sanctuary is mountainous and altitude varies from 645 m to 961 m above mean sea level. The general aspect is south-western with slopes ranging from steep to very steep. Some cliffs are also found on the south-western boundary along Giri River.

The entire area of the sanctuary is bounded by the ridges locally known as Dhars. ‘Taran’ Dhar starts from Badaun village on the western side along the Giri river and culminates just above Mini Zoo. The third ridge ‘Jammu’ Dhar runs from Jammu village towards Jogger Khud and separates northern and southern aspects just above Lord Parshuram temple.

The entire area of the sanctuary is characterized by the presence of sub-Himalayan formation of rocks with sand stone and shale with lime stone as the main rocks. Scattered outcrops of micaceous schists are also found in this area. The lower area has Shivalik formations and the soil varies in texture, depth and colour. The general depth of soil is rather poor in the area.

2.3 Terrain

The whole of the sanctuary is having hilly terrain ranging from modest slope to precipitous.

2.4 Climate

The seasons are well marked into summer, monsoon and winter with intense summer and winters. The mercury dips to about 5⁰C during the winters with minimum recorded temperature of 1⁰C and maximum temperature goes to 45⁰C. The area does not receive any snowfall and the

precipitation is limited mainly to monsoon rains with the mean annual rainfall of 1270 mm spread mainly over monsoon months.

2.5 Water Sources

Renukaji lake and Parshuram Tal forms two major water sources in the sanctuary. Twenty small and big Khallas along with their numerous tributaries drain into these lakes. However, all these Khallas are seasonal and become dry soon after monsoon. 3 Khalas however, continue receiving some water from water springs on way and remain moist for most of the year. There are a few natural springs which form source of potable water for various establishments in the sanctuary. One source of water is along the Koti Dhiman Khala Kiar road. Another spring Bhenot Pani is located near the village Dhar and is the source of water for the field staff of Renuka Range. Giri river and Jogger Khud along the western and southern boundary of the sanctuary, form other two perennial sources of water.

2.6 Range of Wildlife, Status Distribution and Habitat

The Renuka Wildlife Sanctuary covers an area which marks the northern boundary with old natural Sal forest where Sal is found mixed with all its major associates. The area, therefore gains significance in maintaining the biodiversity of the fragile ecosystem and in conserving the gene pool of Sal and its associates along with mixed miscellaneous species like bel, amaltas, shisham, kachnar, anzir etc. The area also supports a good population of Sambar and Barking deer. Goral sightings are rare.

2.6.1 Vegetation

The area of sanctuary falls in the bio-geographic zone 4 (semi-arid) and bio-geographic province 4A as per the classification given by the Wildlife Institute of India. According to classification of forest types by Champion and Seth, the Renuka forest falls under group 5B/C2 i.e. Northern Dry mixed deciduous forest, group 5/DSI i.e. Dry Deciduous Scrub, group 9/C1a Lower or Siwalik chir pine forest and group 3C/C2b(i) bhabhar dun sal forest .

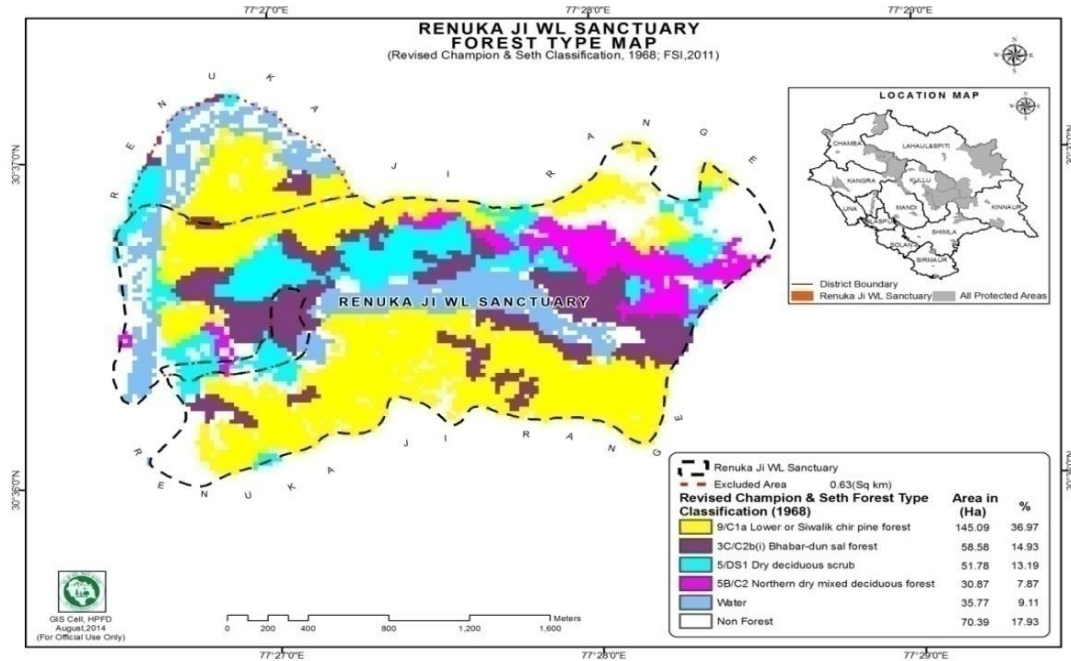


Fig - Forest type map of Renuka Wildlife Sanctuary

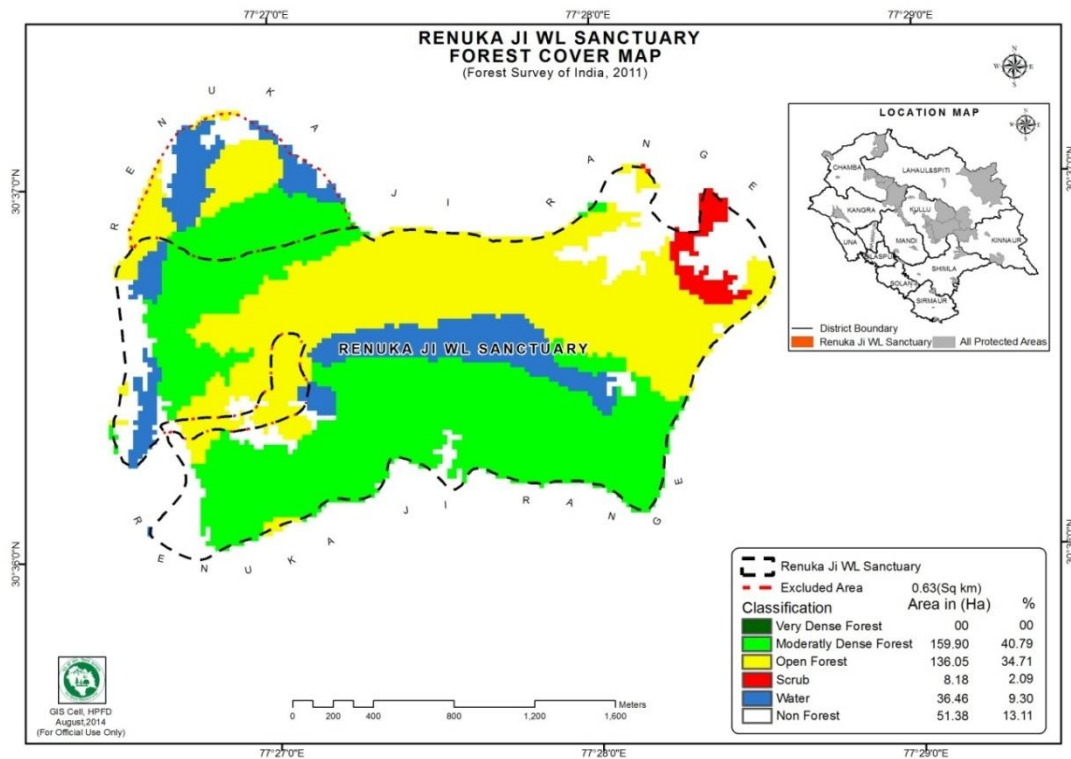


Fig- Forest Cover map of Renuka Wildlife Sanctuary

The area forms northern limits of natural Sal forest, which itself is limited to Badaun Dhar. The rest of the area contains mixed forest of *Anogeissus*, *Lannea*, *Terminalia*, *Bauhinia*, *Khair*, *Shisham* etc.

