

ACKNOWLEDGEMENTS

I wish to extend my gratitude to Department of Forests and Wildlife preservation, Govt. of Punjab, Dr. Kuldip Kumar I.F.S PCCF (Wildlife), Punjab, Sh. Mahavir Singh, IFS, CF (Wildlife) Parks & Protected Area Circle, Punjab, Chamkaur Singh R.F.O (W.L)- Bhadson Range, Charanjit Singh, Block Officer, WLS Dosanjh, Smt. Gurmeet Kaur and Sh. Parmvir Singh Forest Guards of WLS Bhadson for assigning, guiding and assisting the undersigned to prepare the present management plan for Wild Life Sanctuary Bhadson.

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CONTENTS

Introduction

The Executive Summary

Acknowledgements

PART-I

The Protected Area: The Existing Situation

Chapter 1: Introduction to the area	Page No
1.1 Name, location, constitution and extent	1
1.2 Approach and access	1
1.3 Statement of Significance.	3
Chapter 2: Background information and attributes	3
2.1 Boundaries	4
2.2 Geology, rock and soil	5
2.3 Terrain	6
2.4 Climate	6
2.4.1. Rainfall	6
2.4.2. Temperature:	7
2.4.3. Humidity;	7
2.4.4 Wind:	7
2.4.5 Drought, and its periodicity	7
2.4.6 Frost	8
2.4.7 Dew and Hail Storms	8
2.5. Water sources	8
2.6 Range of wildlife, status distribution and habitat	10

2.6.1.	Vegetation	10
2.6.1.1.	The Biogeographic classification	10
2.6.1.2.	The forest types, cover and food for wild animals	10
2.6.1.3.	Species and communities of conservation importance; key areas.	11
2.6.2.	Animals	13
2.6.2.1.	Vertebrates, their status, distribution and habitats. Habitat quality, quantity and key areas.	13
2.6.2.2.	Mammals	13
2.6.2.3.	Invertebrates, their status, distribution and habitat.	14

Chapter 3: History of management and present practices

3.1	General History	16
3.2	Timber operations including bamboo and firewood harvest	16
3.2.1.	Silvicultural systems and tending operations	16
3.2.2.	Firewood harvest and collection	17
3.2.3.	Plantation	17
3.3.	Non wood forest produce (NWFP) collection	17
3.4.	Leases	17
3.5.	Other programmes and activities	17
3.6.	Forest Protection	17
3.6.1.	Legal status	17
3.6.2.	Hunting	18
3.6.3.	Poaching and other Illegal activities	18
3.6.3.1	Poaching	18
3.6.3.2	Illegal cutting of trees	18
3.6.3.3	Illegal removal of NWFP, encroachment & other illegal activities.	18

3.6.4	Livestock grazing	18
3.6.5	Wild fires	18
3.6.6	Insect attacks and pathological problems	18
3.6.7	Wildlife Health	19
3.6.8	Interagency programmes and problems	19
3.7	Tourism	19
3.8	Research, monitoring and training	19
3.9	Wildlife conservation strategies and their evolution	19
3.10	Administrative set up	20
3.11	Communication	20
3.12	Summary of threats to wildlife.	20

Chapter 4- The protected area and the interface land use situation

4.1	The existing situation in the zone of influence	21
4.1.1.	The location, extent, boundaries and natural attributes of the Zone of Influence.	21
4.1.2.	Villages inside and outside the P.A. ethnic identities, traditions, customs, relationships between distinct groups of people, relationship with forests.	21
4.1.3.	The state of the people's economy. Vocations, land use. use of forest and non forest based natural resources and by people seasonal patterns.	22
4.1.4.	Implications of the land use and resources dependency for the conservations of PA	22
4.1.5.	Forest/PA management practices and their implications for people	22
4.2	The development programmes and conservation issues	22
4.2.1.	An evaluation of government and non-government agency programmes for development. Implications for the PA, people and the Zone of Influence.	22
4.2.2.	The interplay of market forces and their impact on the subsistence economy of the local people.	23

4.2.3. A summary of problems faced by people that affect the management of the PA & the ZI.	23
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PART II - Proposed Management

Chapter 5: Vision, Objectives and Problems 24

5.1 The Vision	24
5.2 Objectives of management	24
5.3 Problems in achieving objectives	26

Chapter 6: The strategies 28

6.1 Boundaries	28
6.2 Zonation	28
6.2.1 Period of the Management Plan	29
6.3 Zone Plans	29
6.3.1 Biodiversity Conservation Zone	29
6.4 Theme Plans	32
6.4.1 General Protection Plan	32
6.4.2 Habitat restoration plan	36
6.4.3 Species maintenance/display plan	41
6.4.4 Wildlife health management plan	42
6.4.5 Inter agency co-management plan	44

Chapter 7: Ecotourism, Interpretation and Conservation education 46

7.1. General	46
7.2. Objectives	46
7.3. Issues and Problems	46
7.4. The strategies	47
7.4.1. Identification of the zone	47
7.4.2. Development of Infrastruce/ Ecotourisim Facielities	47

7.4.3.	Strategies for promotion of Conservation Education	49
7.5.	Regulations, monitoring	50

Chapter 8: Eco development **51**

8.1	Introduction	51
8.2	Issues	51
8.3	History of Eco-Development	51
8.4	Specific Issues/Problems	51
8.5	Objectives	52
8.6	General Strategies	52
8.7	Issues Wise Strategies	54
8.8	Table	55
8.9	Monitoring/Evaluation	55

Chapter 9: Research, Monitoring and Training **57**

9.1	Introduction	57
9.1.1	Identification of Issues	57
9.2	Monitoring	58
9.3	Training	59
9.3.1	On the job training	59
9.3.2	Formal training courses	60
9.3.3	Establishment of a learning centre	60

Chapter 10: Organization and administration **61**

10.1	Structure and responsibilities	61
10.2	Staff amenities	62

Chapter 11: The budget **64**

11.1 The plan budget 64

11.2 Planning of the activities 65

**Chapter 12: The schedule of operations and
miscellaneous regulations** **66**

12.1 The schedule 66

12.2 Record of deviations and implemented targets 66

12.3 The record of employment potential 66

12.4 The control forms 66

12.5 Maintenance of compartment histories 67

12.6 Use of pocket field guide for plan implementers 67

PART III

ANNEXURES

<u>Appendix.</u>	<u>Subject</u>	<u>Page No.</u>
1.1	Declaration of Sanctuary	68
1.2	Declaration of 2 nd Class Forest	69-72
1.3	Swot Analysis	73
1.4	Summary data of Bir Bhadson WLS	74
2.1	Annual Rainfall (mm) in Tehsil Nabha	75
2.2	Temperature data of Patiala District	76
2.3	List of trees, shrubs & Grasses of Bir Bhadson WLS (Both Indigenous and exotic)	77-79
2.4	Check list of Wild Animals	80

2.5	Check list of Wild Birds of Bir Bhadson WLS	81-82
3.1	List of Plantation in Bir Bhadson WLS	83
3.2	NOC issue for arms license within 10 Km	84-85
3.3	Detail of Staff in Office of DFO (WL) Patiala	86
3.4	Abstract of Fire Lines in Bir Bhadson WLS	87
4.1	List of Villages around 10 km from Bhadson WLS	88-89
4.2	Land Holding Pattern Households in adjoining villages of WLS Bhadson	90
4.3	Socio-Economic detail of adjoining villages	91-92
4.4	Immunization of cattle details within 5 Km	93
6.1	Compartment wise vegetation composition	94-95
6.2	Population of Wild Animals and Birds in Bir Bhadson WLS (2017 approximate)	96
6.3	Notification of Advisory committee	97-98
7.1	List of Suggested trees, grasses in Bir Bhadson	99
11.1	Financial Forecasts for plan period (10 years)	100-108
12.1	The Control Forms	109-115
12.2	Compartment Wise History	116-118
	Glossary	119
	Abbreviations used	120-121
	References	122

INTRODUCTION

Forests and oceans act as the best sources of carbon sinks as they absorb huge quantities of carbon dioxide thus help to maintain the mean annual temperature of the globe suitable of earthlings. But industrial revolution has contributed a lot in increasing the global warming. In the last century alone, the global surface temperature increased from $0.74^{\circ}\text{C} \pm$ to 0.18°C . The world, especially the third world countries like India, Bangladesh, and Sub-Saharan Africa etc. are experiencing the harmful impacts of global warming like famine, floods, rise in sea level, submergence of coastal areas, appearance of more virulent pests- diseases and arrival of new diseases like mad cow disease, bird flu, dengue, chikungunya, swine flu etc.

In 2006 Sir Nicholas Stern former exchequer of United Kingdom in his report 'economics of climate change' has scientifically highlighted the role of forests in mitigation of global warming. According to his report, existing forests and new forests play a major role in mitigation of global warming; there is a strong need to go for afforestation, stop deforestation, and to protect existing forests. Habitat protection is the first step to ensure the preservation and conservation of wildlife.

Wildlife, both flora and wild fauna like birds, animals, reptiles, insects and other microbes are integral part of the nature. Though the Britishers had various laws to protect Indian wildlife, but the real strength to protect Indian wildlife came only after independence when UNEP conference was held in Stockholm, Sweden in 1972. This conference resulted in the formulation and enactment of Indian wildlife protection Act, 1972. In 1983 Govt. of India for the first time formed a special committee with Wildlife Institute of India as its nodal member to prepare guidelines to write wildlife management plan.

Punjab, being an agrarian state has very small area of fragmented forests (290,000 ha i.e. 5.76% of its geographical area against 33% as

prescribed under national forest policy 1952). The state of Punjab has a total of 21 protected areas out of which 13 are wildlife sanctuaries (WLS), 4 are community reserves and 4 conservative reserve. Out of the total forest area of 290,000 ha of the state, the total protected area is 45155.17 ha amounting to 15.57% of its forest area and only 0.68% of geographical area. In order to preserve the existing wildlife and also to increase the awareness about the role of forests there is a strong urgency to write a management plan based of scientific data collection, analysis-interpretation and future recommendation based management plan.

This is the second management plan prepared for *Bir Bhadson* WLS which is located in Nabha tehsil of district Patiala. Effort has been made to make this management plan scientifically true and to guide the management for future preservation-conservation of important patch of forests.

EXECUTIVE SUMMARY

Wild Life Sanctuary Bhadson is one of the most important protected areas (PA) in Patiala district.

The area is remnant in biodiversity and harbors many species of flora and fauna. For centuries this bir has witnessed many shows of strength and hunting as it was an important *Shikargah* (hunting ground) of erstwhile princely state of Nabha. The management history of Bir Bhadson dates back to 1952 when it was first notified as a Wildlife Sanctuary (WLS) vide Punjab Govt. Notification No.F-150/50 dated 28/02/1952. Thereafter it was managed under regular working plans and continued to be a sanctuary. At present the area spreads over 1022.63 Ha.

The current plan has been written for the period 2018-19 to 2027-28 focusing on the management of the area with the following objectives.

- To secure the conservation of biodiversity and to enhance the status of wildlife by habitat amelioration works in a natural representative habitat of Bir Bhadson WLS.
- To maintain and strengthen the protection measures against external disturbances like illegal grazing, collection of fuel wood, fire, disease etc.
- To remove the alien and invasive species from the WLS and restore the natural habitat suitable for wildlife and to safeguard the hydrological and edaphic factors of the Bir Bhadson WLS through soil and moisture restoration.
- To improve the quality of life of people living around WLS by providing them with alternative means of livelihood, this will also reduce their dependence on the PA.

- To promote conservation-education and environmental awareness of the local communities with the help of meaningful interpretation and development activities.
- To strengthen the activities of training, research and monitoring for effective management of Wildlife in the sanctuary.
- To develop a mechanism for the interdepartmental, inter-agency dialogue, for achieving the broader goal of welfare of the Wildlife as well as the local inhabitants of the area

Guidelines given by Wildlife Institute of India were followed while writing the plan.

The strategies proposed in chapter six to tackle the management problems are to divide the WLS into three zones having their own set of objectives and strategies. They are

- A. Biodiversity conservation zone
- B. Ecotourism zone
- C. Eco-development zone

Five theme plans which are applicable to different areas of WLS, irrespective of the zonation are as under:

1. General protection plan
2. Habitat restoration plan
3. Species reintroduction plan
4. Wildlife health management plan
5. Interagency co-management plan

Chapter 7, 8 and 9 deal with tourism, eco-development, Research & monitoring respectively including various measures for conducting these activities.

Chapter 11 is about budget needed to fulfill strategies which includes state allocation and central aid as well as other projects.

Chapter 12 deals with schedule of operations, month-wise activities of each operation, format for deviation forms etc.

Part- I

The Existing situation

Part- III
ANNEXURES

Part- II

Proposed Management

Chapter-1

Introduction to the area

1.1 Name, Location, Constitution and Extent

Name of the sanctuary is Bir Bhadson Wildlife Sanctuary. This WLS falls in the jurisdiction of Nabha tehsil of Patiala Forest Division (Wildlife) and district. It is situated on the Nabha-Gobindgarh road at about 30 km from Patiala city. It was first notified as a Wildlife Sanctuary (WLS) vide Punjab Govt. Notification No.F-150/50 dated 28/02/1952 (**Annexure 1.1**).

The area is situated at $30^{\circ}30'$ to $30^{\circ} 25'$ North latitude and $76^{\circ}10'$ to $76^{\circ} 15'$ East longitude. The Survey of India toposheet number covering the sanctuary is 53 B/2 (Scale 1"= 1 mile). The total area of the Bir Bhadson is 1022.63 hectare as notified by Punjab Govt. No. 2026/Ft (IV)-61/3654, dated 5th July 1961 by the provision to sub section (3) of section 29 of the Patiala Forest Act, 1999 as second class forest (**Annexure 1.2**). The detail of location of Bir Bhadson WLS in the state and in the district is indicated in Maps shown below.