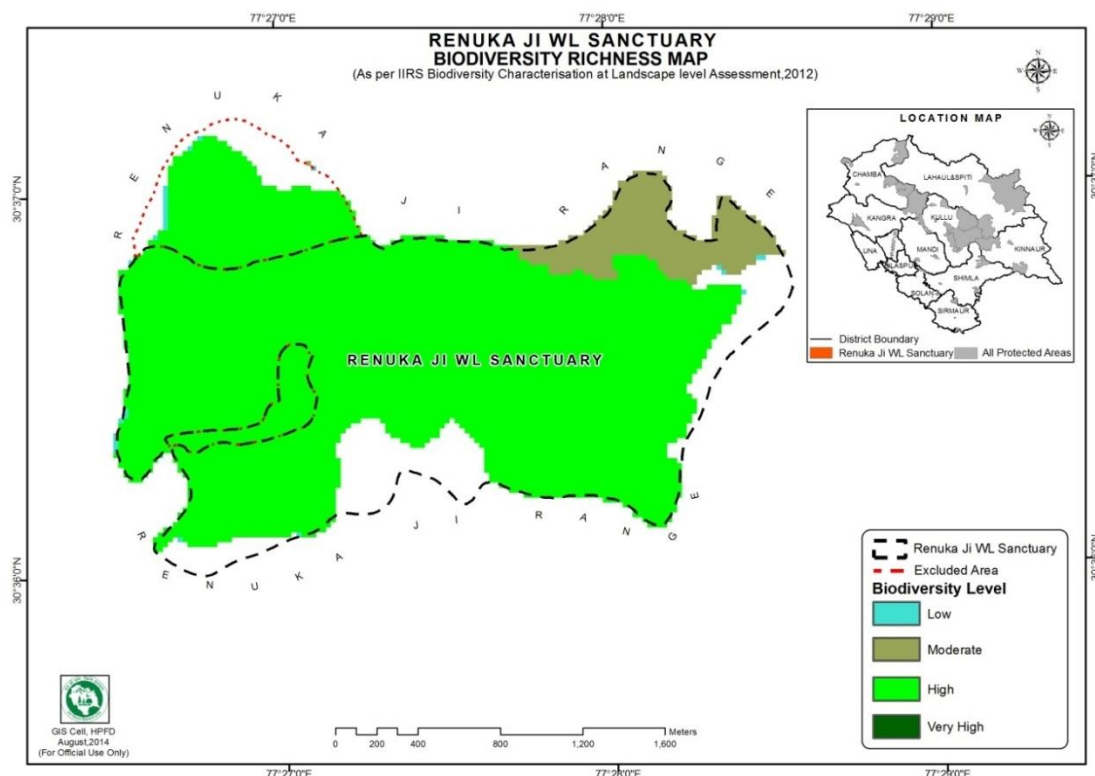


Fig- Biodiversity Richness Map of Renuka Wildlife Sanctuary

Eucalyptus was introduced in the area by raising its plantation, broad leaf species have also been planted in the area since mid-eighties, *Lantana* and *Adhatoda* have already encroached upon major parts of the sanctuary area replacing palatable grasses and under growth.

2.6.2 Animals

The small area forming the sanctuary supports a large variety of wild animals and avi-fauna besides having reptiles and aquatic life. The fauna found in the sanctuary is typical of the fauna found in the Shivalik and the Himalyan foot hills. The most common animal species found in the sanctuary is Sambar with quite common sightings of barking deer, spotted deer and rare sightings of goral. The detailed list of the fauna found in the sanctuary is given in annexure.

Large Mammal Ecology of the Sanctuary - Leopard is the top carnivore in the sanctuary. Considering the ecology of large mammals every sanctuary depends on one or more herbivore species that are found in large numbers to form the lower most stratum of the biological pyramid.

2.7 Major changes in habitat, if any

The Renuka Wildlife Sanctuary has undergone considerable changes in the past one decade, owing to anthropogenic causes. The most significant change has been noticed in the Renuka lake of the protected area.

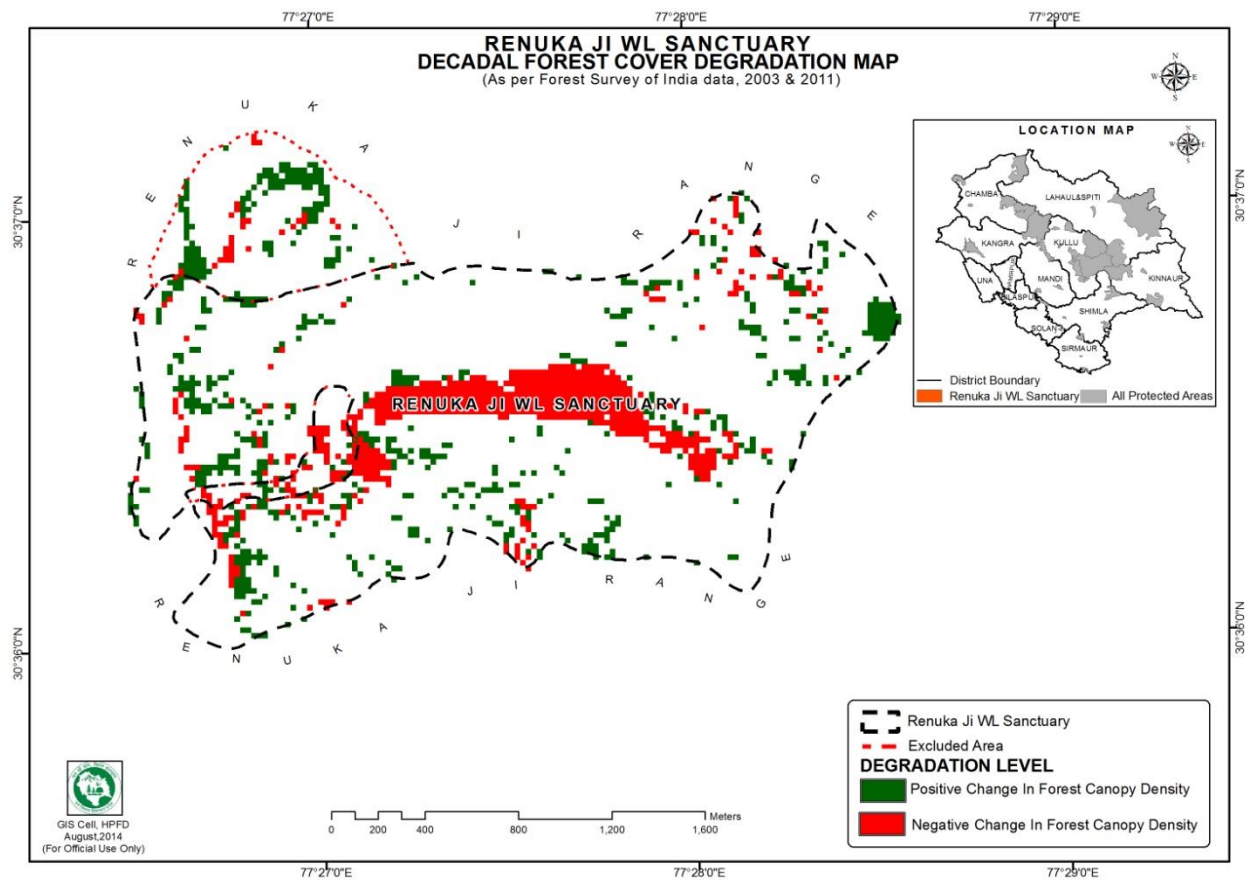


Fig: Change in forest cover of Renuka Wildlife Sanctuary

Chapter 3 History of Management and Present Practices

3.1 General

Renuka forest was declared protected area by the district board, constituted by Raja Shamsher Prakash of Sirmour, in the last decade of the nineteenth century. First working plan for all the forests of Sirmour state was written in 1904 by Sh. Babu Jiva ram, the then divisional forest officer under the guidance of Mr. G.G. Minnikin, the then Deputy Conservator of forest. However, the Renuka forest considered for special treatment only during the 2nd working plan Renuka forest was allotted the blank patches and felling restricted only to meet the bonafide requirements of local people.

The area was declared sanctuary in 1964, under the administrative control of territorial forest division, first with Rajgarh forest division then with Renuka forest division. The area came under the control of wildlife division, Shimla in 1986 and wildlife range was established at Renuka for its management.

3.2 Timber operations including bamboo and firewood harvest:

No timber operations including bamboo and firewood harvest carried out in this PA

3.2.1 Silicultural systems and tending operations	Nil
--	------------

3.2.2 Even aged systems and uneven aged systems	Nil
--	------------

3.2.3 Bamboo working	Nil
-----------------------------	------------

3.2.4 Firewood harvest and collection	Nil
--	------------

3.3 Non wood forest produce (NWP) collection	Nil
---	------------

3.4 Leases

No lease case allotted to people. It is a reserve forest and no settlement rights fall in this PA.

3.5 Other programmes and activities.

There is no village inside the PA, however, the temples of lord Parshuram, Renuka and Shivji, three Ashrams, the tourist complex and the wildlife colony etc. exist in the PA. Renuka being a place of religious importance, a number of worshipers and pilgrims visit the temples, zoo and lake every day.

Apart from this daily disturbance, the forests come under heavy pressure during the three day annual Renukaji fair, when more than 1.5 lakh devotees congregate in the sanctuary.

3.6 Forest protection

The area does not suffer from any recorded rights except the right to worship in the Renuka temples. However, to curb the incidence of illicit lopping and grazing, there are two full fledged beats under the charge of one range officer, who is assisted by one deputy ranger.

3.6.1 Legal Status

See at -1.1 & 1.2

3.6.2 Hunting Nil

3.6.3 Illegal activities Nil

3.6.3.1 Poaching

It is small PA fully controlled by field staff so there is no such incidence.

3.6.3.2 Illegal cutting of trees

People outside of PA sometimes try to enter into the PA for illegal cutting of trees but incidence is very few.

3.6.3.3 Illegal removal of NWP Nil

3.6.3.4 Encroachment & other illegal activities Nil

3.6.4 Domestic live stock grazing

Since the PA is free from rights and it is fenced by interlink chain so there is no such case.

3.6.5 Wild fires

No major fire has been recorded in the sanctuary area. However, the forest by its sheer type is prone to occasional small fires. Dry grass and leaves form the main fire hazard, but the large clumps of lantana form the major cause of worry in converting ground fire into a major fire.

3.6.6 Insects attacks and pathological problems Nil

3.7 Tourism

With a view to develop the area from tourism point of view lion safari was established in 1986 and a safari van was provided to take tourist inside the sanctuary. A Golf cart was introduced in the parikrama road around the lake in 2016. Boating activity for tourists is being carried out by Renukaji Vikas Board on tender basis.

3.8 Research and Monitoring & Training

3.8.1 Research and Monitoring.

Monitoring is being carried out in consultation with National Centre for Biological Sciences Bengaluru. Full study will be carried out with respect to carrying capacity, ratio of carnivores and herbivores, present habitat, available flora and man animal interferences in the protected area in consultation with WII Dehradun, and other reputed institutes for better management of the Renuka Sanctuary.

3.8.2 Training

All level staff sent for training in various institutes and training centers, for better management of the sanctuary. The training is imparted in various disciplines like legal, technical, FCA 1980, Wild Life protection act 1972, census of wild animals etc.

3.9 Wildlife conservation strategies their evaluation

The step towards wildlife conservation was to declare the area as wildlife sanctuary in 1964. The intensive management of the sanctuary was taken up by creating a fully fledged wildlife range during 1986. Environmental awareness camps have since been organized to educate people about conserving the habitat for wildlife specially during wildlife week every year. Patrolling of the sanctuary has been intensified. Weed clearing and plantation activities have also been taken up to improve the fodder availability to the wildlife. All these strategies have been planned to reduce the outside pressures on the sanctuary and improving its green cover.

The steps have been taken up to check the soil erosion in the Nallas by constructing check dams and vegetative spurs and thereby improving the continuous flow of clean water to the Renuka lake. Water ponds have also been constructed for drinking water to the wild animals during dry season.

3.10 Administrative Setup

At present the sanctuary is under the direct control of the Range Officer who is assisted by a team of one Dy. Ranger and three forest guards and eight class IV employees. The overall administrative control of this range lies with the DFO wildlife division, Shimla.

3.11 Communication

The range is well connected by a network of roads, the detail of which has already been given.

3.12 Summary of threats to wildlife

The main threats to wildlife may come from the destruction of its habitat because of heavy biotic pressures. The shrub cover and grass lands outside the sanctuary provide the much needed corridor to the animal to migrate to other areas, thereby, continuing the genetic diversity. However, the loss of this cover due to over grazing may restrict the inbreeding in the long run. Accordingly, buffer belt around the sanctuary has been proposed as Eco Sensitive Zone which is under consideration of MoEF&CC Govt. of India.

Renuka lake is under the threat of dying because of heavy siltation from the nallas of its catchment. Accordingly from 1999-2000 steps have been taken to check the erosion and siltation in the lake by way of constructing toe wall around the lake, channelizing the water and treating all the nallas draining into the lake. Similarly, 10 year restoration plan funded by Science and Technology department of the state is under execution under which various activities like de-silting, de-weeding, soil conservation works, plantations in the catchment and various other works are in progress. This will help in improving the aquatic life of the lake.

Chapter 4- The Protected Area and Interface Landuse Situation

4.1 The existing situation in the zone of influence:

The entire catchment of Renuka lake & Parshuram Tal forms the main zone of influence surrounded by Taran Dhar, Jammu dhar and Khalla-khar. Any disturbance in this valley is liable to increase the silt/debris inflow to the Renuka lake. The zone of influence in the south west area is restricted to Jogger-khad and Giri River.

A prestigious dam 'Renuka Dam' proposed to be constructed on Giri River in North West of sanctuary, which may sink the sizeable portion (approx. 49 ha.) of the sanctuary. However, as per in principle approval by MOEF&CC the legal status of the area will remain unchanged and after submergence the area will be added back to the sanctuary.

The list of villages outside the PA has been given in Annexure. The people of these villages are Aryans, engaged in marginal agriculture and depending upon the forest and grass lands for grazing their cattle. Their dependence upon forest for fuel wood is also traditional.

The general economic condition of the people is not very good. Much of their agriculture land was rendered non cultivable by the debris brought by floods during 1978. Most of the people now are dependent upon the developmental activities in the area which provides them employment.

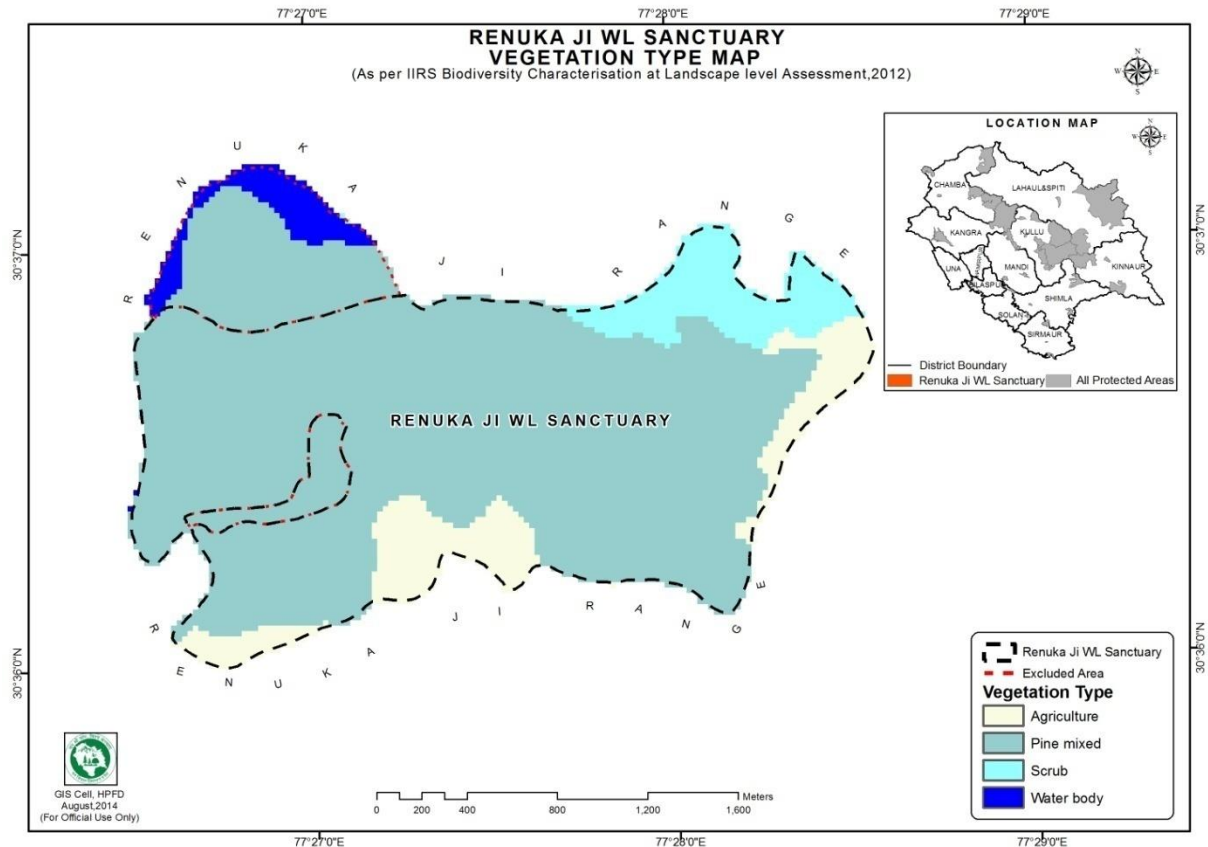
Very little agricultural land and almost bare hills outside the PA do put the PA in precarious condition as to its conservation. The total restriction on lopping of fodder trees and grazing of domestic cattle in PA to cause lot of problems to the local people who have now to go long distances to graze their cattle, collect fodder and fuel wood. At the same time, it makes the PA prone to illegal activities due to the pressures felt by people.

4.1.1 The location, extent, boundaries and natural attributes of the Zone of influence

See at Chapter –already been discussed in chapter 1

4.1.2 Villages inside and outside the PA, ethnic identities, traditions customs, relationships between distinct groups of people, relationship with forests

There is no village inside the PA. Area outside the PA has villages and there is a small town named Dadahu. Most of the people are local; they are called Pahari or Sirmouri. Few of them are outsider. All the local and outsider have no rights in the PA but they take interest for the protection of flora & fauna of PA.



Landuse map of Renuka Wildlife Sanctuary

4.1.3 The state of the people economy, vocation, land-use, use of forest and non forest based natural resources by people and seasonal patterns

There is no village within the PA but outside the PA local people used water resources from the PA for drinking purpose and they use old bridle path and road.

4.1.4 Implications of the land-use and resource dependency for the conservation of PA

There is no harm for the conservation of PA if the water resources and paths are legitimately used.

4.1.5 Forest/PA management practices and their implications for people

There is no village inside the PA except temples and few building Moreover; there are no rights of the people in the Renuka forests.

4.2 The development programmes and conservation issues:

4.2.1 An evaluation of govt. and non govt. agencies for development implications for the PA people and the Zone of influence

All the development works, habitat improvement and conservation works carried out by the govt. agency.

4.2.2 The interplay of market forces and their impact on the subsistence economy of the local people

There is no village and market within the PA.

4.2.3 A Summary of problems faced by people that effect the management of the PA and the Zone of Influence

There is no village within the PA but outside the PA people have problem to use fuel, fodder and natural resources from PA as they have no rights in the Renuka forests.