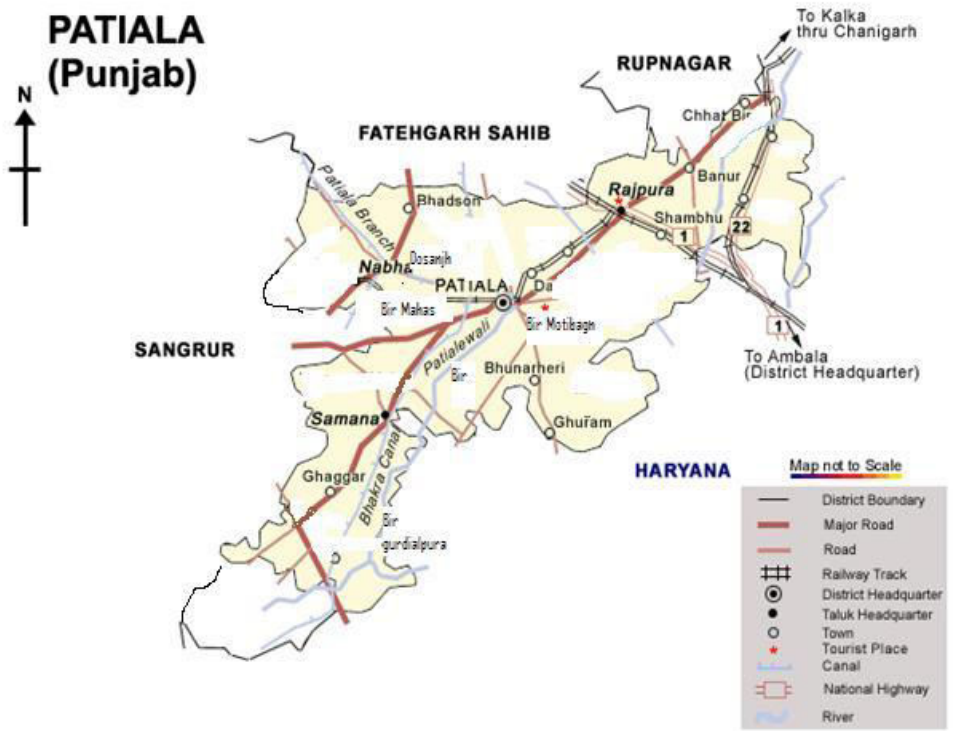
1.2 Approach and access

Bir Bhadson Wild Life Sanctuary is approachable by road. One can reach to Patiala by rail or bus and then can take bus or taxi for Bir Bhadson WLS which is nearly 30 kms from Patiala. One can also reach up to Nabha town also which is the nearest railway station on Patiala Bhatinda railway line to reach Bir Bhadson WLS. The Bir Bhadson WLS is also accessible from the towns of Amloh and Sirhind by road. The entry to the sanctuary is from Nabha-Gobindgarh road which touches its eastern boundary.

WILDLIFE SANCTUARIES IN PUNJAB



LOCATION MAP OF WILDLIFE SANCTUARIES IN PATIALA



1.3 Statement of Significance

1. Bir Bhadson WLS is one among the 13 Sanctuaries declared in the state for the conservation of wild life. At one time in the history it was the hunting ground of erstwhile princely state of Nabha. Still some historical impressions are present in the sanctuary in the form of an abandoned fort, which can act as one of the major attraction in the tourism zone after its renovation as part of heritage tourism along with eco tourism. Regarding its extent Bir Bhadson WLS is the largest sanctuary of Patiala district having an area of 1022.63 hectare. In continuity with its boundary another block forest namely Bir Bhorey Agaul is present which can act as a corridor for WL in the conservation efforts. A very beautiful Forest Rest House in the form of a small palace is situated in Bir Bhorey Agaul. This FRH with all the facilities for visitors can be developed in to an ideal tourism complex.
2. Bir Bhadson WLS is a representative landscape of the Semi Arid Division of 4A Punjab plains province of Indus plains region of the bio geographic zone.
3. It is an important PA of Patiala district harbouring a considerable breeding population of Blue bull (Nilgai), Jungle cat, Jackal, Wild boar, Peafowl, Rhesus monkey, Black and Grey partridges etc. It also forms a home for many species of smaller fauna like Porcupine, Common hare, Common Mongoose, Monitor lizard, spotted owlet and other small reptilian species, birds and insects. The more the area shall be extended and protected more the number of new and old wild fauna will arrive and make the WLS as their new habitat.
4. It is a well-known wilderness area with typical ecological and biological features, rich in terms of timber, fruit and the other indigenous plants etc which can act as a repository for remnant biodiversity and wildlife of the state.
5. It is one of the important conservation units in Punjab which can act as a centre for preservation cum conservation, education and extension. It is utmost important to protect this WLS because it acts as repository of important species which may face conservation threats elsewhere. In the future the wildlife especially the fauna may be used as reserve stock for conservation breeding and re-introduction of wild life in other areas.

The SWOT analysis for Bir Dosanjh WLS and its summary is summarized in **Annexure 1.3** and **Annexure 1.4** respectively.

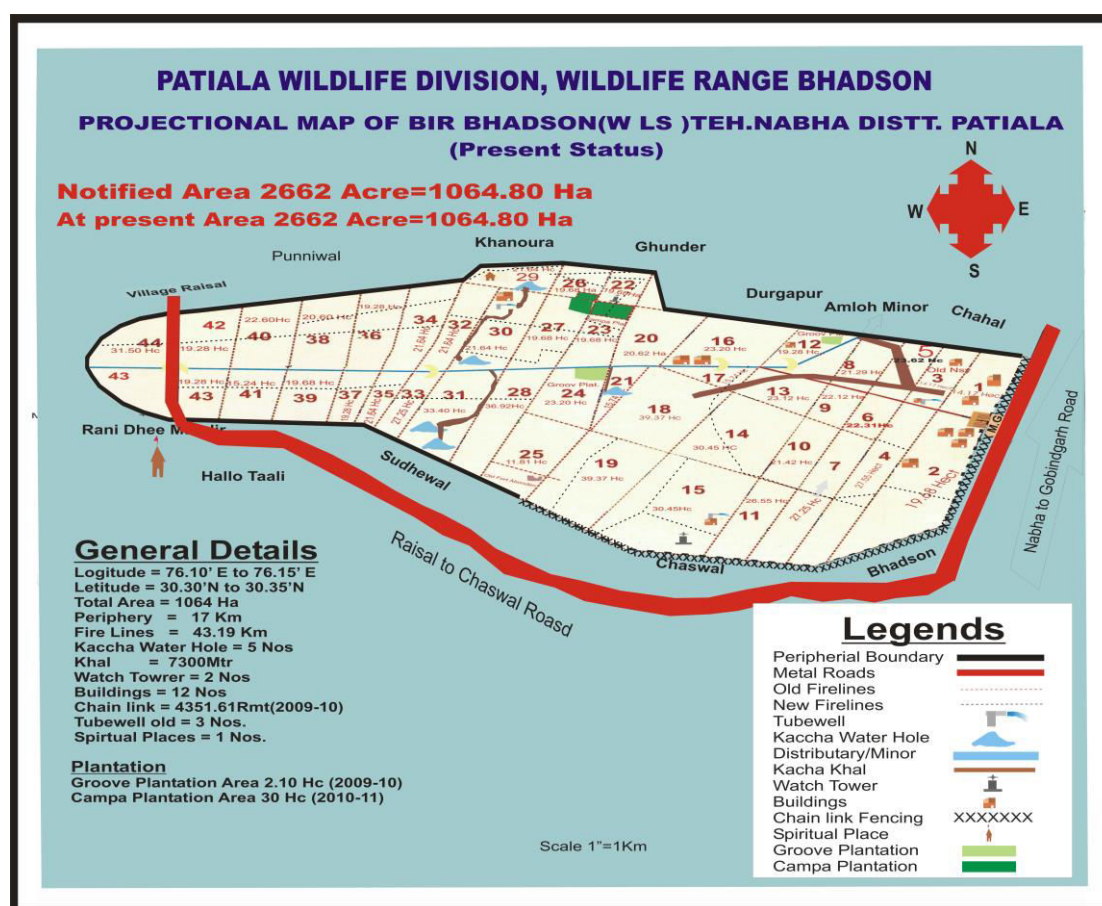
Chapter-2

Background Information and Attributes

2.1 Boundaries:

Total area of Bir Bhadson is 2526.97 Acre. The sanctuary is situated in Nabha Tehsil of Patiala district. Its Hadbast no. is 142 having Khasra no. 1 to 132. The area is demarcated by the boundary pillars at the site. There is no distinction between core and buffer area. The total periphery of Sanctuary is about 17 km which is surrounded by the revenue boundary of adjoining villages of the area.

MAP OF BHADSON WILDLIFE SANCTUARY



2.1.1 External boundary

The shape of sanctuary is compact with continuous boundary. There is no dispute of boundaries with in Bir Bhadson WLS. However revenue land bordering area needs special care to prevent encroachment problem. A list of compartments bordering North, East, South and West of the WLS is given below:-

North: Compartment No.1, 3, 5, 8, 12, 16, 20, 22, 26, 29, 34,
 36, 38, 40, 42, 44

East: Compartment No.1, 2

West: Compartment No.43, 44

South: Compartment No.4, 7, 11, 15, 19, 25, 28, 31, 33, 35,
 37, 39, 41, 43

The extent of ecological boundary of Bir Bhadson WLS considers all adjoining forest blocks of Bir Bhorey, patches and Agaul, strips of Nabha-Gobindgarh road, Amloh minor, Sudhewal-Raisal Link road of the territorial forest division in the vicinity. Therefore, ecological boundary may extend up to neighboring forests of Bir Bhorey Agaul and forest strips bordering revenue lands in non-forests areas. Legal boundary of the Bir Bhadson WLS has to be Surveyed and demarcated by new boundary pillars, which need to be carried out during plan period.

2.1.2 Internal boundary

Internal boundary is marked by compartment boundaries of the sanctuary. Each of the compartments is maintained as a separate unit by fire lines. The whole area is traversed by these fire lines forming a network. Most of the compartments are rectangular in shape which makes them easy to manage. Proper survey of area of compartments both in the field and in the map needs to be carried out using GPS.

A detailed map of the sanctuary is enclosed as to show external and internal boundaries of the Bir Bhadson WLS.

2.2 Geology rock and soil

The geological formation represented in the sanctuary consists of clay, sand, silt and gravel belt. The soil material forms parts of Indo-Gangetic plain deposits. The soil is deep alluvium varying from clay to silty loam. Due to heavy texture of the soil, it becomes sticky

and loose after absorption of water but becomes very hard after drying. The soil is poor in available nitrogen and organic matter but rich in clay content. Depth of the clay varies at places and goes deep to 9-10 meter (30 ft). There are patches of saline soil, largely developed due to impeded drainage and high water. Kankar pan is also found in the saline patches at varying depths in the sanctuary. The area was given the treatment of Farm yard manure zinc and Gypsum when it was under the PLDRC jurisdiction.

2.3 Terrain

The tract forms the part of Indo - Gangetic plains. By and large, it is flat but traversed with ditches and drain. Amloh minor is the main water course passing through the Bir Bhadson WLS. The Sudhewal-Raisal Link road (409 m) passes through WLS.

2.4 Climate

The climate is extremely hot in summers and cold in winters. The three distinct seasons which follow are:-

- (i) The south-western monsoon begins in the first week of July and extends up to mid September.
- (ii) The winter season starts from about the middle October till about middle of February coldest months being December-January.
- (iii) The summer starts from middle of April and continue till August. May being the hottest month.

2.4.1 Rainfall

Most of the rains occur during mid July and mid September and small proportion falls during the summer months of April, May and June. The damage to vegetation and forage content is considerably reduced. Annual average rainfall varies from 145.22 mm to 4.92 mm. The rainfall data of Patiala District with effect from 2006-2016 is given **Annexure-2.1**.

Period (2006-2016)	Average Maximum rainfall	Month	Average minimum rainfall	Month
Patiala District	126.68	July	0.14 mm	November

	mm			
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* Statistics of Patiala-Agriculture department

2.4.2 Temperature

The temperature during summer goes as high as 46°C whereas in winter it touches the freezing point at times frost is common during these months. May and June are the hottest months whereas December and January are the coldest. The temperature data from 2006-2016 is given in **Annexure-2.2**

*

Working Plan- Patiala	Period (2006- 2016)	Mean monthly max. temp.	Month	Mean monthly min.temp.	Month
	Patiala district	44.6 °C	June	2.7 °C.	December

2.4.3 Humidity

As per rainfall and temperature, humidity gradually increases from the month of June to mid October. After that humidity decreases and winter season starts. During December-January the humidity and temperature are very low.

2.4.4 Wind

During summer season dry and hot winds cause drought conditions. Dust storms are common during hot weather. Strong winds following rains also cause uprooting of trees and breakage of branches.

2.4.5 Draught and its periodicity

The Bir Bhadson WLS experiences dry weather throughout the year. Most of the rainfall is received between June to September. During winter there is negligible rain in Bir Bhadson WLS. Thus, the overall climate is dry and drought prone.

2.4.6 Frost

During winter season, frost is quite frequent but is very severe whenever there is long drying spell and causes considerable damage to seedlings.

2.4.7 Dew and Hail storms

Dew does occur after rainy winter months but has not got much significance for the vegetation but certainly for the herbivorous animals. No record of observations regarding hail storms is available. Fog occurs during winter months of December and January. Dense fog reduces visibility which induces chances of accidents under the fog cover.

2.5 Water Sources

There is no natural source of water or water holes in the Bir Bhadson WLS, although canal water supply through Amloh-Minor is available, but it is neither adequate nor regular. In earlier times several water pumps were installed but now most of them are not in working condition. The sub soil water is suitable for irrigation and drinking of animals. There is a continuous low lying topography forming depression through compartment no. 30, 32, and 34, 36, 38, 40 and from compartment number 31, 33, 35, 37, 39, 41. Another mild slope is present from compartment number 19 to 15, 14, 18, 21, 24, 25 and also from compartment number 11 to 7, 10, 14, 15. Though water is collected during rainy season due to low lying topography and mild slope but the water is dried up during summers causing great inconvenience to wild life population. Detail of water resources is given below.

Water Holes within Bir Bhadson WLS

Sr. No	Water resource	Compt. no.	Number	Status
1	Water hole (kacha)	15	1	Functional
2	Water hole (kacha)	15	1	Functional
3	Water hole (kacha)	31	1	Functional
4	Water hole (kacha)	30	1	Functional
5	Water hole (kacha)	29	1	Functional
6	Water hole (kacha)	23	1	Functional
7	Water hole (kacha)	21	1	Functional

Source: Field data by staff of Bir Bhadson WLS

Photographs of Water Resources/ Water Hole and Minors



Amloh Minor



Water Hole C.No.21



Water Hole C.No.30

2.6 Range of Wild Life, Status and Distribution

2.6.1 Vegetation

2.6.1.1 The bio geographic classification

As per the bio geographic classification of India (Rodger and Panwar 1988), the area falls under bio geographic zone 4 i.e. 'Semi arid' and biotic province 4A - 'Punjab Plains'.

2.6.1.2 The forest types, cover and food for wildlife.

The original vegetation in the sanctuary area were of the type dry tropical thorn and scrub forests which fall under the 'sub group' 5-B (Northern tropical dry mixed deciduous forests, according to the revised classification of the forest types of India by Champion & Seth (1968).

Due to the various edaphic factors like soil, climate and biotic factors which have played on the natural vegetation of this bir forest the vegetation can be recognized as " Saline and alkaline scrub savannah sub type E8 of group 5-B."