4.3 Stakeholders in the landscape and forest resource dependency

The stakeholders are as below:

Non-Governmental

- Local people (peripheral villages and small towns)
- Local business interests (accommodation facilities for visitors /shops)

Governmental

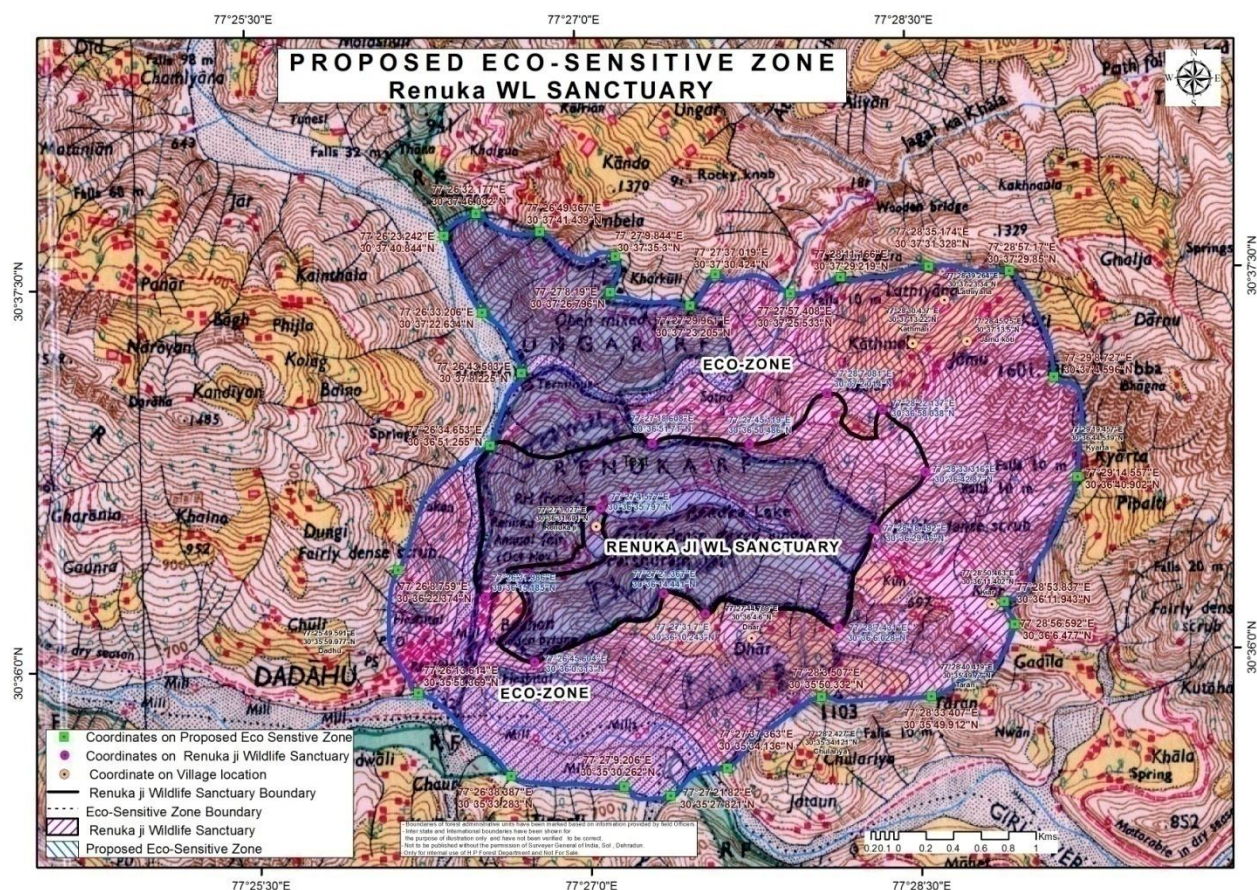
- Forest
- Police
- Renukaji Vikas Board
- Tourism
- Revenue
- Agriculture
- Irrigation & Public Health
- Public Works Department

The local village people are, in particular dependent on forest resources for their livelihood/sustenance, while dependency of other sector (secondary stakeholders) is mainly the use of land to meet their sectoral demand/business.

4.4 Eco sensitive zone

The Government of Himachal Pradesh has developed a proposal for declaration of an Eco-Sensitive Zone for the Renuka Wildlife Sanctuary which is pending with Govt. of India. An area of 15.29 Km² area (11.96 Km² Forest land and 3.32 Km² Private land) with extent varying from 3 m to 2041.96 m has been proposed as Eco-Sensitive Zone and is under consideration with Government of India. The area of ESZ is as shown in the map below.

Commercial mining, stone quarrying, setting up new saw mills, setting up of industries, new major hydroelectric projects, fishing, muck disposal, establishment of large-scale commercial livestock and poultry farms by firms, setting up of kilns etc have been prohibited in the proposed Eco-sensitive Zone. Activities like establishment of hotels and resorts, widening of roads, construction and repair of civic amenities, cottage industries, home stays, felling of trees, erection of electrical lines, communication towers, collection of fodder, change of agriculture system, extraction of ground water, vehicular traffic at night, introduction of exotics, collection of NTFP, solid waste management, eco-tourism etc have been regulated. However, emphasis will be on promoting certain activities like agriculture and horticulture practices, dairy farming, aquaculture, fisheries, organic farming, rain water harvesting, use of renewable energy and fuels, agro-forestry, use of eco-friendly transport, skill development, restoration of degraded habitats, environmental awareness.



4.5 Forthcoming major projects/ land-use change, if any within the landscape

An approval has been granted for diversion of 49 ha of area of sanctuary for construction of Renuka Dam by Govt. of India. As per stage I approval, the legal status of this 49 ha will remain

unchanged and after submergence, the entire submerged area of the project would be included in the sanctuary bringing the total area of the sanctuary to 1597.6 ha.

4.6 Status of Corridor linkages

The Renuka Wildlife Sanctuary is presently an isolated protected area in the southern border of Himachal Pradesh. It is not continuous with other protected areas in the region (Churdhar WLS and Col. Sher Jung National Park).

PART-II

Proposed Management

Chapter 5 Vision, Objectives, Issues and Problems

5.1 Vision

To be a well protected sanctuary in Shiwalik Himalayas free from human pressures with an undisturbed well protected ecosystem which is home to a variety of flora and fauna and to maintain the biggest natural lake / Ramsar Wetland site i.e. Renuka lake.

5.2 Objectives of management:

The long term goals of management of Renuka wildlife sanctuary are to conserve the biodiversity of the area, improvement of the habitat by planting of palatable grasses and other indigenous fodder species, eradicating weeds, improvement of water regime, stabilize various slips and streams to reduce and ultimately minimize the siltation and develop the area around lake from tourism-cum-education point of view. The specific objectives of the present plan to achieve these long term goals are as under:

- i. Plantation of degraded areas with native broad leaved species of fodder value.
- ii. Gradual eradication of weeds like *Lantana camara*, *Adhathoda vasica* and *Parthenium hysterophorus*.
- iii. Carrying out soil stabilization works in the erosion prone areas by constructing engineering structures along with vegetative spurs to reduce the silt of Renukaji lake and the prevent and improve the general habitat of the sanctuary.
- iv. Improving water regime by constructing water trough and water ponds.
- v. Reducing the incidence of illicit lopping and grazing in the sanctuary.
- vi. Soliciting the involvement of people in conserving and improving ecology of the area by carrying out eco-development works in the surrounding villages.
- vii. Engendering awareness in people about the need to conserve nature by laying out Nature and Educational Trails, Information Center, Displaying sign boards at appropriate places and by constructing watch towers etc. from where the people can appreciate the nature around them.
- viii. Developing facilities like recreational parks, rain shelters around Parikrama road, and toilets at appropriate distances for the benefit of the tourists.
- ix. Carrying out annual wildlife census and conducting scientific study on wildlife in the area.

5.3 Issues and Problems

Issue of Small PA

The Renuka Wildlife Sanctuary being a small PA faces some unique issues. Firstly, small populations in such PA's are subject to population fluctuations that may lead to loss of species. Secondly it may be difficult to maintain the complete assemblage of herbivore species in such PA's to support a sufficient population of the apex predators. Thirdly small PA's may provide limited tourism opportunities. These problems are sought to be addressed in this management plan. Specific interventions may be needed to address these issues.

Destruction of the Habitat

The main threats to wildlife may come from the destruction of its habitat because of heavy biotic pressures in and around the PA. The shrub cover and grasslands outside the sanctuary provide the much needed corridor to the animal to migrate to other areas, thereby, continuing the genetic diversity. However, the loss of this cover due to over grazing may restrict the animals to the small area of the sanctuary bringing in the problems of inbreeding in the long run.

Grazing/ fodder extraction

Some issues of grazing and related problems are there but their extent is not of great significance. Any trespassing in the sanctuary should however, be appropriately tackled. The population of domesticated animals is high in surrounding villages, it is therefore, understood that they are dependent on sanctuary for extraction of fodder as there is no other source of fodder in the vicinity. This causes biotic pressure on the sanctuary.

Soil erosion and siltation

Renuka Wildlife Sanctuary forms the major catchment of the Renuka lake. Renuka's immediate catchment is prone to soil erosion and landslides essentially due to infrastructure development. The fragile nature of the substrate and soil, the large number of seasonal streams i.e. twenty khallas in the sanctuary and others just outside the sanctuary but draining into Renuka lake, the land slips caused by the construction of khalla-kiar koti-dhiman road have increased soil erosion in catchment. While development and road connectivity is necessary, steps for mitigation of environmental hazards should be under taken. Forest Department in the past, has taken steps to control soil erosion, check- walls and toe-walls were constructed, contour bunding and plantation taken up extensively. However, these measures have not been sufficient and further steps need to be taken up. Large scale mitigation measures are required for the same. In the previous plans it was mentioned that 'the Renuka lake was under the stage of dyeing because of heavy siltation from the nallas of its catchment. Accordingly from 1999-2000 steps has been taken to check the erosion and siltation in the lake by way of constructing toe wall around the lake, channelizing the water and treating all the nallas draining in to the lake. De-silting and Deweeding works in the lake have been taken up periodically. This will help in improving the aquatic life of the lake. There is threat of excessive siltation to the lake and this is having adverse effect on the lake, but inherent resilience of ecosystems enables it to adapt to changing situation. Unscientific de-silting

actually is detrimental to lake ecosystem. The turbidity created by such activities adversely affects aquatic fauna and flora. Need of the hour is to look at alternative solutions for tackling the situation.

Encroachments/ Land Tenural Issues

As the ashrams and the temple trust 'Vikas Board' owns significant land area within the sanctuary, disturbance to the ecosystem cannot be averted. The activities of these organizations like expansion and development cause the problem of disturbance and fragmentation.

Lack of regeneration of native species

Shisham(*Dalbergia sissoo*), an important native species is drying out in the region; lack of mother trees is hampering regeneration of the species. Similarly, native Sal(*Shorea robusta*) and its associated species are also facing the problem of regeneration. This is a common problem observed in many parts of the sanctuary, the root cause of which is thinning of green cover beyond its capacity to regenerate. In such a case, intervention to plant not only the native trees but also those species that are part of the undergrowth is required.

Old Plantation

Plantation of *Eucalyptus* was taken up in part of the sanctuary long back. These plantations are now mature and are not native. The species prohibits natural undergrowth and retains higher degree of heat. As a result the wild animals also do not prefer to habit it during summer. Natural regeneration of native species also does not occur in the plantation area. These plantations need to be gradually replaced with native Sal trees and its associated species.

Tourism

Renuka being a popular tourism destination due to Renuka lake and Renuka Mini Zoo being situated inside the sanctuary, faces heavy tourist influx. Sustainable tourism management includes management of vehicle movement, parking space, management of visitor movement, control of vandalism, garbage and littering, education and interpretation, sensitivity towards animals, no disturbance to animals (including aquatic fauna) etc. It is observed that all of this is lacking at Renuka and need to be implemented in partnership with the tourism department and Distt. Administration.

Monkey Menace

Rhesus Macaque (*Macaca mulatta*), over the years have grown in population and increased beyond sustainable limits. As such the monkeys have become vandals and attacks on locals and visitors are common. Mostly the attacks are for want of food which probably is not naturally available to them. Managing this population is also a priority as these cause destruction, accidents, are a nuisance and above all carry a threat of spread of disease.

Garbage and littering

Lack of civic sense among the visitors and locals alike causes them to litter the garbage around even though garbage bins are provided along praikarama road. It is common practice to throw things around including empty polyethylene pack, wrappers, bags, plastic bottles, etc. These are all non biodegradable things that choke the environment and make the place ugly.

Lack of co-ordination among stakeholders and line departments

There are several agencies working in isolation of each other, even when they have common concerns. Key stakeholders- the District Administration, the Temple Trust, and the Tourism Department need to share responsibilities with Forest department taking the lead in planning and coordinating. When several agencies work in the same place in isolation they end up duplicating activities, resulting in waste of resource.

The Science and Technology Council of Himachal Pradesh also have a key role in the management of wetland. All the lakes/ wetlands in the state are monitored by the Science and Technology Council. At Renuka also this council has taken certain measures of interventions.

Chapter 6 The Strategies

6.1 Management Philosophy

At the outset it would be appropriate to discuss the philosophy or the approach towards management of the sanctuary. Some of the ideas are discussed in this section.

A policy of low intervention in natural biological processes has been followed in this management plan. Put in simple terms it may be stated as “nature knows best”. The floral and faunal assemblage of the sanctuary has arisen through years of evolution and adaptation to a natural set of conditions. All life forms are dependent on each other in a complex web of life. The chain of interdependence is too complex to be understood in totality. Fiddling with this natural ecosystem out of insufficient understanding may create a chain of events that we do not understand and may have long-term undesirable effects. Hence the management is therefore mostly directed towards reducing human influences that may create undesirable impact on the flora and fauna.

At the same time a totally hands off approach cannot be justified since the sanctuary ecosystem has already been altered by human influences over the years. In situations where the cause and effect relationship is well understood it may be justifiable to carry out interventions that help to alleviate or “set right” some components of the sanctuary ecosystem. This requires a certain level of expertise in the ecology of the sanctuary at the habitat level and species level. The contribution of experts is a valuable tool for improving the quality of sanctuary management.

Today’s protected areas are often like islands in human altered landscape. Unlike in the distant past, when the species and ecosystems evolved, the natural checks and balances do not function fully. The sanctuary fauna therefore inevitably spill out into the human landscape creating conflict. In such situations interventions are necessary to manage the problem.

6.2. Management Strategy

The Sanctuary requires an active exclusive wildlife management agenda complemented by an inclusive co-occurrence agenda in the peripheral area of the PA.

Since, there is no statutory provision for notifying a buffer zone as in the case of a tiger reserves, the said arrangement becomes imperative to address the interface/resource dependency to elicit local public support for conservation, owing to the presence of many villages in the periphery, patchy forests and forest resource dependency.

Owing to the near isolation of the Sanctuary, and the surrounding human dominated landscape with large number of visitors to this place, it would be prudent to adopt a broad-based conservation strategy for in-situ conservation of the entire eco-system.

There are number of villages in the periphery of the PA, with considerable dependency on the forest resources of the sanctuary, besides being mythological sanctity attached with this place. The salient features of the management strategy are as below:

- In-situ protection of the habitat, its flora and fauna through an effective patrolling and surveillance
- Carrying out field interventions for amelioration of the habitat wherever necessary, while taking care not to boost up the prey base to artificial levels leading to distortion of prey-predator balance or aggravating the human-wildlife interface
- Embarking on special in-situ efforts for conserving the Sal (*Shorea robusta*) and Shisham (*Dalbergia sissoo*)
- Protecting the habitat from man-made fires
- Capacity Building of frontline field personnel to professionalize intelligence-based enforcement and use of modernized patrolling protocols
- Monitoring the changes in habitat due to ongoing protection and seasonal changes in the spatio-temporal use pattern of prey species
- Ensuring proactive measures for disease surveillance
- Promoting field-based research

6.3 Boundaries

With the coming of sanctuary under effective control, the population of wild animals has already started increasing. With the imposition of ban on hunting and effective control on poaching, there is a trend of increase in wild life population which is likely to continue to increase. Moreover, the construction of proposed Renuka Dam on Giri river is likely to submerge about 49 ha. area of the sanctuary. However, after coming into existence of Renuka Dam, the submerged area will be part of the sanctuary.

To avoid impending threat of managing wild life in this sanctuary it is advisable to include more areas in the sanctuary from the buffer belt. It is proposed to include the following areas into the sanctuary.

Name of the Forest	Area in ha
RF Keoga	68
RF Ungar	75
Shamlat Khall-Kiar	25
Shamlat Jammu-Lathyani	40
Shamlat Khathmali	40
Shamlat Dhar Taran	52
Total	300

The revised boundaries of the sanctuary after inclusion of these areas will be as follows:

North	Kharkuli village & Sangrah road.
South	Kharkuli village & Sangrah road.
East	Shamlat of Khali-kiar & Kathmali villahge.
West	Giri Bridge

The Renuka Dam, when constructed, will be included in the sanctuary making it 1597.6 ha and submerged area will be managed for aquatic life.

6.4 Theme Plans

The managerial strategy will have following theme plans

6.4.1 Theme Plan for Protection

The habitat is susceptible to various inimical factors with, overarching threats of poaching.

This theme has two broad components:

- preventive measures
- control operations

The **preventive measures** typically include:

- creation/maintenance/strengthening of protection infrastructure in the form of permanent patrolling camps with frontline staff
- wireless communication
- creation of installing surveillance system
- maintenance of road network with manned/unmanned barriers
- vehicular support
- providing arms and ammunition to frontline staff
- implementing intelligence based patrolling protocols, intelligence gathering, supervisory checks on patrolling intensity, constitution of patrolling squads and capacity building.

The **control measures** would include:

- 24x7 surveillance

- exchange of information
- combating poachers, apprehending offenders
- preparation of offence case/description of crime scene/complementary forensic investigation and prosecution.

The special focus would be on:

- capacity building of frontline
- fitness of field staff to perform patrolling
- basic knowledge of legal provisions and wildlife offence cases
- technical expertise for safeguarding the offence site to reconstruct the crime scene
- patrolling intensity in sensitive areas of the habitat
- use of modern technology
- status of arms and ammunition
- status of wildlife crime litigations (especially Schedule 1 and Schedule 2 Part II animals) ongoing in the courts of law
- efforts taken to sensitize the judiciary and innovative efforts to strengthen protection by eliciting support of local people
- deployment of local workforce in patrolling, while using them as informants
- efforts taken to check local country side markets
- surprise checks: markets/ bus stands/barriers on state as well as national highways
- monitoring of livestock/human injury/depredation (to assess the sensitivity towards positive revenge killings)
- checking of water points around the wildlife habitat for contamination/poisoning.