The crop consists of both planted and natural, indigenous and exotic trees and shrubs. The main tree species found are Prosopis juliflora (Mesquite), Acacia nilotica (Kikar), Dalbergia sisso (Shisham), Albizia lebbeck (Sirris), Morus alba (toot) and Zizyphus mauritiana (Beri). The less common trees found are Syzygium cumini (Jamun), Butea monosperma (Dhak), Azadirachta indica (Neem), Ficus religiosa (Pipal), Phoenix sylvestris (Khajoor) Cordia dichotoma (Lasura). A number of few species like Jamun, Arjun were tried in experimental plot of compartment no.18 and 21 in the year 1990 but failed. Later on mesquite was planted in those areas. However some compartments have been overtaken by the mesquite growth which creates hindrance in regeneration of natural vegetation for wild animals.

The undergrowth consists of Zizyphus nummulaira (Mallah), Calotropis procera (Aak), Capparis sepieria (Heens), Cassia spinarum (Karonda).

A number of grasses and herbs are also found of which Saccharum spontaneum (Kahi), Saccharum munja (Kanna), Vetiveria zizinioides (Panni) are important. The tall grasses are Typhaelephantian (Dab), Pharagmites karka (Nara), Arundinaria falcata (Nara), etc. in blanks

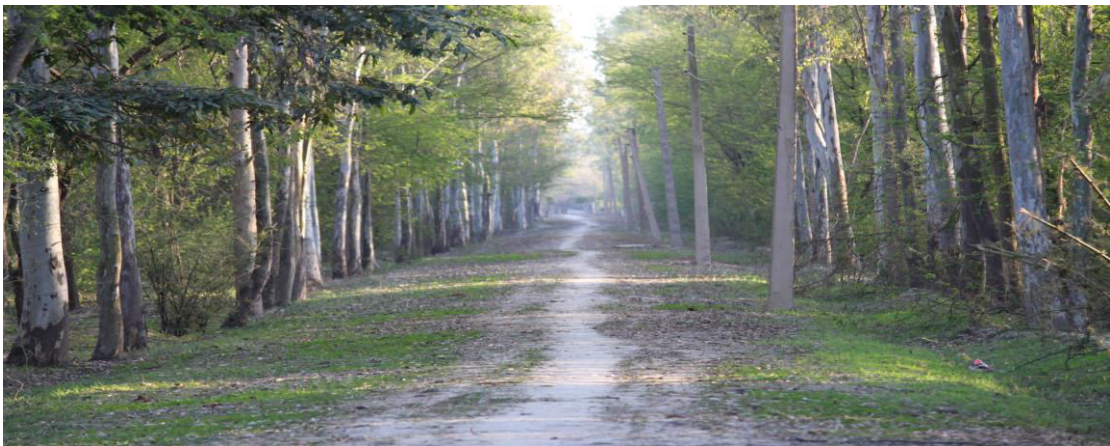
as well. as over the entire area. Cynodon dactylon, Malva parviflora, Galium aparine, Veronica agrestis are the common winter annuals.

The detailed list of flora and vegetation composition of Bir Bhadson WLS has been given in **Annexure 2.3**.

2.6.1.3 Species and communities of conservation importance; key areas.

Bir Bhadson WLS is an important repository of the diverse floristic elements. Even though it is not as rich in terms of endemic plants or animals, it does harbor many of the important elements of tropical dry deciduous forest.

Photographs of Vegetation in Bhadson WLS



C.No.25



C.No.15



Bamboo C.No.32



Phalahi and Beri C.No.19

2.6.2 Animals

2.6.2.1 Vertebrates, their status, distribution and habitat, habitat quality and key area

The sanctuary is an abode of many herbivorous and carnivorous species, except for large carnivores which are not found. A variety of bird species are found in the sanctuary of which peacock, blue-rock pigeon, common dove, lapwing, hoopoe, seven sister, common myna, partridges and robins are common. Among the animals rhesus monkeys, blue bull, wild boar and jackal are found in abundance. The population of rhesus monkeys and blue bull is constantly on the increase. The small Indian mongoose is also seen. The species of garden lizard, cobra, krait, viper and rat snakes are also found in the sanctuary. A check list of wild animals is given as **Annexure 2.4.**

A) Mammals

(a) Herbivores

Blue bull or *Nilgai* , Indian Crested Porcupine (*Hystrix indica*), Rhesus Macaque/monkey (*Macaca mulatta*), Indian hare (*Lepus negricolis*) etc.

(b) Carnivores

Indian Jackal, Jungle Cat (*Felis chaus*), Grey Mongoose (*Herpestes edwardsii*)

B) Birds: The inventory of birds of the Bir Bhadson WLS areas comprises different species belonging many families and avian orders including both terrestrial as well as arboreal, **Indian Peafowl** (*Pavo cristatus*) **Grey Partridge** (*Francolins pondicerianus*) **Redwattled lapwing** (*Vanellus indicus*) **Rose ringed parakeet** (*Psittacula krameri*) **Hoopoe** (*Upupa epops*)

etc.

Check list of Wild Birds is shown as **Annexure 2.5.**

C) Reptiles: Systematic list of reptilian species has not been prepared but reports of occurrence of many reptilian species/sub species in Bir Bhadson WLS are available. This includes Cobra, Krait, Viper, Monitor lizard, Yellow Monitor Lizard (*Varanus flavescens*), turtles etc.

D) Amphibians and Fishes: The class amphibian is represented by order Anura which includes the frogs and toads.

2.6.2.3 Invertebrates, their status, distribution and habitat

With greater emphasis on mammals, invertebrates have been mostly ignored. The knowledge of the occurrence and status of the invertebrates in this WLS is important from management point of view. Insects being primary feeders are important part of the ecosystem. Larvae and ants feed extensively on decaying remnants. Honey bees, butterflies, wasps, termite, bugs, beetles and ants etc are different types of insects found in Bir Bhadson WLS. Honey bee can be an important economical insect of the area. Other invertebrates form the important food of birds and few animals.

Photographs of Wildlife in Bhadson WLS



Nilgai C.No.11



Black Buck C.No.21



Eagle C.No.28



Monkeys C.No.4

CHAPTER-3

HISTORY OF MANAGEMENT AND PRESENT PRACTICES

3.1 GENERAL HISTORY

There are two types of forest resources present in Patiala. One is Strip forests and other one is Bir forests. The Strip forests were managed by the respective departments before handing over to the forest department. The Bir forests or block forests of Nabha were owned by the princely state of Nabha before the integration of princely states. This bir was maintained mainly as game reserves/ hunting ground for the king of the state.

The area was declared as Second class forest in the year 1961 after that plantation work was started. As soil of the area was mainly Saline-alkaline most of the species failed there except the naturally coming *Prosopis juliflora* being the hardy species. Later on Eucalyptus, Shisham and few other species were tried and established which are still surviving. Though the Bir Bhadson was declared as sanctuary but it was managed under the territorial forest division and the approach was never wildlife biodiversity centric.

3.2 Timber operations including bamboo and fire wood harvest.

3.2.1 Silvicultural Systems and tending operations Analysis of working plan for Bir forests of Sh. R.K.Luna, IFS (1991-92 - 2000-01)

Earlier the Bir forests have been divided in to Working circles depending upon the main species growing in that area. The system of dividing areas on the basis of species have not been successful as the areas are so diverse in soil type and geology, therefore, the block forests has been brought under a Single Working Circle called the Development Working Circle, which constitute of all areas of the Birs/ block forest which do not constitute or form part of a sanctuary.

There is no systematic history of management present for Bir Bhadson WLS. Though in principle it was under the control of DFO (Wild life) Patiala for management but actually the territorial division was managing it and doing plantation works till last few years.

3.2.2 Fire Wood Harvest and collection

As no right exists in the WLS, the villagers especially landless people enters and collects fire wood illegally.

3.2.3 Plantation

Plantation have been carried out under JBIC Project by Territorial Division **Annexure attached 3.1**. Detailed record regarding this plantation is available with Territorial Division.

3.3 Non Wood Forest Produce collection

The vegetation of the WLS does not yield much variety of NWFP. But, definitely grass, kanna, kahi are present and auctions were going on. There is no statistics available for the last 10 years.

3.4 Leases

At present there is no lease is given to anybody/ firm and the sanctuary is free from all its burden of lease.

3.5 Other Programmes and activities.

The temple of Sati Devi inside the WLS and another temple in buffer zone are the two places where people assemble and regularly visits. The visit of large number of people definitely must have an adverse impact on WL.

3.6 Forest Protection.

3.6.1 Legal Status

The Notification regarding declaration of Bir Bhadson as WLS had been issued vide No F-150/50 dated 28-2-1952 under the Fauna of Patiala Act 1896. Notification to declare it as second-class forest had been issued vide No. 2026/Ft (IV)-61/3654 dated 05.07.1961.

3.6.2 Hunting

Under the control of princely state it was a hunting ground but now a days the hunting is totally banned inside the WLS under the preview of WPA' 1972. **(Annexure 3.2)**

3.6.3 Poaching and other Illegal Activities.

3.6.3.1 Poaching

Poaching is not a common practice and people are aware of stringent punishments for poaching under this Act.

3.6.3.2 Illegal cutting of trees

The villagers do collect fire wood illegally but illegal cutting of trees has not been reported so far.

3.6.3.3 Illegal Removal of NWFP, encroachment and other illegal activities

The illegal removal of NWFP is mainly in the form of firewood or grass. Bir Bhadson WLS is free from all encroachment problems.

3.6.4 Live stock Grazing.

Though grazing is not a problem as such but people left then useless cattle/stray inside the WLS which competes with WL for food and space.

3.6.5 Wild Fires

The area is though highly prone to fire but no major fire incidents has been reported in the WLS in the last few years except some ground fire incident of minor type.

3.6.6 Insect Attacks and Pathological Problems

There is no previous history of insect attack or any loss. Though, termites are present in the WLS but as a part of ecosystem and helps in recycling of nutrients.

3.6.7 Wildlife Health

No history of epidemics is present for WLS. Feed/ Fodder is a problem as most of bir is dominated by Prosopis and Eucalyptus.

There is no facility of rescue centre, Veterinary Laboratory, Veterinary Officer.

3.6.8 Interagency Programs and Problems.

Till last few years the WLS was experiencing the dual control from management point. The territorial division was doing plantation activities, the Wildlife Wing was responsible for enforcing Wildlife (Protection) Act, 1972.

3.7 Tourism

The sanctuary was never promoted as tourism site because of management hurdles, poor infrastructure etc. though Sanctuary can be developed on the lines of eco-tourism.

3.8 Research monitoring and training

3.8.1 Research and Monitoring

The WLS has no systematic record of research. Though, long ago Jamoa and Arjun were planted in few experimental plots which failed due to water scarcity or poor soil conditions/other reasons.

Training

The staff was mostly from territorial division having no knowledge about the WL management still trained man power is a major issue for WLS management.

3.9 Wildlife Conservation and their evolution

Earlier the bir forests were managed according to the working Plan of Patiala Forest Division. However, more stress on wildlife management has been paid since the inception of the sanctuary.

3.10 Administrative Set up

The WLS falls under the Control of DFO (WL), Patiala who works under Conservator of Forests (Wildlife), Parks and Protected Area Circle. At field level a Forest Range Officer is the incarge of the WLS

supported by one forester and two Forest Guards. The details of Administrative Set up is given at **Annexure 3.3.**

3.11 Communication

The Sanctuary is divided in to 44 Compartments through fire lines, which are used as paths also. The detail description of these fire lines is given in **Annexure 3.4.** The total periphery of WLS is approximately 17 km and road network approximately 31 Km. One State highways Nabha-Gobindgarh touches the eastern boundary of the WLS and a metal led link road passes as dividing boundary of Compartment number 40, 41 and 42, 43.

The Wireless communication is non-functional at present.

One Mahindra Bolero Camper and one tractor is present at range level. Additional vehicles are required for effective and efficient management of WL.

3.12 Summary of Threats to Wild Life.

1. Water Scarcity – is a major bottleneck/ threat to WL. No perennial water source is present in the WLS. Hence SMP has to be installed in WLS.
2. Over population of Rhesus monkeys- Monkeys destroys the agricultural fields resulting in the feeling of anger among villagers.
3. Stray cattle groups- are present in WLS completing the habitat of WL.
4. Absence of grass/ ground cover.
5. Poor soil texture- most of the soil is Saline-Alkaline and needs thorough treatment of FYM, Gypsum etc.
6. Scarcities of fruit and Fodder trees- No such tree are present which can be beneficial to the WL.
7. Lack of trained man power.
8. Absence of Infrastructure/Vehicles/ Communication.

Chapter-4

THE PROTECTED ATEA AND THE INTERFACE LAND USE SITUATION

4.1 The Existing Situation in the Zone of Influence

Bir Bhadson WLS is surrounded by agricultural fields from three sides and a mettaled Nabha-Gobindgarh road forms its eastern boundary. There are 10 villages are situated along with or periphery of the sanctuary are mainly subjected to interferences (**Annexure 4.1**). The types of pressures are illegal removal of fire wood, grazing, visit to the temple etc.

4.1.1 Location, extent, boundaries and natural attributes of zone of Influences

The Zone of influence can be formulated by observing the man-animal conflict, people pressure on WLS. The major pressure on WLS is observed from the villages located within close periphery or within 2 Km outside the PA. Thus Bir Bhadson having its zone of influence as follows-

On Northern limits of PA, **Zone of influence 'A'** is proposed for the villages Raisal, Punial/Shrinagar, Khanaura, Ghunder, Dargapur and Chahal.

Zone of Influence 'B' is composed of another block forest Bir Bhorey Agaul and the Link road passing through the WLS.

Village Sudhewal, Sakrali, Chaswal, Bhadson touches the Southern boundary of the WLS and comes under **Zone of Influence 'C'**

4.1.2 Villages inside and outside the PA Ethnic Identities, traditions, Customs, relationship between distinct groups of people, relationship with forests

The people of surrounding areas are mainly agrarian people mainly dependent on agriculture throughout the year. The Jat Sikhs are main community in surrounding villages along with scheduled castes and backward class. Their main festivals are Lohri, Baisakhi, and Diwali and religions fairs at Temple Rani-Dhee, Sati Devi and Gurudwaras. As such WLS has no direct effect on livelihood of the people except the illegal removal of fuel wood, grazing etc.

4.1.3 The state of the people's economy, vocations, land use, use of forests and non-forest based natural resources by people and seasonal pattern.

The people residing around the PA influence the WLS directly or indirectly. As area being WLS people have no right over the resources of WLS, which is the bone of contention among the villagers.

4.1.4 Implications of the land use and resource dependency for the Conservation of PA

The land surrounding WLS is mainly agricultural land and for fuel wood people are mostly dependent on WLS. The villages leave their stray and non-productive cattle in to WLS, which competes with herbivore for food and habitat and also carrier of the diseases. On the other hand crops of surrounding fields are always prone to damage by blue bull, monkey etc.

The people are mostly farmers but few families are either having very small land holding or landless.

The community surrounding WLS does not directly depend upon the PA but certain families especially landless, labourers depends upon WLS for their fuel wood requirements, grass, grazing etc.

4.1.5 Forest/Protected Area Management Practices and their implication for people

After declaration of WLS and curtailment of rights of free access to WLS people are not keeping any positive attitude towards the WLS. The crop raid by the blue bull, monkey's etc. also added to the problems. Therefore, management has to think about these serious issues and their solution without compromising on the interests of WLS.