6.4.2 Theme Plan for Staff Development

The Renuka Wildlife Sanctuary consists of 1 Range, 1 Block and 2 Beats. The existing staff strength at Renuka Wildlife Sanctuary is listed below:

Name of the post	Sanctioned	Staff in position	Vacant posts
Forest Range Officer	1	-	1
Deputy Ranger	1	1	2
Forest Guard	2	2	-
Total	4	3	1

Capacity Building

The following thematic areas are important for capacity building of frontline staff, which may be ensured through collaboration with agencies having the domain expertise:

1. Basic knowledge of wild animal evidences and their identification/collection
2. Knowledge of local flora/fauna, floral associations, inter-specific associations amongst wild animal species, vocalizations, wildlife techniques and data collection, jurisprudence, use of GPS/Camera trap/range finder and related basic tools.

3. Basics of self-defence, anti-poaching operations, day to day regimen for physical fitness
4. Making opportunistic observations of wild animals, crime scene analysis and evidence collection, use of forensic kits and basics of sample collection/packaging.
5. Monitoring based on camera trap, other evidences, monitoring of livestock kills.
6. Innovative techniques for wildlife crime related information gathering, surveillance and sharing of intelligence
7. Intelligence based enforcement and monitoring
8. Fundamentals of fire protection, forest road repair and minor civil works
9. Monitoring the health status of wild animals, prophylactic immunization, testing quality/contamination of water points.
10. Exposure to chemical immobilization, rescuing wild animals causing distress and wild animals in distress, maintenance of rapid response teams.
11. Basics of hospitality management, first aid etc.

6.4.3 Theme Plan for People-Wildlife Interface issues

The human-wildlife conflict occurs mainly due to presence/proximity of habitation and agricultural crop in and around the wildlife habitat. The common interface conflicts include: crop depredation and cattle depredation.

Preventive and Control Measures:

- Categorize and map the vulnerability of areas in the context of human wildlife conflicts.
- Facilitating solar fencing/live hedges in patches near intensively cultivated village area
- Ensuring timely payment of compensation/ex-gratia for crop depredation and loss of human life
- Deploying fully equipped “**rapid response team**”
- Capacity building of frontline to handle wild animals in distress and those causing distress
- Using camera traps

6.4.4 Theme Plan for prophylactic interventions

Renuka Wildlife Sanctuary makes a direct interface with human settlements in the outer landscape. Therefore, several proactive preventive prophylactic measures are required, in collaboration with the Animal Husbandry Department. The landscape epidemiology needs to take into consideration history of pastoral events (grazing) of the area. Due care should be ensured to periodically test the quality of water points close to habitation to rule out the possibility of vectors/contamination. In general, the following actions are advised:

1. Prophylactic immunization of livestock against communicable diseases as required under the Wildlife (Protection) Act, 1972 (FMD, haemorrhagic septicaemia, black quarters, anthrax etc.)
2. Creation of a “prophylactic buffer” through immunization of pet dogs of surrounding area and maintaining a record for prevention against canine distemper

3. Periodic ocular assessment of the health status of wild ungulates and carcasses examination.

6.4.5 Theme Plan for Fire Protection

This theme plan incorporates:

1. Fire prevention measures (fire lines, deployment of fire watchers, control burning along forest roads, and provisions for incentives for local people in case the area is maintained free from fire)
2. Fire control measures (fire beating)

Proposed Fire Management Strategy

Preventive measures-

- Maintenance of fire lines (all around forest boundaries and roadsides to serve as fire breaks)
- Establishing fire watch-towers and deployment of fire-fighting squads with control rooms at range headquarters linked to division office
- Creating awareness (village level meetings/pamphlets/posters in local vernacular language)

Control measures-

- Reporting fire (from watch tower) to control room
- Rushing fire-fighting teams to the spot along with equipments and accessories
- Clearing a new strip (dry leaves/debris/wild herbivore droppings) to prevent spread
- Beating/Counter firing as per terrain/wind direction

6.4.6 Theme Plan for Protected Area Infrastructure development (latest technology)

In view of the fast-changing nature of wildlife/forest offences and loss of habitat, the latest technology should be adopted to assist the protected area management. In the context of Renuka Wildlife Sanctuary, the following are suggested:

1. Protection

- Evolving a wildlife crime database management system (containing functionalities for: profile management, baseline data, provision for adding offender profile, crime history, case disposal, report generation).

2. Human-Wildlife interface conflict

- Deploying vehicle with chemical immobilization/cage/ veterinary facilities for rescuing wild animals in distress or those causing distress

3. Field Monitoring

- Use of latest field instruments (laser range finder/compass /night viewing device/GPS)
- Use of camera traps and creating photo database of major wildlife species
- GIS based time series monitoring for change in cover in collaboration with the GIS cell at Shimla

4. Fire Protection

- Using remote sensing for fire detection

5. Capacity Building of frontline

- Fostering proficiency in use of all field equipments/data analysis

6. Ecotourism

- Creating interpretation center

7. Orienting local communities for securing support towards wildlife

- Conservation education in local schools

6.4.7 Theme Plan for Retrofitting Measures

The heavily used infrastructure, commonly found within the habitat of Renuka Wildlife Sanctuary, and the required retrofitting measures/safeguards for wildlife are indicated below:

- **Roads**

A State highway which connects Dadahu to Paonta Sahib, passes through the sanctuary (3 km.). Further, a state highway, also traverses the protected area which runs from Dadahu to Sangrah (2 km).

The following general safeguards are suggested to avoid mortality of wild animals due to road hits, apart from ensuring surveillance for preventing trafficking of wild animal body parts:

1. Regulating speed limits of vehicles at crossing point used by wild animals (use of speed breakers and signages)
2. Creating manned barriers (as required) at sensitive points close to habitations
3. Setting speed limit of vehicles plying on highways

- **Renuka Dam**

After coming into existence of the Renuka Dam, which will eventually be part of the Sanctuary, all due precautionary measures should be adopted to prevent accidents involving wild animals.

- **High tension wires**

It is important to insulate transmission lines in and around the PA with a collaborative initiative with the electricity department of the state.

6.4.8 Theme Plan for soil and Moisture Conservation Activities

The important hydrological activities envisaged are:

- 1. Maintenance of existing water points to ensure water availability**

- a. Periodic cleaning/desilting
- b. Periodic testing of water for its quality/contamination
- c. Periodic testing of water for pathogens/vectors
- d. Monitoring the use of water points by livestock to prevent the possibility of disease transmission from livestock

- 2. Soil and Moisture Conservation Works**

This needs to be an ongoing initiative keeping in mind the siltation of the Renuka Lake.

- a. Construction of Small check dams
- b. Construction of percolation ponds/tanks

Chapter 7 Tourism, Interpretation and Conservation Education

7.1 Tourism

7.1.1 Tourism Goals and Strategy

Renuka ranks quite high on the tourism map of Himachal Pradesh for its big clear water lake surrounded by sylvan surroundings which provide tranquility from the hustle and bustle of the area outside it. Renuka is also famous for its ancient temples of Renukaji and lord Parshuram, for its Mini Zoo housing Swamp Deer, Himalayan Black Bear, Black Buck, Leopard, Sambar, Chital, Barking deer, Red Jungle Fowl, Geese and Emu besides wildlife sanctuary. However, the flow of tourists in this sanctuary has not been quantified till date because the sanctuary provides free access to the visitors in most of the areas. However discussions with field staff and local people indicate that tourists from nearby areas visit Renuka during holidays, whereas, the week days find only occasional tourists coming to the sanctuary. The heaviest rush of visitors to the area is experienced during the three day Renuka fair when more than 1.5 lakh pilgrims visit the area.

Even with the erratic flow of tourists, no facilities of any kind for the tourists exist and the nature education potential of this place is still to be tapped. The rush of tourists is likely to increase with the projecting of Renuka as a tourist place.

7.1.2 Philosophy of Tourism in Renuka Sanctuary

Each protected area should have its own Tourism policy to define the manner in which Tourism will be developed. Wildlife tourism is a double edged sword that needs to be used with care. There is a need to give some hard thinking about the agency that will be responsible for executing tourism in the sanctuary.

7.1.3 Nature of Tourism to be promoted

Tourism in Renuka wildlife sanctuary should focus on natural landscape, scene beauty of the area, bird watching and role of forest in water conservation sighting of mammalian fauna.

7.1.4 Publicity

Renuka wildlife sanctuary should be publicized as a tourism destination. Information on the sanctuary should be put up on the website of the forest department as well as on the website of Shimla wildlife Division, including contact details such as address, telephone number and email addresses. Public should be informed about this sanctuary through print media and electronic media. Programmes should be organized for local schools and colleges.

7.1.5 Conducting Tourism in the Sanctuary

Trails should be identified for wildlife viewing inside the sanctuary. They should be given clear names for identification. A brief description should be written of the main features of each trail, including the wildlife likely to be seen on the trail. Efforts should be directed towards providing

basic amenities to tourists like, benches and rain shelters around Parikrama road, toilets at appropriate distances for the benefit of the tourists.

During the annual fair, organized in the fair ground, special arrangements are made for movement and stay of people. However, this also causes disturbance to the area. Certain core areas should be cordoned off during this time. Special arrangement for disposal of garbage, sanitation facilities, etc is to be made. Onsite treatment of wastewater should be incorporated in fair management to ensure that high number of visitation cause minimal pollution. Post fair cleaning of area needs to be taken up.

7.1.6 Sanctuary Literature

Brochure/Pamphlet about the sanctuary should be printed for distribution to tourists. The brochure should give the trekking map of the sanctuary including trails, list of wild animals, birds and plants. It should inform tourists about the rules to be followed in the sanctuary.