4.1.6 The development programmes and conservation issues.

4.2.1 An evaluation of government and non-government agency programmes for development. Implications for the PA, People and Zone of Influence (ZI)

The District administration and Zila Parishad in this area takes up different development programmes. Different development schemes like Sampoorna Gramin Rojgar Yojna (SGRY), Punjab

Nirman Programmes, integrated rural development programmes etc. has taken up. Education facilities are present in the form of

elementary and secondary schools. The primary health centers are present for health care needs. The role of NGO's can be better utilized to develop a positive interface between government/forest department and local villagers, community development etc.

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

Because of the era of consumerism the market forces are influencing the people. There is high demand of timber for which people sometimes does illegal felling.

4.2.3 A summary of problems faced by people that affect the management of the PA and the ZI

There are 49 villages within 10 km of the Bir Bhadson WLS. The problems faced which are being faced by these people are listed below-

- **Denial of forest resources** -since the area was declared sanctuary the people free access to forest resources has been stopped. Therefore the people remove firewood illegally from the WLS.
- **Stoppage of grazing**- As grazing is not allowed people leave their stray and unproductive cattle in the WLS.
- **Man-Animal Conflict**- Monkey menace is the big challenge for nearby area as the vegetation within the WLS does not provide sufficient food to cater the population. Sometimes, accidents happen on road due to sudden collision of animal and vehicles resulting in casualties.

Chapter-5

Vision, Objective and Problems

5.1 Vision

Bir Bhadson is one of the last remain of the old block forests or hunting ground of erstwhile princely state of Punjab. The place was earlier bearing the burden of loss of biodiversity mainly due to hunting practices of Maharaja of Nabha state and later on loss to floral diversity due to water scarcity and so the change in vegetation composition. The water scarcity due to poor recharge of ground water, erratic rainfall pattern and over exploitation by the nearby farmers lead to serious ecological problem inside the Bir, as sanctuary was left with very little biodiversity. Therefore it never attracted the tourists or local people. Further, there was almost no management practices were going on to conserve the biodiversity expect the plantations work by territorial division.

As water is the key factor for the development of specific type of vegetation, habitats and wild life. So in all conditions water plays an important role in the vision for management plan and secondly the motibagh the glory of old representative biodiversity with emphasis on flora and faunal conservation with in the spirit of ecology. At the same time, among the people a sense of belongingness should be brought for conservation of WLS. Therefore the vision for Bir Bhadson WLS is **"Restoring the past glory of representative biodiversity of Punjab plains with emphasis on water conservation along with natural flora and faunal representation and the involvement of local people."**

5.2 Objectives of Management

- To conserve Wild Life in the area on a sustainable basis
- To create, develop and preserve ideal habitats for the wild fauna by undertaking habitat improvement works and protection measures.
- To improve the environmental and to maintain the ecological balance of the area

- To conserve the water in the WLS by all possible measures
- To improve the vegetation cover by plantations of indigenous and site specific species beneficial for wild life and gradual removal of exotic and invasive alien species.
- To create awareness among the various stake holders about importance of conserving wild life.
- To involve the local population and other stake holders in the conservation efforts.
- To enhance the aesthetic value of the area so that eco-tourism can be promoted with the spirit of generating awareness among the people and benefit sharing.

5.2.1 Special Objectives of Management

Objective-1: To secure the conservation of Biodiversity and to enhance the status of wild life by habitat amelioration works in a natural representative habitat of Bir Bhadson WLS.

Problems: The problems in achieving above target include habitat deterioration, anthropogenic pressures, poor faunal and floral diversity, and poor research and monitoring activities, lack of fencing, protection related problems due to the untrained and unequipped field staff, lack of awareness.

Objective-2: To maintain and strengthen the protection measures against external disturbances like illegal grazing, trespassing, collection of fuel wood, fire, disease etc.

Problems: Anthropogenic pressure, illegal collection of firewood, trespassing due to absence of check gates and passing of metal road through WLS, disease threats by the stray cattle.

Objective 3: To remove the alien and invasive species from the WLS and restore the natural habitat suitable for WL and to safeguard the hydrological and edaphic factors of the Bir Bhadson WLS through soil and moisture restoration.

Problems: - Water scarcity, poor soil quality, lack of natural water resource and regular water supply, lack of information regarding original floristic, prolific regeneration of *Prosopis juliflora*, monocultures, funds availability, almost nil research inputs.

Objective-4: To improve the quality of life of people living around and dependent on the sanctuary by providing them with alternative

means of livelihood, which will also reduce their dependence on PA.

Problems: Presence of large number of BPL (Below Poverty Line) landless families largely dependent upon sanctuary for fuel wood, increased population, high demand for fuel wood, freely accessible resource, poor respect for forests and Wild Life, lack of Socio-economic studies.

Objective-5: To promote conservation education and environmental awareness of the local communities with the help of meaningful interpretation and development activities.

Problems: Presence of two temples, one inside the sanctuary and other in buffer zone. Religious beliefs, easy accessibility to WLS, absence of trained staff, absence of institutionalized schemes & programme, lack of extension activities, poor awareness and poor respect for conservation of flora, fauna and water as resource, poor funding, absence of publicity efforts.

Objective-6: To strengthen the activities of training, research and monitoring for effective management of wildlife in the sanctuary.

Problems: Inadequate infrastructure facilities, shortage of funds, no scientific research input, untrained and insufficient staff.

Objective-7: To develop a mechanism for the interdepartmental, inter agency dialogue, for achieving the broader goal of welfare of the Wild Life as well as the local inhabitants of the area.

Problems: Less coordination, lack of priority given to wildlife areas.

5.3 Problems in achieving objectives

General scenario:- Bhadson WLS is facing following problem which need immediate attention.

Sr. No	Problems
1	Invasion by Mesquite , Congress Grass. Insufficient fodder grass, fruit trees & indigenous species of trees.
2	Water Scarcity
3	Overpopulation of monkeys
4	Stray Cattle
5	Man-animal conflict on the periphery
6	Financial constraints
7	Lesser staff.
8	No watch tower for inspection.
9	Less number of water holes
10	Lack of Fire Fighting equipment (water tanker, pump, pipes, fire buckets etc.)

Chapter-6

The Strategies

6.1 Boundaries

The detail of physical boundaries has been discussed in section 2.1 of part I of the plan. The outer boundary is shared with the revenue areas of neighboring villages on three sides and on one side (East) of the WLS Nabha - Gobindgarh road passes. Some of the problems with boundary of Bir Bhadson WLS are:-

1. The boundary of the WLS has been fenced in 2014-15 except at the entry/ exit points of the road and along the roads.
2. The ecological boundaries of WLS go beyond its physical boundaries. Avifauna, Reptiles and small mammals venture out to adjoining areas.
3. The continuity of Bir Bhadson WLS forests with the other territorial forest blocks of Patiala needs to be translated in field and managed under coordinated and compatible working & management plan. Their administrative objectives need to be similar.

6.2 Zonation

The Bir Bhadson WLS consists of 44 compartments. At present there is no Zonation, but compartment no. 2 is being treated for office, residential complex. The objectives which have been envisaged in section 5.2 can be achieved in better fashion if the entire area is divided into different zones. A zone is an area of specific management category distinguishable on account of its objective. Separate zones need to be created because some of the management objectives may not necessarily be compatible. Within the finite area of PA different uses can be accommodated through separation of functions by area. This is accomplished by specific objectives and activities. The main emphasis will be given to habitat

preservation water conservation with efforts to restore the ecology and original vegetation. Zonation for the entire sanctuary including the teams- boundary area is as follows:-

Sr. No.	Name of the Zone	Details
1	Biodiversity conservation zone	Entire area of sanctuary except ecotourism zone.
2	Eco-tourism zone	Compartment no. 1,2,3,4,5,6,7,8,9,12,13,17,21,24 & 25
3	Eco-development zone	Village areas of zone of influence (Around 10 villages come under the zone of influence)

For Eco-development zone, area of only 10-villages within the zone of influence, have been considered. However deviations will be made if new villages are included in this zone as per management requirement. The area of WLS does not include area of eco-development zone.

6.2.1 Period of the Management Plan

This management plan will be for a 10 years period i.e. from the year 2018-19 to 2027-28.

6.3 Zone Plans

6.3.1 Biodiversity Conservation Zone- The objective of creating Biodiversity conservation zone in this management plan is to keep the area undisturbed from any external interference and to preserve the natural habitats after their restoration. The rationale behind creating this zone is to safeguard the area against all forms of biotic interference.

6.3.1.2 Objectives

- 1.To minimize the external disturbances by accelerating the process of elimination of causative factors like weeds, stray cattle, diseases, water scarcity, adverse anthropogenic interference etc.
- 2.To conserve the natural habitat and to conserve the water by ameliorating the degraded habitat and water conservation measures.

- 3.To promote the sustainable development of the biodiversity of the area.
- 4.To under the ecological process, food chains, food webs and their interrelationships on floral & faunal biodiversity.
- 5.To undertake research and monitoring work to understand the ecological processes.

6.3.1.3Problems

The major problem is degraded habitat. Dominance of Eucalyptus and Prosopis juliflora in most of the compartments lead to single type of habitat with absence of grasses. Large population of stray cattle groups are permanent resident of WLS and add to the further degradation on habitats. In addition shortages of funds, trained manpower, water supply, anthropogenic pressures like trespassing and fire wood collection are other constraints.

6.3.1.4Past Management approach

Plantation of Eucalyptus, Prosopis juliflora and Shisham has been undertaken in past throughout the area of the sanctuary. Road cum fire line to the tune of 31.2 km. dividing sanctuary in to 44 compartments. One wireless system had installed in the sanctuary which is non- functional at present. To meet the water needs of wild animals only seven artificial water holes are present. Rest of the need is dependent on Amloh minor passing through the Bir Bhadson. A check gate is present on the Northern boundary of the WLS.

At present management plan is approved from 2006-07 to 2016-17 for Bir Bhadson WLS. This is the second plan attempts to focus on the issues related to wild life, biodiversity and water conservation in the WLS.

6.3.1.5Management Strategy

A)General Strategy

- (i) No person except the authorized staff and their vehicles will be allowed inside this zone of sanctuary. Visits of researchers and public (in areas other than tourism zone) will be possible only after the permission from CWCW or his authorized officer.

- (ii) No person will be allowed to halt within the sanctuary during night time except the authorized staff and officers and the census staff during Wild Life census. All labour oriented work (except watch & ward) will be done only during day time only.
- (iii) No activity should be undertaken in this area except the approved maintenance works, habitat restoration and improvement works, forest and fire protection works and research and monitoring. The details of these works are given in various theme plans and under **chapter-9**.
- (iv) Proper protection of the boundary should be ensured through a chain link fencing watch towers and manned check-gates at strategic locations.
- (v) The other regular habitat management activities like weed control, habitat amelioration, fire protection, ,moisture conservation, water hole, fodder development etc will be carried out as per the requirement of site and as prescribed in the theme plans.

6.3.1.6 Monitoring / Evaluation

- (i) A post of Dy. DFO will be created, who will be the incharge of vigilance squad. Protection measures and enforcement will be monitored by regular vigil, inspection and surprise checks by authorities at all level.
- (ii) Monitoring of the vegetation and related habitat change can be done using the ecological studies/vegetation analysis methods.
- (iii) For the treated areas, vegetation and soil characteristics changes will be monitored as discussed in chapter-9, so that comparison can be made in later years.
- (iv) The increased wild life use will itself be the indicator of success.

6.3.1.7 Eco-tourism zone

The details of management of this zone are described in **chapter-7**.

6.3.1.8 Eco-development zone

The details of management of this zone are described in **chapter-8**.

6.4 Theme Plans

Several strategies on virtue of their nature are a zonal or common to several zones eg. fire protection, anti poaching, maintenance of water sources, replacement of exotic and alien species etc. Separate sub plans are developed for components called theme plans. Five theme plans visualized for this sanctuary are as follows:-

- a) General protection plan
- b) Habitat restoration plan
- c) Species maintenance/display plan.
- d) Wildlife health management plan
- e) Inter agency co management plan

6.4.1 General Protection Plan

6.4.1.1 Introduction

General protection plan deals with the protection of Bir Bhadson WLS from all the threats including natural calamity. It is very necessary to protect it from external disturbances like encroachment, illicit felling, poaching, illegal trespassing, firewood collection, fire etc.

6.4.1.2 Objective

1. To safeguard the wildlife and their habitat against ill effects of illegal anthropogenic activities, stray animals.
2. To protect the microclimate and the natural ecological processes and functions of the area.

6.4.1.3 Limiting factors

The limiting factors are presence of stray animals, trespassing, location amidst habitation, over population of monkeys, poor surveillance, shortage of funds and manpower etc. The area of the sanctuary is not very large but limited staff, mobility, communication and various other factors makes management a challenge.

6.4.1.4 Strategy

A) General Protection

General protection is very important for the conservation of biodiversity of Bir Bhadson WLS, It will be achieved through the following measures:-

- (i) For adopting strong protection measures. There is need of a permanent post of Deputy Divisional Forest Officer at division level who will head the vigilance squad.
- (ii) A full time Range Forest Officer/Deputy RFO (WL) is required who will be the incharge of WLS. Further two Forester and four. Forest Guards are required for man power support and protection work.
- (iii) All check gates and newly created watch towers should be manned.
- (iv) A continuous monitoring protocol including the patrolling schedule, surprise visits, surveillance at sensitive areas especially in morning and evening hours should be developed for the field staff including DFO. This includes details of distance & area covered by patrolling staff, animal evidences seen, record of illegal activity, offences etc. Entries will be maintained in patrolling register.
- (v) The fire lines will be kept clean of debris, fallen trees or unwanted growth to prevent fire and will also be used as patrolling/inspection paths.
- (vi) Keeping track of habitual offenders, wild life trade etc. through developing rapport with the villagers and through informers and liaison with police department.
- (vii) All patrolling staff, watchers will be given the kit having equipments useful for protection such as Compass PDA (Personal-Digital Assistant), torch etc. after providing them proper training.
- (viii) All new structures, enclosures, interpretation centre will be created near the entrance of the WLS to minimise the disturbance to wildlife.
- (ix) A separate registered 'Wildlife Development Society' can be made for the controlled development works for the WLS and to take the assistance of interested people.

(B) Boundary Consolidation

It is important to maintain the integrity of boundary. Encroachment in the forest area is although not a common feature in Bir Bhadson WLS but people might tend to expand their agricultural fields if boundary is not properly maintained. This problem can be dealt with:-Repair and maintenance of fencing need to be done as and when necessary. Check gates are proposed at compartment No.41, 42, 43, 44 for proper vigilance.

(C) Fire Prevention

For fire prevention following strategies will be implemental

- (i) Cutting and burning of fire lines of different width is prescribed. The width of the external fire line all along the boundary and between the compartments should be maintained as 10-15 meter. The internal fire lines within the compartments do not exist or not very clear at many places. These should be developed as 5 to 7 meter wide depending upon the density of the vegetation.
- (ii) Deployment of the fire watchers at strategic locations and permanent watch towers as prescribed below-
 - a. During fire season 4- additional fire watchers will be deployed to patrol the entire area in addition to regular watch and ward.
 - b. At least 4 new permanent watch towers will be erected at different locations preferably near water holes in compartment no. 11, 30, 31, 36.
- (iii) There is need to develop good rapport with the nearby villagers and panchayat members to convince them about ill effects of fire. Panchayat meetings can be used as platforms to convince the people. Staff initiative can be helpful in identifying persons and dissuading them from such activities.
- (iv) During the fire season a vehicle and a tractor with water tanks will be kept ready round the clock at WLS headquarter and the squad will attend the fire as early as possible.

- (v) The equipments like water bottles, fire fighting kits, torches etc. required for fire watchers and fire fighters etc. will be procured in advance. At least six such kits will be purchased for the WLS.
- (vi) All fire incidents will be correctly reported with exact location, extent and estimated loss, cause of fire should be identified and reported. Fire reporting will be done by the beat-in-charge and sent to the wildlife warden for division record. The report shall contain –
 - Name of the beat, compartment numbers
 - Extent of area burnt, shown on map
 - Estimated loss in terms of flora & fauna
 - Probable cause of fire
 - Probable time of occurrence of fire, date
 - Fire line network in that area
 - Name of the offender, if known

(D) Miscellaneous Management

- (i) Vehicles like pick-up van/motor cycle will be made available to the patrolling staff.
- (ii) Mobile/wireless handset will be provided at all the important points, to all the patrolling staff and field staff.
- (iii) Staff may be given arms training and arms and ammunition.
- (iv) Step will be taken to get the young and motivated staff. Staff motivation level can be enhanced by providing them certain incentive/special PA allowance. Further regular trainings and tours outside the state should be organized to expose them about techniques adopted in other states.
- (v) The detailed record keeping of offences/problems will be maintained.
- (vi) The special issues of protection will be discussed in the monthly meeting with DFO (Territorial) at division level and with CF (Park and Protected Areas) at circle level.
- (vii) Watch Tower for Wildlife Management shall be constructed.
- (viii) An Interpretation center to create awareness shall be constructed.

6.4.1.5 Monitoring and Evaluation

The effectiveness of the protection measures taken will reflect in the initial increase in the number of offence report but decline later on. This is because more vigilant staff or machinery will detect more number of offences however this number will come down as deterrence starts working.

6.4.2 Habitat Restoration Plan

6.4.2.1 Introduction

Habitat management in wild life areas primarily involves restoration of natural vegetation, undisturbed habitat, proper water regime, improvement of ecological balance etc. with adoption of suitable practices for the long term conservation.

6.4.2.2 Objectives

1. To ensure maximum possible natural conditions to the flora and fauna so as to bring the area as close as possible to its natural functioning.
2. To protect, augment and manipulate the available natural resources for attaining the goal of conservation.
3. To maintain and improve the ground water and water resources and the soil quality which will help in improving the ecology.

6.4.2.3 Limiting factors

Important limiting factors include monoculture, planting of exotic and alien species, poor crop composition, water scarcity, anthropogenic pressure, shortage of money and man power, poor baseline data etc.

6.4.2.4 Strategy

Since the area has been exposed to the greater level of human and cattle disturbances it is essential to undertake ameliorative works on priority to develop the habitat conducive for WL the habitat management of Bir Bhadson WLS will be a multi pronged approach. It involves following activities:-

A) Water resource management

The sanctuary falls under the semi arid zone of western India. The plants and animals have evolved with water as a limiting factor. However wildlife faces hardship in peak summers hence some manipulation is required. Further due to over exploitation of ground water by farmers the water level has gone down which has a apparent impact on the vegetational structure of the WLS.

- (i) The only water course in the sanctuary is Amloh minor, so it is proposed to install seven submersible pumps in compartment number 3, 11, 12, 19, 26, 30, 31 (one in each) adjacent to the water holes.
- (ii) Five new water holes of 15m x 15m size are proposed in compartment number 11, 25, 34, 36, 41 to meet the water needs of WL within the sanctuary area. The water holes will be converted in to the permanent structure by providing stone pitching or cement base to prevent seepage.
- (iii) The level of water in water holes will be maintainable by gradual release of water from the water tank kept at some distance when the water level in hole falls a minimum level.
- (iv) Water will be maintained in all the water holes throughout the year. Annual clearing and depending works will be undertaken. Wherever needed the ground water recharge will be ensured by undertaking moisture conservation activities.
- (v) Sufficient water supply will improve the micro climate of the WLS as well as attract migratory birds during the winter.

(B) Control of Invasive and alien species

Bir Bhadson WLS has been infested with many invasive and alien species like *Prosopis juliflora*, *Parthenium*, *Eucalyptus*, etc., which needs to be checked/ removed. Other invasive shrub species like *Heens*, *Capparis*, *Adathoda* have taken up the area which has further degraded the quality of vegetative

composition. Other than this, a large part of area is covered under Eucalyptus plantation in form of monoculture which has changed the original vegetation type. Compartment wise vegetation composition was assessed in year 2016-17 the details of which is given at Annexure-6.1. Following measures will be taken to control these undesirable species.

(i)The uprooting of invasive species Mesquite, Eucalyptus, Congress Grass etc. will be done from all the areas of the sanctuary. The replacement of Prosopis juliflora (Mesquite), Eucalyptus, Congress grass etc. with indigenous species in a phased manner at the rate 50 ha/year will be ensured after closing the area of plantation by chainlink fencing so that it does not cause any imbalance in the existing wild life in the sanctuary.

(ii)Strict grazing control in the uprooted areas will be done to prevent damage to regeneration by putting enclosures of 10 acres each.

(iii)Prosopis, capparitis etc. present along the boundary of the sanctuary, near water sources and less shrubby area will be retained.

(iv)Shisham with mixed trees areas show less spread of weed. Artificial regeneration will be done to create this composition.

(v)Bamboo plantation will be done in compartment with high moisture level as bamboo prevents weeds growth and also useful for fodder eating species and birds.

(c) Retaining of old and dying trees

As Bir Bhadson WLS have a long management history there are good numbers of old dead and dying trees and logs. Although there is a need to remove unwanted, alien and exotic species, it will not be desirable to remove all the dead and dry material as they form part of wildlife habitat and food chain.

A fair number of dead and dying trees should be left standing as shelter for birds and small mammals. It should not be attempted to cover stray grassy areas by gap planting. Fruit and fodder species

should in no case be removed, even if low in timber value. Monocultures should be avoided by mixing a few other species along with the main species in plantations. In long rotation plantations, under planting of the various species should be done.

(D)Fodder / Forage management

Uncontrolled illegal grazing not only reduces the quality and quantity of browse and fodder but also affects forests regeneration, causes soil depletion and creates openings for the weeds. Followings measures are suggested for improving forage availability for wild life.

(i)Ensure strict enforcement to stop illegal grazing in the WLS.

(ii)There are many degraded sites in the sanctuary, which do not support vegetation at present. Such sites should be developed for forage and fodder development for WL. It is important to arrest the spread of weed and convert some areas in to palatable grassy patches for the benefit of wild herbivores and ultimately the ecosystem. Meadows so developed would be prime areas for WL.

(iii)It is recommended to develop several grassy meadows in the sanctuary and all blank patches after complete removal of all the exotic trees and shrub vegetation and closing this area by chainlink fencing.

(iv)For the better grass growth the area will be control burnt in the month of December-January depending upon the drying of vegetation. The area will be protected for first 2 years by putting enclosures to support seed formation and germination of palatable species before opening for wild life use.

(v)To augment forage values of land, plantation of fruit bearing nutrition's species will be undertaken wherever possible and desirable. The main species will be Jamun, Gular, Mulberry, Bauhinia, Khjoor, Bel, Lasura, Ber, Barh, Peepal etc.

(vi)Treatment of soil before plantation with gypsum, farm yard manure etc. Construction of loose boulder structures, Stoned pitched forest ponds etc. will improve soil quality and water balance of the area.

(vii)The choice of species will be as per requirement of wild life. Plantation sites, area, extent will be selected by DFO (WL). Maintenance and protection will also be ensured and covered in the plantation expenditure.

(viii) Artificial salt licks will be provided at suitable locations to fulfill mineral requirement of the WL, artificial wallows will be made near water holes (Blue bulls etc. may require such wallows)

(E) Dismantling of old structures

For improving the habitat of the sanctuary and to make it suitable home for various herbivores there is need to restore habitat as near natural as possible. This will require removal of those factors which give artificial look to the area and do not merge with the surrounding. Sanctuary area should be made free from unnecessary concrete structure as far as possible.

(F) Elimination of stray/nuisance animals

Due to absence of fencing large number of stray cattle and dogs make their way in the sanctuary. They are detrimental to the sanctuary habitat and the health of the wild life. It has been reported that approximately 300 stray cattle and 20 stray dogs are sharing the natural resources on which wild animals primarily depend for their survival. This stray population should be shifted from the sanctuary area at the earliest.

- (i) **Stray cattle-** a) Restricting of stray cattle to some part of sanctuary so that whole sanctuary does not get affected by stray cattle.
b) Sterilization of male cattle with help of Animal Husbandry Department will be done to restrict breeding of stray cattle.
c) Public participation will be done in order to managing the stray cattle.
- (ii) **Stray dogs-** The municipal corporation/Animal Husbandry department can be very helpful in solving the problem of stray dogs.
- (iii) **Rhesus monkey-** It is estimated that nearby 5000 rhesus monkeys are roaming freely in the WLS area especially over the Nabha-Gobindgarh road because people are offering them various kind of food as religious custom. One of the viable options is to establish rescue centre for them with segregation of sex to restrict their further breeding.

6.4.2.5 Monitoring & Evaluation

- (i) Regular vegetation monitoring and analysis will be done to see the changes in the quality of habitat and composition of species.
- (ii) The change in habitat use by wild animals will be recorded.
- (iii) Pre weeding and post weeding effects in meadows will be studied by laying down special 5m x 5m quadrants in the area of operation.

6.4.3 Species maintenance/display plan

6.4.3.1 Introduction

The habitat of the sanctuary is appears to be suitable for introduction of a species which once upon a time was native to WLS such as black buck. The present condition of WLS like degraded habitat, domination of Eucalyptus, Prosopis, absence of fencing poor protection does not allow to design a plan for species reintroduction. It is therefore recommended that during this plan representative species like black buck can be displayed in managed enclosure. It will help in promoting eco tourism and awareness generation. After the plan period will be over and if conditions like infrastructure fencing and habitat is improved then species reintroduction plan can be materialized.

6.4.3.2 Objectives

- 1.To promote eco tourism by the display of black buck species which can be a major attractions for visitors being the state animal of Punjab?
- 2.Creation of sense of respect for WL among the people by bridging the gap between people and wild life.
- 3.Accommodating the excess population of black buck present in Deer Park/ Zoo.
- 4.Keeping the rescued/injured animals

6.4.3.3 Limiting factors

- Funds
- Poor Habitat

- Absence of infrastructure
- Lack of technical expertise/Veterinary officer
- Water scarcity
- Administrative hurdles

6.4.3.4 Strategies

- Sign boards explaining about blue bucks will be erected near the enclosure.
- Permission will be taken from CWLW and CZA, Government of India.
- Only a viable and maintainable population will be maintained inside the enclosure.

6.4.3.5 Monitoring and Evaluation

All the animals will be kept under observation of a veterinary officer. The quantity and quality of fodder will be ensured. The social structure of the population will be maintained. The health animals and increase in the number of visitors after opening of enclosure will be taken as indicates.

6.4.4 Wild Life health Management plan

6.4.4.1 Introduction

Wild Life health within WLS is an important aspect of management which is to be taken care of.

Objectives

- 1.To introduce and maintain the wild life health monitoring protocol and disease surveillance system.
- 2.To prevent and control the epizootic disease to the wild animals.
- 3.To improve wild animal rescue and rehabilitation facilities.
- 4.Immunization of all the cattle in the surrounding villages including stray cattle.

6.4.4.3 Limiting factors

Presence of stray animals, lack of expertise and infrastructure, lack of trained staff, lack of veterinary officer

6.4.4.4 Strategy

- (ii) Immediate efforts to drive out stray cattle/ dogs are required immediately from the sanctuary. This prevent any outbreak of contagious disease.
- (iii) Measures should be taken to vaccinate all the cattle of adjoining villages. Immunization should be ensured with certificate or tagging of the animals.
- (iv) Help of local animal husbandry department will be taken for immunization, surveillance, prevention and control. The district level coordination committee meeting can be used as forum for addressing such problems.
- (v) A veterinary laboratory and a modern incinerator will be established at WLS having facilities for sample collection and preservation, equipment & chemicals, basic tests and analysis (blood, urine, faecal, sample, microbiological and histo-pathological testing etc.). The incinerator will be used to burn dead animals/medical waste.
- (vi) All cases of major cattle and poultry disease etc. in adjoining areas will be reported.
- (vii) The health of wild animals will be regularly monitored. Staff will be trained in collection and dispatching the samples and study disease symptoms.
- (viii) A rescue and rehabilitation facility for the treatment of diseased animal needs to be established. This centre must be equipped with necessary animal capturing and tranquilizing devices. Trapping cages dart gum, squeeze cages, ropes etc. will be kept ready for any emergency situation and man-animal conflict. Selected staff will be trained in tranquilization and rescue operations. An herbivore proof enclosure of 2 acre area will be made in compartment no. 20 along the nature trail will be of chain link fencing with one gate with dimensions as per advice of experts. This will be developed as a rehabilitation centre for other wild animals.

6.4.4.5 Monitoring and evaluation

- (i) Regular sample analysis and body health condition studies will be done to monitor any change in health of wild animals.
- (ii) Documentation of disease spread in adjoining villages will also help in monitoring.
- (iii) Regular Census of Wild animals shall also be conducted at least once in 5 year.

6.4.5 Inter-agency Co-Management plan

6.4.5.1 Introduction

The WLS is surrounded by thick human habitation areas from 3 sides and one side is connected to Bir Bhorey Agaul. The control of Bir Bhorey Agaul is under the jurisdiction of territorial forest division. It is required to adopt similar approaches in the working plan/management of territorial forests as well to create a "Corridor" for WL.

6.4.5.2 Objectives

- 1.To prepare an official platform for the cause of WL conservation
- 2.To minimize the adverse impact of conflicting management practices.
- 3.To ensure the better coordination and Institutionalized mechanisms to achieve long term wild life conservation.

6.4.5.3 Limiting factors

Low priority areas in state agenda, different jurisdiction in neighboring forests, need based approval, procedural delay, inadequate coordination among various departments, each of integrated approach, lack of financial support, legal hurdles, shortage of trained staff, low profile of wilderness area, lack of awareness & Extension activities.