7.1.7 Signage

Signage needs to be developed in the sanctuary. Signboards should be put at Dadahu and tourist complex near the Renuka Lake.

7.1.8 Capacity building

Guides should be trained in conducting tourism in and around the sanctuary. The main skills for which they need to be trained are as follows:-

1. Knowledge of animals, birds and plants in the sanctuary.
2. Wildlife interpretation skills.
3. Basic principles of safety while escorting the tourists. Forest guards and foresters should also be trained in these skills so that they can act as resource persons for future trainings.

7.2 Interpretation

“Interpretation is a means of communicating ideas and feelings which help people understand more about themselves and their environment.”

Designing Interpretation Programme

Although designing an interpretation programme would require an in depth analysis and planning; an outline for the components is given as under:

- Orientation and interpretation centre
- Exhibits
- Print material
- Nature trails
- Watch towers

- Audio- visuals
- Outreach programme

Interpretation programme should be designed with long term conservation goals in mind. Steps should be taken to evolve from ‘education & awareness’ to ‘interpretation’ programmes. A complete lack of educational and interpretation facilities is observed at Renuka. As the visitor flux is high, this area is an important platform in not only generating awareness about Sanctuary, lakes, wildlife specifically but also about environment conservation in general. The zoo also should have many more educational sinages describing in detail about the ecology, behaviour and conservation status of the species. It should be a place where visitors are made aware about ex-situ conservation and not only entertainment.

7.3 Conservation Education

Conservation education increases people’s knowledge and awareness about the wildlife conservation and associated challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. Conservation education is public awareness and participation for bringing about an attitudinal change towards restricting further damage to the environment and finally making conservation everyone’s agenda.

Designing Conservation Education Programmes

An outreach programme targeting tourists and various stakeholders should be designed. This can be divided into three components- direct contact programmes, print media and interactive media.

Direct contact: a programme involving naturalists/ guides is to be implemented. Training to be imparted to people coming in direct contact with the stakeholders and tourists; these are:

- Forest department staff
- Naturalist and
- other department officials

These groups should be trained in awareness activities, communication skills and knowledge about the region and biodiversity of Renuka.

Print media: material with correct information on Renuka and surroundings including biodiversity, hydrology, mythology, history culture and conservation issues & ‘Dos and Don’ts’; for wide circulation to be printed. The material to include-

- brochures
- leaflets
- posters
- display boards

These should be displayed at prominent location and well visited areas including Lake, Mini Zoo Temple Complex, and Boating Point etc

Interactive programmes: Regular programmes in bird watching, trekking to be organized for tourists and wildlife enthusiasts etc.

Chapter 8 Management of Human Interface

8.1 Philosophy of Interaction with Human Population

Presence of human population around the sanctuary is an unavoidable reality. Their presence impacts the sanctuary biotic components in a number of ways described in the previous chapters. It is important to manage the interaction of the community with the sanctuary so that the most beneficial results are obtained for the people as well as for the sanctuary. The objectives of the interactions with local community are as follows:

- i. Create awareness about sanctuary values among local people
- ii. Obtain cooperation from local community for the management of sanctuary
- iii. Give benefits to local people from the sanctuary, especially the poor and women
- iv. Resolution of various issues and conflicts that the sanctuary authority may have with local people and vice versa.

Interactions with local community are often ad hoc and without a fixed policy and direction. Therefore true progress is not achieved in co-operative efforts. Conflicts arise because proper communication does not take place.

8.2 Formation of Co-ordination Committees

Issues regarding people's interaction with the sanctuary are difficult to solve unless an interactive forum is created for resolving various issues especially conflict of interests. A coordination committee is proposed for achieving this purpose consisting of representatives of the local people and representatives of the sanctuary authority and other departments. The composition of the coordination committee shall be as follows:

- DFO Wildlife Shimla (Chairman)
- DFO Renuka (Territorial)
- Representative of Renuka Vikas Board
- Representative of Revenue Department
- Representative of Tourism
- Representative of IPH
- Range Forest Officer Renuka Range (Wildlife)
- Two Panchayat Pradhans from around the PA
- One or more NGO representatives at the discretion of the Chairman

The following shall be the main functions of the co-ordination committee:

- i. To provide a forum for communication to the local people as well as line departments and resolve various issues related to sanctuary management.
- ii. To obtain cooperation of local people/line departments in sanctuary management.

- iii. To give opportunity to local people/line departments to voice their grievances and requests.
- iv. To seek opinion of people about implementation of eco development works in villages.
- v. To arrange joint programmes and functions, especially awareness programmes.
- vi. To decide modalities for tourism in the sanctuary with involvement of local people.
- vii. To involve local people in monitoring activities of the sanctuary.

8.3 Eco-development Programme

Eco-development activities in the sanctuary should be carried out as part of the regular sanctuary activities to build relationship with the local people. If possible a local NGO facilitated by the sanctuary authority should be employed as an intermediary. This will help in development of the villages and it will also help to gain their cooperation for sanctuary objectives. Some activities that may be carried out are as follows:

- i. Distribution of seedlings of fodder species, local wild fruit bearing species at subsidized rates/free of cost
- ii. Soil conservation and stabilization activities in shamlaat and private lands
- iii. Water conservation structures such as check dams on private land
- iv. Development and stabilization of paths in the villages
- v. Sulabh shauchalay
- vi. Promotion of LPG use by offering incentives to poorer households

It is important that various eco development interventions be carried out in a gender sensitive manner and for this a good representation of women from all social groups/strata need to be ensured/encouraged to actively participate in community activities and social development issues.

8.4 Involvement of Local People in Conservation Activities

Desire for conservation comes from appreciation of wildlife and its importance. Appreciation for wildlife is best achieved from personal experience of wildlife in natural settings. Therefore, local people, especially school and college children, should be involved in treks, outings and various field programmes. If local people can be made conservationists the job of the sanctuary authority will be a lot easier. Wildlife NGOs should be involved in the task of spreading awareness and conservation message among local people. If possible nature clubs can be started for local children and youths.

Local youths and college students should also be involved in wildlife monitoring programme on a voluntary basis. Collaborative programmes of various kinds should be started in schools, colleges and local bodies depending on their interest.

Chapter 9 Research, Monitoring and Training

The Renuka Wildlife Sanctuary has considerable ecological significance. It is virtually a benchmark of the Shiwalik Biodiversity, besides being the northern limit for the Sal in the Terai Landscape. The PA has been subjected to anthropogenic influences in the past. This has affected natural regeneration of indigenous species at several fertile places. The successional stages of forest flora has been “arrested” at various stages apart from human induced changes. These have significantly reduced the productivity of the habitat. The managerial strategy needs to take into account these historical factors for prescribing appropriate measures for Renuka Wildlife Sanctuary.

Being close to Nahan, Shimla and Dehradun, the PA assumes a special significance in terms of tourism, interpretation, research opportunities, and conservation. Over the years, considerable research work has been done by Zoological Survey of India.

9.1 Research Priorities

In view of the ecological significance of Renuka, vis-à-vis challenges relating to its conservation, the following priorities are identified for research:

- Carrying out annual wildlife census and scientific study on wildlife in this area and its habitat for recording baseline data.
- Human-wildlife interface.
- Changed behaviour patterns of wild animals.
- Wildlife disease.
- Corridor management.
- Water quality monitoring to understand the lake ecology.
- Monitoring of silt load to take appropriate management action to control erosion.

9.2 Wildlife Population Monitoring Programme

Mammals are generally the most visible charismatic species of a sanctuary. They are also generally among the most threatened because of their small population. Therefore, the main target of the monitoring program shall be large mammals.

Because of the steep terrain population estimation is very difficult in the Himalayas. An appropriate scientific methodology needs to be adopted so that it is feasible to execute the monitoring protocol and obtain reliable results.

Some of the methods that can be used for monitoring are described in the following sections. The techniques described can be divided into index-based monitoring techniques and absolute population estimate techniques. Monitoring by index-based techniques yields trends in

populations. Monitoring must be carried out for a few years before clear population trends emerge.

9.2.1 Synopsis of Monitoring Techniques

Animal encounter rate

In this method a network of routes are marked inside the sanctuary that are well dispersed inside the sanctuary. The routes should not follow the main trails only but should pass through the undisturbed parts of the forest where probability of encounters is higher. Each route should be about 4 to 5 km long. The total length of routes inside the sanctuary should be sufficient to give reliable results. These routes should be regularly walked at fixed hours in the morning and evening, when animal visibility is higher, and animals encountered along the route should be recorded. This exercise should be carried out regularly throughout the year, say once in a month. The walks should be carried out at a fixed time at dawn or in the evening when the animal sightings are highest.

The encounter rate of a species is defined as:

$$\text{Encounter rate (i)} = \frac{\text{Number of animals sighted of ith species}}{(\text{Total length of routes walked} \times \text{no. of times walked})}$$

The encounter rate is an index of population density. If this exercise is carried out every year we can get population trends reliably. However this exercise cannot give estimates of absolute population.

Sign encounter rate

The sign encounter rate relies on sighting/collection of animal signs. It is useful for monitoring carnivore populations, since their scats are highly visible. Sign encounter routes are laid as above. Since there is no compulsion of walking during morning hours or evening the length of the route can be increased to 10 km. The routes should be broad and clear with no vegetation growth so that scats can be spotted easily. Heavy human traffic should not be there on the routes so that scats are not trampled. These routes are also walked a number of times in a year and scats of leopard, bear and other carnivores with highly visible scats, are collected.

$$\text{Scat encounter rate (i)} = \frac{\text{Number of scats sighted of ith species}}{(\text{Total length of routes walked} \times \text{no. of times walked})}$$

The scat encounter rate is an index of population density. If this exercise is carried out every year we can get population trends. This exercise also cannot give estimates of absolute population. It is useful for monitoring population trends in species wherein sightings are very low, such as leopards.