6.4.5.4 Strategy

- (i) **Peripheral areas co-management committee:** A quarterly meeting of territorial and wild life division under the chairmanship of CF (south)/CF (PPA) needs to be institutionalized, to discuss all related issues. These may include staff positions, communication measures, forestry operation works in wild life division, analysis of working plan prescriptions, FDA works, man-animal conflict cases in territorial area, combined patrolling, coordinated rescue operations, said intelligence sharing etc.

- (ii) **District level coordination:** The district level coordination committee, as per state government notification no. 34/45/98-Ft iv dated 2.2.1999 should immediately be set up with a view to promote effective interdepartmental coordination for the control of illegal trade in wild life and wildlife products in the state. This committee will work as per guidelines of the said notification.
- (iii) **Creation of the sanctuary level advisory committee** The "Sanctuary level Advisory Committee" has been constituted vide Notification No.34/18/2009-FT-5/458689/1 dated Chandigarh the/10.04.2015. **Annexure 6.3.**

6.4.5.5 Monitoring and Evaluation

The success of these mechanisms can be evaluated against the smoother functioning of the forest, WL, irrigation, Revenue departments, especially on ground level, more reliable data on various parameters and acceleration of the pending activities due to the various administrative hassles.

Chapter-7

ECOTOURISM, INTERPRETATION AND CONSERVATION EDUCATION

7.1 General

The importance of wild life in the survival of human being is not known to all. The involvement of local people, employment generation and least or no disturbances to the WLS are the key issues. It is therefore, essential to make the people aware of its importance. Eco tourism, thus come handy as a tool for wild life management and awareness creation. Facilities of wild life viewing such as nature trail, watch towers and hides should be developed to encourage the people to visit the sanctuary and their sensitization towards wild life. Unfortunately there is no previous history of eco tourism in the Bir Bhadson WLS.

Considering its location on Nabha-Gobindgarh road the area is suitable for strengthening and promoting the ecotourism activities.

7.2 Objectives

Eco tourism or wild life tourism can be tool for helping conservation efforts through involvement of local peopel and awareness generation:-

- a) Involvement of local people in conservation efforts will help in creating a positive interface between PA authorities and people.
- b) Awareness generation among the public especially school children this is another aim of starting eco tourism in the WLS
- c) Involvement of local administration in planning process will help in solving the issues promptly.

7.3 Issues / Problems

- 1)No previous activities of eco tourism.
- 2)Poor wild life sightings.

- 3) Poor extension work.
- 4) Vegetation cover is not very attractive for people.
- 5) Lack of funding and Infrastructure.
- 6) Lack of staff & trained man power.

7.4 The Strategies

New infrastructure and various facilities will be developed in different compartments. A separate nature trail will be developed on which visitors will be allowed. The different zones will be earmarked for the development and promotion of ecotourism in the Bir Bhadson WLS.

7.4.1 Identification of zones

The tourism zone in the sanctuary is covering/passing through the compartment number 1,2,3,4,5,6,7,8,9,12,13,17,21,24 and 25. Tourism zone is shown in **Map-7**

Name of the sub zone Description

- | | |
|--|---|
| 1. Veterinary Enclosure for wild animals | Compartment no. 1 |
| 2. Interpretation centre | Compartment no. 1 |
| 3. Nursery | Compartment no. 3 |
| 4. Bamboo setum/grove | Compartment no. 30 |
| 5. Nature trail | Compartment no. 1, 2, 3, 5, 9, 13, 17, 21, 24, 25 |

7.4.2 Development of Infrastruce / Eco tourism facilities

After the creation /development of infrastructure, habitat improvement and renovation of existing important structure for tourism the eco tourism activities can be started.

1. Interpretation Centre

- An Interpretation Centre will be developed in compartment no. 1 near the entrance of WLS.
- The Interpretation Centre will be designed in a very attractive and natural manner. Help of centre for environment education (CEE), Ahmedabad, GEER Foundation, Gujrat at can be taken in this.

- Interpretation Centre should include audio-visuals, video visuals, voice call machine of the birds and animals for the visitors.
- A souvenir shop will be opened and will be run by local people for sale of souvenirs like caps, photographs, calendar, key rings, posters, books etc. near the interpretation centre in compartment no. 1.
- One touch screen kiosk will be installed to get the information about wild life, plants, animals their distribution, flowering/breeding season etc.
- Day Camps of school students can be allowed with prior permission from competent authority.
- Various theme based photo-galleries will be created viz. Animals, plants, type of forests, impact of anthropogenic activities/ Population over forests, wild life and environment etc.
- Drinking water facility and toilet facilities should be created in interpretation centre complex.

2 Nursery

- A nursery of 0.5 ha. Area will be established in compartment no. 3.
- Area of previous nursery can be used to develop a nursery for developing plants of having importance for wild life, medicinal plants etc. The plants so raised will be used for plants in WLS as well as for public sale. For public it will be an added advantage to get the important plants, local plants and medicinal plants while visiting the WLS.

3 Bamboo grove

- A Bamboo grove will be developed in compartment no. 30 along the nature trail so that visitors can take rest in bamboo grove.
- Benches can be installed in Bamboo grove.
- Different varieties of Bamboo will be planted to display the biodiversity of bamboo.

4 Nature trail

- A nature trail will be developed using fire line/ paths along compartment no. 1, 2, 3, 5, 9, 13, 17, 21, 24 and 25.

- The nature trail will include deer safari, nursery, walk in the jungle, and walk across bamboo grove.
- Plantation of various important species useful for wild life will be done on both the sides. Such as Barh, Peepal, Pilkhan etc. which attracts birds and wild life (list of suggested species is given as **Annexure 7.1**).
- Nature trail will be opened to visitors only after the study of impact of visitors on wild life.
- For visitors the structure of the old fort /Hathi Khana can be renovated, signboards displaying the history of the fort can be raised.
- Forest Rest House "Rani Dhee" located in nearby Bir Bhorey Agaul can be part of eco-tourism activities after coordination with territorial division. There is enough space and other facilities are available at FRH and are highly suitable for camping / simple tourist visits developing an ideal tourism complex.
- No person will be allowed to deviate from the path or feeding to wild animals. A strict vigil will be kept on the visitors entering the WLS and all the rules of Wildlife Protection Act (1972) will be binding on the visitors.

7.4.3 Strategies for the promotion of conservation education

Conservation education is the process of educating people for conservation of flora, fauna, environment and ecology of conservation education for Bir Bhadson WLS will be achieved through eco-tourism, eco-development and interpretation activities beside involvement of schools, villagers and celebration of various events. The following activities are proposed-

- Display of wildlife related movies in nearby schools on a particular day/date after coordination with school authorities. Film shows can be organized in villages after Panchayat meeting to involve the villagers.
- Conducting tours and visits of students and teachers to wild life area's in the state like Chhattbir Zoo, Deer Park, Patiala. Tours can be conducted for wild life areas outside the state also like Corbett National Park, Uttrakhand, Kanha National Park, M.P. etc. to imbibe a real feel of wild life in the young minds.

- Organizing work shops, various competitions, bird watching etc. for schools, colleges city/village residents, other departments to sensitive them towards the wild life and conservation.
Involvement of volunteer students, youth, villagers in rescue operations or post rescue care activities
- People from local villages, students, youths may be involved in land scaping, help to WLS staff in various activities like patrolling, wireless operations, participation in conservation efforts.
- Local people will be promoted to open shops for traditional clothes, food etc to attract visitors outside the WLS area.
- Distribution of certificates, prizes, photographs of wild life in various workshops, competitions etc.
- Distribution of pamphlets, stickers, caps, photographs etc in the schools and to the visitors.
- If possible after permission from competent authority camel/elephant/horse ride may be allowed along the nature trail for specific distance of half or one kilometer. The person will be trained before starting the ride and employment earning should go to locals.

7.5 Regulations, monitoring and evaluation

Regulation and monitoring will be done as follows:-

- Guidelines to be followed in tourism zone will be published and displayed at all locations/important points to generate awareness. Guidelines will be given to all visitors while allowing the entry.
- All the relevant rules and regulations will be obeyed within the WLS area.
- The number of visitors allowed at the time will be fixed per day and no deviations will be allowed.
- A strict vigil will be kept on visitors entering the WLS to prevent any kind of adventurism.
- No visitor will be allowed during night time except prior permission from competent authority for night camping/patrolling with staff.
- All the details of number of tourists per day their educational background, occupation etc. will be maintained and evaluated. The response of visitors for different activities will

be analyzed and accordingly that activity may be promoted or removed.

- Involvement of local people will also be an indicator.
- Local people participation in conservations efforts as guides, shopkeepers, upkeep of WLS etc. will also be a significant indicator.

Chapter-8

ECO DEVELOPMENT

8.1 Introduction

Eco development may understand in the way that it is a process of ecological development of the PA along with socio-economic development the PA. The rationale behind the concept is that socio-economic upliftment of the people dependent on the forest will reduce their dependency and ill effects on PA.

8.2 Issues

The WLS area is surrounded by highly productive agricultural belt most of the people are dependent on the agricultural as their primary occupation. People are self sufficient to fulfill their needs and do not depends on the forests. However, they do involve in illegal grazing, illicit removal of wood and fire wood, trespassing. Most of the stray, weak or drought cattle are dumped in to the WLS for grazing. At the same time crop raiding by wild animals is also an issue.

Hence, the PA-people interface is not very conducive for the WLS as objectives, and interests of the two sides of the WLS are mostly contradictory. Due to their ban in entering WLS and using the resources people are not so friendly with the PA management.

8.3 History of Eco-Development

The area was under the administrative control of territorial forests division and there was no FDA scheme is going on. Therefore, there is no record of eco-development of the nearby areas.

8.4 Specific Issues/Problems

- Low respect for WLS/insensitive attitude of the people
- Low motivation level and poor awareness level
- Illicit fire wood collection / felling
- Man-animal conflict in the form of crop raids
- Illegal grazing and dumping of stray cattle in the WLS
- Decreasing level of ground water
- Unavailability of funds
- Poor staff strength and lack of trained man power
- Institutionalization of such programmes

8.5 Objectives

- To mitigate the biotic pressure over the natural resources of the WLS and eliminating the resource dependency of the local communities after their identification
- To generate alternative livelihood options for the dependent communities through eco-development
- To generate the necessary timber and fire wood for the dependent communities to reduce pressure of illegal removal of fire wood.
- To involve local people in the management of Bir Bhadson WLS to generate a sense of belongingness among them towards WLS.
- To raise awareness among local community for the long term conservation of Bir Bhadson WLS

8.6 General Strategies

A) Constitution of Eco-development committees (EDC)

- Initially the villages having boundary with WLS will be selected to constitute EDC.
- Participatory Rural Appraisal (PRA) exercise will be conducted to know their perception about WL, WLS, problems, their needs etc. They will be allowed to identify and prioritize their needs.
- Care to be taken that landless people and BPL families must be involved in PRA exercise and EDC formation.
- Micro planning will be done first in villages affecting WLS more and having large number of dependent communities.

- The numbers of EDC will be selected by the villagers' works to be undertaken will be decided after discussion between EDC and the department.

B) Addressing administrative, financial and technical constraints

Financial constraints, policy and technical constraints will be taken care of by involving various departments; funds can be raised from state government or through centrally sponsored schemes (CSS) for PAs, National Afforestation programmes, schemes of Zila parishad, Forest Development Agency (FDA), territorial forest division, District planning board etc.

- Visit and study tours of EDC members and staff should be organized to other PA even outside the state, to show them functioning of EDCs and their results.
- Resource persons from such areas and institutions will be invited for experience sharing and motivating villagers.
- People will be provided training and funds to start income generation activities and plantation activities to meet the fuel wood demand.

C) Entry Point Activities (EPA)

- Supply of hand pumps and submersible pumps
- Supply of fuel wood at very cheap rate through forest department /FDC
- Construction of community hall, shed at shamshan ghat, toilets in school etc.
- Supply of milch cattle to land less /BPL families after formation of SHGs
- Supplying stationery / uniforms / shoes to school children
- Construction of cattle proof trench around the farms
- Providing electrical fencing at the cost sharing basis around their fields
- Running a mobile dispensary in nearby villages and free supply of medicines

8.7 Issue wise strategies

A) Stray cattle management

- Efforts will take to eliminate stray cattle and prevent their reentry.
- New Gaushalas (sheds to maintain stray cattle) will be constructed in nearby villages under the EDCs.

B) Problem of crop raiding by Blue bull

- Compensation for crop raids can be provided to the villagers as per crop value and extent of loss through competent authorities.
- Cattle proof trench may be created around the fields through EDCs.
- Special efforts will be taken to plant fodder species and grasses within WLS to meet the demand of WL.

C) Control of monkey population

The population of monkeys has increased tremendously that it has become menace now. Further, people provide them food on main road so most of the time they are sitting on the road which creates nuisance. The strategy to solve the problem will be:-

- Monkey will be translocated to rescue centre with segregation of sex to control their population.
- On main road sign boards will be erected to prevent the people to offer them food.
- The people will be motivated to feed the monkey by funding in rescue centre through EDCs
- Sterilization of male monkeys can also be tried.

D) Illegal removal of fuel wood and its control

- EDCs will be made key agency to provide fuel wood to the dependent communities at cheaper rates through FDC depots.
- EDC will be given share in forest produce extracted from its jurisdiction and as a result of habitat management works with prior approved of CWLW. The EDC will decide how to distribute it among the beneficiary.
- Plantations of fuel wood/fast growing species will be done in common areas of Panchayat to meet the fuel wood demand of dependent communities.

8.8 Table- Financial forecasts

Financial forecasts- Physical/Financial forecast of eco development plan

Sr. No	Activity 2017-18 – 2026-27	Physical target	Financial target	Remarks
1	Identification of target areas (i) PRA exercise (ii) Micro plan (iii) Formation of EDC	All the villages surrounding WLS	11.25 lakhs	15 villages will be covered @ 75000 Rs/village
2	Entry point activities (i) Community assests (ii) Stationary for students (iii) Compensation for crop damage (iv) Mobile dispensary (v) Hand pumps (vi) Plantation	5- Rescue centre (Monkeys) 4 community hall Uniform /Shoe / Stationary cattle proof trecnh 20 Health camps 15 Hand pumps Plantation @ 15 hac/year	50 lakhs 40 lakhs 4 lakhs 30 lakh 10 lakh 30 Lakh/yr	
3	Income Generation activities	All activities proposed	10 lakhs	@ 10,000/ IGA/SHG/ Year
4	Training/ tours	Staff, villagers	10 Lakhs	Lumpsum @ 100000 Rs/year
	Total		196.75 Lakhs	

8.9 Monitoring and Evaluation

For Monitoring and Evaluation issue wise indicators will be set up and results will be analyzed. Participation of people it self will be an indicator. Reduction in the number of crop raid cases, reduction in illegal fuel wood / Head load removal may be other indicators.

Chapter-9

RESEARCH, MONITORING AND TRAINING

9.1 Introduction

The research, monitoring and training are generally the neglected area. At the same time there is no history of specific research and monitoring of the Bir Bhadson WLS. Further, it is also well established that research, monitoring and trainings plays very important role in evaluation and better implementation of the management plan.

9.1.1 Identification of Issues

(A) Research

- Gradual elimination of exotic and invasive species such as Prosopis juliflora
- Impact of Prosopis juliflora on biodiversity/ flora and fauna and habitat of wild life, water table
- Existing food chains and food herbs or any relation ship between different food chains
- No. of bird species visiting/resident of the WLS
- Possibility of any corridor for WL
- Habitat occupancy maps (HOM) for different species
- Socio-economic and ecological impacts of WLS on the nearby villages and vice-versa
- Establishment of a model village /EDC participating in conservation efforts
- GIS/Remote sensing based creation of maps (Digitization of maps/digital maps)
- Establishment of Research plots for regeneration of grasses/habitat improvement

(B) Strategies

- Research plots of appropriate size can be laid at various locations for study the elimination of Prosopis juliflora and impact of prosopis on biodiversity/flora and fauna, habitats water table etc.

- Research plot will be established to study the regeneration of grasses in enclosures
- An ecological study can be done to know the existing food chains and food webs and their interrelationship.
- Inventory of Bird species visiting/resident of WLS should be made to estimate avian biodiversity of the Bir Bhadson WLS.
- Habitat occupancy maps (HOM) should be prepared to know the habitat and niche of different species and their interrelationships.
- Study for possibility of corridor for WL.
- Study to know the socio-economic and ecological impacts of WLS on villages and vice-versa
- Efforts will be made through FSI/IIRS to prepare digital map/digitization of map.

9.2 Monitoring

(A) Identification of issues

- Identification of various indicators for monitoring of research/management activities over a period of time
- The indicators must be biological, ecological, social and economical.
- Monitoring protocols for protection for all level of staff from watcher to DFO
-

(B) Strategies

- Indicators for various discipline viz biological, ecological, socio-economical will be prepared separately to know the impacts
- Protocols for monitoring will be developed for all level of staff
- Monitoring will be done to study the improvement in vegetation cover, increase in the number of animal or birds etc.

- Monitoring methods will be prepared to study the impact of water management, creation of water holes/water body.

9.3 Training

(A) Identification of issues

- Training of all field level staff viz. watcher, forest guard, forester, Deputy Ranger / RFO, Dy. DFO, DFO, about laws, eco tourism, management communication (PDA, wireless etc.), census, rescue operations etc.
- Training of EDC members / villagers for tourist guide, entry point activities, running of souvenir shop etc
- Coordination with various training institutes such as WII, ICFRE, FRI, SFS, IGNFA, Dehradun; PAU, Ludhiana; Punjabi University, Patiala etc.
- Establishing a permanent learning centre for knowledge dissemination.

9.3.1 On the job training

(A) Application of laws and regulations-

- Various trainings will be organized for all level of staff for laws, various related acts useful for the staff to update their knowledge
- Training for laws and procedures will be organized to train the staff about law, filing of cases, court procedure, do and do not s , including procedure for investigation, collection of evidences etc.

(B) Post mortem and wild life health care matters

- Trainings will be provided to field staff about essentials of post mortem, collection & preservation of samples and their dispatch to laboratory.
- Trainings will be organized to provide knowledge to the staff about common disease of animals, animal's health indicators on regular basis.
- Trainings for the staff will be organized to for improving proficiency in identification of WL signs and their interpretation on a regular basis.

9.3.2 Formal training courses

- Formal training courses will be organized or staff will be allowed to join these courses to upgrade their skills, better scientific management in various disciplines like conservation, GIS and computer applications, law and procedures, ecotourism etc.
- Help of various institutes like WII, Dehradun, Police department etc will be taken to train the staff in field research techniques, weapon handling and maintenance etc.

9.3.3 Establishment of a learning centre

A learning centre will be established at Bir Bhadson WLS as a part of continuing informal and formal training, platform of experience sharing etc.

CHAPTER-10

ORGANISATIN AND ADMINISTRATION

10.1 Structure and Responsibilities

Structure

(A)The Staff strength is not very adequate as per requirement of the field. For better management following staff strength is prescribed for Bir Bhadson WLS-

Tree Diagram

DFO (WL)-1



Dy. DFO-1



Range Forest Officer-1



Dy. RFO/ Forester-1



Forest Guards-4



Watchers/ Daily Wagers (As per requirement)



Computer Technician-1



Social facilitator (at division level)-1



Veterinary Officer-1

* The post of RFO and below is exclusively suggested for WLS.

Responsibilities

The hierarchical responsibilities of the man power is given below:-

DFO (WL)	-will be the overall incharge of the Division DFO will Supervise all the activities and Coordinate with higher authorities.
Dy. DFO (WL)	- Dy. DFO will be the incharge of vigilance Squad. The Dy. DFO will supervise all the staff under him and field requirements. The Dy. DFO will coordinate between staff and DFO.
RFO	- will be the incharge of wildlife Range and execute all the works within the WLS.
Dy. RFO/Forester	- will act under RFO to help him in execution of work, Protection, Investigation and court cases.
Forest Guards	- will be incharge of beats and will be responsible for all the works and protection of beat.
Watchers/Daily Wagers	-will be employed on Protection/ Patrolling duties and other field works under the supervision of Forest Guards.
Computer Technician	-will maintain all the record in computer, GIS data, digital maps etc. in the Division office.
Wireless operator	- will be the incharge of wireless communication.
Veterinary officer	- will deal with the animal health issue, postmortem of dead animals rescue operations etc.
Social facilitator	- will be appointed for the establishing links with local people framing eco-development activities and arranging meetings with wildlife functionaries.

10.2 Staff Amenities.

The Bir Dosanjh WLS does not have any infrastructure for staff. The availability of housing and other facility will enable the staff to perform their duties more efficiently.

A) Amenities, Infrastructure, Uniform, Weapon and communication

- Each staff be provided a accommodation near to the WLS area as far as possible.

- Transport facilities up to Forest Guard should be provided for effective execution of work and patrolling. Bike to Forest Guard/ Foresters and bicycle to watcher/ Daily wagger must be given.
- A four wheel vehicle like Gypsy/ Jeep may be made available at WLS to meet any emergency/ rescue operation etc.
- Check posts, watch towers, tube well rooms will be renovated.
- Facilities like safe drinking water, furniture, electricity, field kit will be provided to all the staff.
- Uniforms along with a field equipments viz. binoculars, measuring tape, compass, Khukri, field boots, warm clothing in winters must be provided as per state forest manual.
- All the staff must be given the uniform, arms and training to use arms. Necessary amendments in the relevant acts may be sought through competent authorities.

(B) Incentive and Rewards

- A special pay must be given to all the field staff for encouraging the staff. The provisions of GOI for special pay must be explored and implemented.
- Rewards/ incentive or commendation certificate should be given to the staff for meritorious work done to motivate the staff. The DFO (WL) may give citation/ certificate to the meritorious staff.
- The provisions for awards available at central government level should be explored and applied as per procedure for officials and non officials.
- A corpus fund can be created for the welfare of WLS by the WLS authorities or the families of Staff working in Sanctuary. This corpus fund may be used as welfare fund/ to run the Souvenir shop.

Chapter-11

The Budget

11.1 The Plan Budget

The plan budget refers to the budget required to operate the management plan strategies irrespective of classification of funds. As funding is the main running force for the implementation of a plan. The budget is always a constraint for the management of the Bir Dosanjh WLS. Presently no separate fund is available exclusively for the sanctuary which is the main hurdle to undertake developmental work. The only paltry funding is available from Punjab Government under non-plan budget for all sanctuaries.

For proper funding various schemes of Government of India, State government, International agencies must be explored:-

1 Funds will be sought central government/ state government schemes/ other projects:-

- (i) Under CSS scheme of Integrated Development of Wildlife Habitat (IDWH)
 - (ii) Puncampa
 - (iii) Green India Mission
 - (iv) Green Punjab Mission
 - (v) Grants form GOI
 - (vi) Under NAP programme of NAEB
 - (vii) Under intensification of Forest Management of MoEF.
 - (viii) CZA funds
 - (ix) MGNREGA
- 2 The various schemes of territorial forests division can be explored such as compensatory afforestation etc.

- 3 Funds can also be sought through research, project from Department of science and technology, etc.
- 4 All the developmental schemes will be must be linked with eco-development. A special component must be allocated to the eco-development of villages at the periphery of the WLS.
- 5 Uniforms, shoes, equipments etc. should be purchased through collaboration with NGOs and other agencies.
- 6 A WLS welfare society can be formed to secure the funding through various agencies.

11.2 Planning of activities

The Financial forecasts for the plan period 2017-18 to 2026-27 has been given in **Annexure 11.1**

Chapter-12

THE SCHEDULES OF OPERATIONS AND MISCELLANEOUS REGULATIONS

12.1 The Schedule

All the proposed activities under the management plan will be completed over the plan period in a phased manner. Annual plan of operations will be made and all physical targets and financial targets will be achieved. The budget will be achieved timely so that the schedule of work should not suffer.

12.2 Record of Deviations and Implemented targets

There may be instances where annual plan of operations or management interventions may be allowed to deviate for necessary reasons. These deviations proposals will be recorded in a "Sanctuary Book" and approval will be taken from competent authority. There may be some new strategies develop over a period of time. These new strategies will also be recorded in Sanctuary book maintained at Division level. A separate book will be kept for each strategy proposed and undertaken and all the physical and financial targets, achievements; operational problems will be recorded in those books. These books will help in the evaluation of work done and their progress. At range level also a book must be maintained.

12.3 Record of Employment Potential

All the posts whether permanent or temporary will be recorded. At the same time employment generated will also be recorded as per details of strategy, work done, man days generated, season, period taken etc. at Division level and range level.

12.4 Control Forms

Different Control forms for different strategies will be maintained at range level and Division level. These forms will help in monitoring of the various activities the Control forms to be used are given in **Annexure 12.1 (seven control forms)**.

12.5 Maintenance of Compartment History.

The System of maintaining the compartment history shall be revived. It will provide the information about the works done, treatment given to particular compartment and corresponding results over the years. The information will be recorded in format given as **Annexure 12.2** on annual basis. A copy will be maintained at Forest Guard level and another at Division level.

12.6 Pocket field guide for plan Implementation.

A field action document in the form of pocket guide will be designed and be given to all the field staff. The size of pocket guide will be 16 cm X 10cm. The field guide must include compartment detail, the objective of each strategy, important maps, field observations etc.

Annexure 1.1

Copy of Notification No.F-150/50 dated 28.2.1952 published in Patiala and East Punjab State Union Government Gazette Extraordinary dated 9-3-1952 part I-sec. I page 1954

AGRICULTURE & FORESTS DEPARTMENT NOTIFICATION

No.F-150/50 dated 28-2-1952.

In exercise of the powers conferred by sub-section (I) of Patiala Act, 1996 (No.I of 1996) and in super session of Notification No.I appended to the printed copy of the preservation faunae of Patiala order 2006 this highness the Rajpramukh is pleased to declare the following forest areas in the State to be Wild Life Sanctuaries, namely:-

1. Tara Devi
2. Karoi
3. Chail and Pashgaon
4. Bir Motibagh
5. Bir Shikargarh
6. Bir Bhunerheri
7. Bir Mehswala
8. Doshanjan
9. Bhadson and Aishwan
10. Bhupinder Sagar.

JAIDEV SINGH
Secretary to Government

Annexure 1.2

**AGRICULTURE DEPARTMENT
FORESTS
NOTIFICATION
The 5th July, 1961**

No. 2026/Ft. (IV)-61/3654- In exercise of the powers conferred by the provision to sub-section (3) of section 29 of the Patiala Forest Act 1999 (No.VII of 1999 BK) and all other powers enabling him in this behalf, the Governor of Punjab is pleased to declare the area of Government Birs demarcated by boundary pillars, whether under tree growth or not, described in the following schedule to be Second Class Forests.

SCHEDULE

	District	Tehsil	Name of Bir	Hadbast No.	Description Khasra Nos.	Area in acres
	1	2	3	4	5	6
1	Patiala	Patiala	Bir Bhunerheri	154	1 to 152	2058
2	--do--	--do--	Miranpur	267	1 to 92	839
3	--do--	--do--	Bir Sarkar (Kheri Mallah)	76	1 to 14	159
4	--do--	--do--	Bir Ghogpur (Bhagwanpura)	263	1 to 32	274
5	--do--	Rajpura	Bir Chaat	285	1 to 22, 23-min 24 to 28, 29-min, 30, 31. 32 min, 33min, 34 min, 35 to 37, 38min, 39 min, 41 to 52, 54, 56, 58 to 64	606
6	--do--	Patiala	Bir Kule Majra	143	1 to 23, 60/24, 25/1, 61/25, 64/26, 66/37, 68/29, 70/32, 33 to 36/3 72/37, 33 to 58	694
7	--do--	--do--	Bir Kheri Gujran	34	195 to 315	176
8	--do--	--do--	Bir Sanaur	121	1 to 54,	330
9	--do--	--do--	Bir Majal	207	1 to 23/1	291
10	--do--	--do--	Bir Motibagh	67	1 to 73	1296

11	--do--	Nabha	Bauran	203	1 to 6 8 to 11, 17, 18, 242/29, 243/29, 48 To 50, 52 to 57, 59, 287/61, 289/61 294/62, 63, 64 253/64, 253/65, 255/69, 258/70 min, 71 min, 72 to 77, 79, 81 to 99, 100 min, 106 min 107 to 109, 111 to 117	997
			Annhi Dehrian (Mashmula Nabha-Khas)		3,5,7 & 16, 2091	1013
11	Patiala	Nabha	Bauran	203	1 to 6, 8 to 11, 17, 18, 242/29, 243/29, 48 to 50, 52 to 57, 59, 287/61, 289/61, 294/62, 63, 64, 253/64, 253/65, 255/69, 258/70 min, 71 min, 72 to 77, 79, 81 to 99, 100 min, 106 min, 107 to 109, 111 to 127	997
			Annhi Dehrian (Mashmula Nabha-Khas)		Khasra Numbers 3, 5,7 and 16, 2091	1013
12	--do--	--do--	Bir Doshajhan	207	7 To 22,23 min, 33 min, 39 min, 41 min, 42 min, 43 to 47, 48 min, 49 to 55/1, 57, 58 min, 59 min, 61 min, 139/62,65, 149/63, 75 min, 88 to 83, 84 min 85 to 87, 157/88, 159/88, 155/89 min, 90 min, 161/91, 92 min, 93 to 126.	1279

13	--do--	--do--	Bir Mehas		188, 169/3, 4, 180/5, 185/8 196/9, 199/16, 11, 12, 15, 17 to 32, 200/33, 34, to 207/33, 34, 36, 38 to 46, 48 to 61, 72, 75 to 78, 115 to 128.	
			Bir Mohshmula Nahba		Kharra No. 1331, 2614 and 2753	4/524
14	Patiala	Nabha	Bir Bhadson	142	1 to 157	2662
15	--do--	--do--	Bir Agaul	167	1 to 172, 174	2931
16	--do--	--do--	Bir Amlah	27	1, 27 min, 44 min, 51, 58 min, 59 to 62, 248/63, 64, 249/65, 259/65, 264/147, 266/65, 279/65, 71, 96, 111, 282/147, 14, 389/152, 153, 390/154,	
17	Sangrur	Sangrur	Bir Aishban	38	1 to 17, 18 min, 20 min, 21 min, 23	661

No. 2026/Ft-IV-61/3655- Whereas by Punjab Government Notification No. 2026/Ft- (IV)-61/3654, dated the 5th July, 1961, certain Government waste lands demarcated by boundary pillars whether under tree growth or not as mentioned in the Schedule annexed to the said notification have been declared to be II Class Forests under section 29 of the Patiala Forest Act, 1999-BK.