Carnivore scats collected during the exercise can be analysed by microscopic examination of hair of prey in the scat samples to determine the dietary pattern of the carnivore.

Pellet densities

This method is used for monitoring populations of ungulates by estimating density of their dung pellets. Pellet densities are estimated by laying plots in the forest all over the sanctuary and counting the pellet piles in each plot. The plots should be in the shape of belt transects with dimension 50 m x 2 m or 100 m x 2 m. The plots should be laid in the same season and month every year. This method is fairly simple but it cannot give absolute population estimates. Its reliability has not been well established.

Line transect sampling

Line transect sampling is used for making absolute estimates of wild animal population. A number of straight lines, known as transects, are laid in the forest in a scientifically designed pattern. Each transect has a fixed length, generally 3 to 4 km, and fixed orientation. Transects are clearly marked by marking the trees along the transect in red or yellow paint. Extensive bush cutting is not necessary. An estimated 15 to 20 transects should be laid with a total length of 50 to 100 km.

These transects are walked by observers and records are made of each animal sighting. For each encounter the distance of the group is estimated by a rangefinder and a compass bearing is taken. This data is used to estimate the perpendicular distance of the animal from the transect. In this manner all transects are walked and animal sightings recorded. All transects must be walked a number of times so that sufficient observations are made to make reliable estimates. If number of observations is low reliable estimates cannot be made. Ideally all observations must be made in the same season. Typically 10 to 20 repetitions may be necessary considering the low ungulate density in the sanctuary. However it may be possible to carry out the sampling by making monthly rounds of observations without much loss of accuracy.

Line transect sampling requires a high level of training of the observers for proper recording of observations such as compass bearings and distance estimation by rangefinders. It is also fairly laborious technique. It has the advantage that one can make reliable estimates of animal populations.

Considering the steep Himalayan terrain line transects cannot be laid in the standard manner because a straight line cannot follow the contours of the mountains. Transects laid along steep slopes will require too much effort on part of the observer and he will not be able to concentrate on making observations of animals.

Hilby and Krishna (2001) describe a modification of the line transect method for curved transects. This modification is well suited for line transect monitoring in the Himalayas. Curved

transects should be laid along the contour lines all over the sanctuary in a well-distributed manner. Line transect sampling should be carried out in the sanctuary on these curved transects like straight line transects.

Design and layout out of line transects need considerable effort. These transects need to be remarked annually if they are to be used on a repetitive basis. Considerable effort is also needed in carrying out observations. Nature enthusiast volunteers from Shimla and nearby towns and youth from local villages should be invited to participate in the monitoring exercise.

Population estimation of Leopards by DNA analysis of scats

DNA analysis of leopard scats can be used for population estimation. The technique is still at an experimental stage and researchers in the country are working on it to perfect it. The technique may soon become generally available, but it may be expensive. The technique requires collection of fresh scat and its preservation by appropriate technique. DNA analysis is carried out in specially-equipped laboratories.

9.2.2 Recommended Monitoring Techniques

Herbivores

All the above mentioned techniques have their advantages and disadvantages. If population estimation of ungulates is the goal then line transects monitoring is the only suitable technique. Hence the line transect method is recommended for monitoring herbivore populations in the sanctuary.

Carnivores

Population estimation of carnivores is not possible by line transect method because number of encounters is generally too low. Hence some other monitoring technique is necessary. Scat collection and DNA analysis is possible only through involvement of a professional research institutes, otherwise scat encounter rate is the only technique for monitoring population of carnivores.

Scat collection routes should be laid all over the sanctuary. Existing trails may be used for this purpose. Each route should be 2 to 3 km long. The start and end points of the routes should be clearly marked and the routes should be marked at one kilometer intervals. Considering the small size of the sanctuary about 5 to 6 routes should be sufficient.

Scat collection walks should be carried out regularly. The success of the method depends on collection of large number of samples. Hence more walks will give better results. Scat collection walks should be conducted 5 to 6 times a year. Scats should be collected and labeled. The results for the entire year should be pooled and scat encounter rate should be determined for each

species. The exercise should be conducted every year. The trends in scat encounter rate reflect the trends of population density.

Camera trap method should be used to supplement density estimation, abundance survey, proof of presence of a species in an area and trends in population change due to anthropogenic pressures of both herbivores and carnivores.

Integrity of Data

The reliability of the results of population monitoring depends on the quality of data collected. Hence accurate data collection is very important. The participants should carry out the exercise in a sincere manner. The participants should be thoroughly trained in the techniques so that the data collected is accurate.

Development and Implementation of Monitoring Programme

The monitoring exercises outlined in this section require qualified and trained persons for its implementation. Recently Bengaluru based National Center for Biological Sciences a professional institute with experience in monitoring techniques had been engaged for developing and fine-tuning a monitoring programme for the Renuka Sanctuary including implementation of the method and training the staff. The sanctuary staff should continue the exercise themselves in subsequent years.

Recording Opportunistic Observations

The field staff should record opportunistic observations of important wildlife species seen during their patrolling rounds. A format for recording these observations is given in the Annexure. These should be regularly filled and submitted to the range officer on a monthly basis.

It is necessary to pinpoint the location of such observations. The field staff should have good quality topographic maps with contours gridded at approximately 1 cm intervals. Location of observations can be accurately recorded as horizontal and vertical coordinate of each square on the grid. Such maps should be prepared on priority and distributed to all field staff.

9.3 Training of Sanctuary Staff

Training is a very important tool for capacity building and improving the professionalism of sanctuary staff. The sanctuary staff, while carrying on their normal protection duties, also need to develop an understanding of various issues related to sanctuary management at a professional level. Capacity building in this regard can best be achieved through trainings designed for this purpose.

Improving the knowledge and capacity of staff has several benefits. It helps them to carry out their duty with an increased understanding and awareness and hence with increased dedication. It gives them more confidence in their work. This helps them to deal with various stakeholder

groups, such as local people and tourists, with more confidence. Improved skills and knowledge will improve their productivity and quality of output.

Some areas where training will benefit the staff are as follows:

- i. Knowledge and identification of mammal species found in the sanctuary, habits of species, biology and ecology of important species
- ii. Identification of bird species found in the sanctuary
- iii. Knowledge of reptile and amphibian species found in the sanctuary
- iv. Knowledge and identification of plants, including medicinal plants found in the sanctuary
- v. Sanctuary ecology, interdependence of plant and animal species
- vi. Monitoring methods, population estimation methods.
- vii. Anti-poaching skills and documentation of offence cases
- viii. Wildlife interpretation skills
- ix. Wildlife tracking and field signs
- x. Conflict resolution skills for dealing with local people
- xi. Weapon training
- xii. Darting and trapping wild animals
- xiii. Soil conservation methods
- xiv. Nursery techniques
- xv. Use of instruments such as compass, binoculars, digital camera, GPS
- xvi. Computer literacy

Field staff should be given small projects on which they should collect information from the field such as information on mammal, bird or plant species. They should make write-ups and give presentations on their project.

Training should also be imparted to local people, particularly guides and tour operators with the intention of upgrading their skills for tourism. Some training subjects are:

- i. Sanctuary rules
- ii. Skills of dealing with tourists
- iii. Interpretation skills
- iv. Basic information on identification of species, tracks and signs, habits of species.

Professional organizations should be involved in developing and conducting training programmes. Officers of the department should also be involved in training programmes.

Chapter 10

Organisation and Administration

The effective implementation of the management plan will require strengthening of staff, providing amenities to the staff and proper and adequate equipment. The following proposals are made in this regard.

10.1 Structure and responsibilities.

At present the sanctuary is under the direct control of a Range Officer who is assisted by a team of one Dy. Ranger and two forest guards and 5 class IV employees. The overall administrative control of this range lies with the Divisional Forest Officer Wildlife Division, Shimla assisted by Assistant Conservator of Forests Shimla.

The existing position of staff in the sanctuary is as under:

Forest Ranger	1
Deputy Ranger	1
Forest Guards	4
Gate Keeper	1
Camel Cart Driver	1
Mali	1
Peon	2

However, in view of the extensive works to be taken up in this sanctuary as proposed in preceding chapters, it is proposed to add one Range assistant and two more Forest Guards. With the addition of Golf Cart facility at parikrama road, services of driver has been outsourced which should be renewed every year.

10.2 Staff amenities

The following basic facilities will be provided for better management of the sanctuary.

Requirement of Equipment: However, GPS, binoculars, cameras, search lights and other necessary equipments are purchased almost every year, the following equipments/ machinery are required for proper and effective sanctuary management.

1. Vehicle 1 No.
2. Tranquilizer Gun 1 No.

Staff amenities: Construction of Offices and Residences: Office for deputy ranger and residences for staff requires to be constructed in the Forest colony, and a Fgd hut is required near village Dhar-Taran.

It is recommended that the strengthening of field staff be taken up immediately, to enable effective management.

10.3 Human Resource and Training Level

While the officers and staff are trained in forestry and/or wildlife management, they lack training in wetland management. Regular training for wetland management of the staff should be incorporated in department's training curriculum. Staff should be sent for refresher courses on regular basis.

Chapter 11 Budget