Now, therefore, the Governor of Punjab in exercise of the power conferred by Section 30 of the said Act is pleased:-

- (i) to declare all tree standing upon those lands to be reserved the date of Publication of this notification in the official Gazette; and
- (ii) to prohibit from the same date, the quarrying of stones, bur of lime or charcoal or collection or subjection to any ring process, or removal of any forest produce in the said Forests and the breaking up or clearing for cultivation for building, herding cattle or for any purpose, of any land any of the said Forests.

No.2026/Ft-(IV)-613656- whereas by Punjab Government notification No.2026/Ft-(IV)/3654 dated the 5th July, 1961 certain Government waste lands whether tree growth or not mentioned in the Schedule annexed to the said notification has been declared to be Second Class Forest under section 29 of the Patiala Forest Act, 1999-BK

Now, therefore, in exercise of the powers conferred section 52 of the Act, The Governor of Punjab is pleased to make the

following rules applicable lands specification in the schedule of the aforesaid notification:-

RULES

- 1 No person shall cut, saw, convert and remove trees and timber and cell manufactures and remove forest produce from these area concepts with the premise of the Divisional Forest Officer concerned.
- 2 No person shall clear and break up land for cultivation or for others purposes with the permission of the Divisional Forest Officer concerned will consult conservator of Forests concerned, before according such permission.
- 3 No person shall cut grass and pasture any cattle without the previous permission of the Divisional Forest Officer provided the right holders entitle to graze their cattle according to the entries in the Revenue recording may graze their cattle in the thrown openby the said officer for exercise of the right by the right holders.
- 4 No person shall set fire, or kindly a fire without taking reasonable permutations to prevent its spreading to any tree reserved- vide Punjab Government Notification No.2026/Ft/(IV) 61-3654, dated 5th July, 1961 whether standing, felled or fallen or any portion of the said forests.
- 5 No person shall leave burning any fire kindled by him in the vicinity or any such tree of the said forests.
- 6 No person shall fell any tree or drag any timber so as to damage any tree reserved as aforesaid.
- 7 Fishing, hunting and shooting is prohibited except with the permission of the Divisional Forest Officer Concerned.

Annexure 1.3

SWOT ANALYSIS

STRENGTH	OPPURTUNITY
<ol style="list-style-type: none"> 1. Rich biodiversity area amidst agriculture background 2. Learning centre for common especially local people. 3. Remnants of indigenous animal species like blue bull, sambar, jungle cat, jackals found 4. Shelter for many local native birds, reptile and other small invertebrates 5. In-situ as well as Ex-situ conservation unit 	<ol style="list-style-type: none"> 1. Considerable size to provide long term conservation 2. Investment can give good results like restoration of area 3. Can be developed as tourism destination for the region 4. Research and studies can be taken up as area is accessible and compact. 5. Local people can get economical and social benefits by promoting it.
THREATS	WEAKNESS
<ol style="list-style-type: none"> 1. High level of external disturbance in the area due to its proximity to town 2. Increasing monkey population 3. Encroachment/ Expansion of Agriculture 4. Low priority in state level agenda 	<ol style="list-style-type: none"> 1. Invasive species like Prosopis etc. 2. Monoculture of Eucalyptus, Mesquete. 3. Stray domestic cattle, dogs 4. Less habitat diversity 5. Water is liming factor 6. Objectives of other agencies are not in harmony with conservation

Annexure 1.4

Summary data of Bir Bhadson WLS

Date of Establishment	Notification No 2026/Ft(IV)-61/3654 dated 5 July, 1961
Area	1022.63 ha
Biotic Province	4A (Punjab plains)
Location	District: Patiala Latitude: 30°30' to 30°35' East; Longitude: 76°10' to 76°15' North, Nearest town/Rail/ HQ: Nabha (20 km) Nearest airport: Chandigarh (105 km)
Topography	Altitudinal range: 0 to 25 m Temperature: 3.5° C to 44.5° C Average Rainfall: 870 mm
Vegetation	Subtype E8 Saline and alkaline scrub Savannah
Fauna	Mammals: Blue Bull, Jungle cat, Jackal, Black naped hare Birds: Grey Partridge, Peafowl, Rose ringed parakeet, spotted owlet. Reptiles: Cobra, Rat snake, Monitor lizard,
Cultural Heritage	In the past Bhadson WLS Hunting ground of erstwhile princely state of Nabha
Management details	<ol style="list-style-type: none"> 1. Weeding invasive and non-native weeds like Prosopis, 2. Digging tube wells to supply water to wildlife during summers 3. Fencing to avoid herbivores crossing boundaries and damaging agricultural crops and also to discourage stray cattle from entering in to WLS 4. Catching and shifting Rhesus monkeys' out of WLS 5. Reintroduction of native species like Black buck, Cheetal etc. 6. Growing food, fruit and grasses and other legumes which is useful diet for wildlife
Human pressure	Surrounded by thickly populated areas
Information for visitors	When to visit -November to February (except breeding season); where to stay -Hotel , Guest Houses, Forest Rest House etc.
Approach	30 kms from main Patiala City 20 kms from Nabha Town 08 kms from Amloh Town
Contact Details	DFO (WL) Opposite Mini Secretariat, Jail Road, Patiala. Conservator of Forests (WL), Parks and PA Circle, Punjab, Forest Complex, Sector 68, SAS Nagar. Chief Wild Life Warden, Punjab Forest Complex, Sector 68, SAS Nagar.

Annexure 2.1**Annual Rainfall (mm) in Tehsil Nabha**

Month	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Average rainfall (month wise)
April		36.00	22.00	22.00	0.00	0.00	34.00	3.00	22.60	25.00	0.00	16.46
May		1.00	84.00	24.00	0.00	19.00	1.00	0.20	38.00	6.00	61.00	23.42
June		66.00	242.00	51.00	57.00	240.00	3.00	125.00	53.00	82.00	63.50	98.25
July		48.00	46.00	126.00	419.50	49.00	73.00	54.20	54.00	256.20	140.90	126.68
August		41.00	107.00	108.00	167.00	121.00	116.20	97.10	22.00	183.20	163.60	112.61
September		94.00	157.00	51.00	262.00	82.00	57.40	27.40	101.00	106.00	0.00	93.78
October		0.00	0.00	0.00	0.00	0.00	0.00	6.40	10.00	12.00	0.00	2.84
November		0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	0.00	0.00	0.14
December		1.00	0.00	0.00	37.00	6.00	9.80	16.80	46.00	0.00	4.50	12.11
January		3.00	1.00	4.00	8.00	12.00	5.40	65.20	9.20	0.00	54.70	16.25
February	0.00	1.00	15.00	10.00	3.00	0.00	36.80	32.00	29.00	8.00	0.00	12.25
March	37.00	0.00	25.00	0.00	20.00	0.00	24.20	54.00	82.20	83.00	20.00	31.40
Total Annual Rainfall	37	291	699	396	973.5	529	360.8	482.7	467	761.4	508.2	

Annexure 2.2

Temperature Data (°C) of Patiala District

Month/ Yr	2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
January	18.1	5.7	25.1	5.2	26.2	3.4	25.3	2.9	27.1	3.9	22.7	3.1	26.3	4.1	23.0	3.3	25.4	3.7	22.7	2.8	24.7	3.2
February	20.0	9.7	27.3	6.1	26.3	3.2	29.7	4.3	24.7	3.4	25.2	4.1	27.2	3.7	26.5	4.1	27.3	2.9	25.6	3.2	27.6	3.7
March	27.6	13.7	29.0	74.1	28.7	6.9	30.2	7.2	28.4	6.4	29.3	6.1	28.5	7.5	32.3	7.8	29.6	6.9	27.7	6.7	30.7	6.9
April	40.5	14.1	40.0	14.2	41.1	11.3	42.3	13.1	42.7	12.7	40.7	13.7	43.3	14.7	42.9	13.7	41.7	13.1	42.7	12.9	40.9	11.7
May	42.6	17.9	43.1	19.2	41.9	18.7	44.3	18.1	43.3	17.7	41.7	17.0	43.3	19.1	42.9	18.3	44.5	15.5	43.2	18.9	41.8	17.9
June	44.6	24.1	41.9	22.1	43.7	23.2	44.1	24.3	42.9	23.7	44.2	23.9	43.9	24.0	43.0	22.7	44.1	23.9	43.9	23.2	43.3	23.1
July	41.6	21.9	40.7	21.7	41.6	23.6	42.7	24.2	41.7	22.7	42.3	27.2	39.3	23.7	40.7	22.3	41.9	23.7	42.4	22.9	41.9	23.4
August	39.1	21.6	40.3	23.0	36.7	22.1	38.5	22.9	37.6	23.0	39.2	23.3	36.9	22.7	37.9	21.7	38.7	22.7	36.7	22.2	40.2	23.5
September	36.2	16.9	34.9	17.7	32.8	21.7	33.7	19.4	35.6	19.3	34.9	19.7	33.9	18.3	32.6	17.9	37.5	19.1	33.9	18.3	34.6	17.7
October	27.9	10.6	34.3	12.7	35.5	17.7	33.7	12.9	32.9	13.4	35.3	12.3	36.2	13.6	33.6	13.9	34.7	14.1	33.9	13.2	35.2	13.9
November	32.1	16.6	33.7	9.9	28.7	23.0	31.2	8.5	29.6	7.8	30.3	8.6	28.6	6.9	28.3	6.3	30.2	8.2	27.5	7.5	28.9	17.4
December	21.8	6.2	25.3	2.7	24.0	9.9	25.5	4.2	24.4	3.7	24.0	4.6	31.1	2.9	27.3	3.9	25.5	3.9	24.6	4.3	24.2	3.3

Annexure-2.3

LIST OF TREES, SHRUBS AND GRASSES of BIR BHADSON WLS, PATIALA

(BOTH INDIGENOUS AND EXOTIC)

<u>S.No.</u>	<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>	<u>Habit</u>
	TREES			
1	Arjun	<u>Terminalia arjuna</u>	Combretaceae	A large evergreen tree.
2	Ber, Beri	<u>Zizyphus mauritiana</u>	Rhamnaceae	A fruit tree.
3	Barh	<u>Ficus benghalensis</u>	Urticaceae	A large sized deciduous tree.
4	Bahera	<u>T. belerica</u>	Combretaceae	A large evergreen tree.
5	Bel	<u>Aegle marmelos</u>	Rutaceae	Evergreen armed tree.
6	Dhak, flame	<u>Butea monosprema</u>	Leguminosae	A moderate deciduous tree.
7	Hins	<u>Capparis sepieria</u>	Urticaceae	A large sized deciduous tree.
8	Jand	<u>P. cineraria</u>	Leguminosae	Deciduous tree.
9	kikar	<u>Acacia nilotica</u>	"	A moderate to large deciduous thorny tree
10	Kala siris	<u>Albizia lebbeck</u>	Leguminosae	A medium sized deciduous tree
11	Karaunda	<u>Carissa carandas</u>	Apocynaceae	A large sized deciduous tree.
12	Khajoor	<u>Phoenix dactylifera</u>	Arecaceac	Evergreen tree

13	Lasura	<u>Cordia dichotoma</u>	Boraginaceae	A medium sized tree.
14	Mesquite	<u>Prosopis juliflora</u>	Leguminosae	A shrub to middle sized thorny tree.
15	Mulberry, Toot	<u>Morus alba</u>	Urticaceae	A small deciduous tree.
<u>S.No.</u>	<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>	<u>Habit</u>
16	Neem	<u>Azadirachta indica</u>	Meliaceae	A large sized evergreen tree.
17	Phalahi	<u>Acacia nilotica</u>	Leguminosae	A small to middle sized thorny tree
18	Pipal	<u>Ficus religiosa</u>	Urticaceae	A large sized deciduous tree.
19	Rehru	<u>Acacia leucophloea</u>	Leguminosae	A small sized shrub or tree
20	Safeda or Mysore gum	<u>Eucalyptus hybrid or E.tereticornis</u>	Myrtaceae	A large sized evergreen tree.
21	Shisham, Tahli	<u>Dalbergia sissoo</u>	Leguminosae	A large sized evergreen tree.
22	Simbal	<u>Bombax ceiba</u>	Malvaceae	A medium sized tree.
23	Teak, (Sagwan)	<u>Tactona grandis</u>	Verbanaceae	A large sized deciduous tree.
	SHRUBS			
1	Ak	<u>Calotropis procera</u>	Asclepidaceae	A shrub
2	Bathu	<u>Chenopodium album</u>	Chenopodiaceae	A annual weed
3	Bhang	<u>Cannabis sativa</u>	Urticaceae	A tall annual weed.
4	Kaui	<u>Capparis decidua</u>	Capparidaceae	A thorny shrub
5	Karaunda	<u>Capissa spinariun</u>	Apocynaceae	-do-
6	Puthkanda	<u>Achyranthes aspera</u>	amaranthaesae	An erect shrub
7	Mallah	<u>Ziziphus nummularia</u>	Rhamnaceae	A bushy shrub
8	Giloe	<u>Tinospora malabarica</u>	Menispermaceae	A twining large sized climber

<u>S.No.</u>	<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>	<u>Habit</u>
	GRASSES			
1	Anjan	<u>Cenchrus ciliaris</u>	Urticaceae	A perennial grass
2	Dib	<u>Desmostachya bipinnara</u>	-do-	-do-
3	Khabbal	<u>Cynodon dactylon</u>	-do-	-do-
4	Kahi	<u>Saccharum spontaneum</u>	-do-	-do-

The list is not exhaustive

Annexure -2.4

CHECK LIST OF WILD ANIMALS OF BIR BHADSON WLS, PATIALA

Sr. No.	Common Name	Scientific Name	Status & Schedule
1	Blue bull	<i>Boselaphus tragocamelus</i>	Schedule -III
2	Common Indian Hare	<i>Lepus nigricollis</i>	Schedule-IV
3	Common Mongoose	<i>Herpestes adwardsi</i>	Schedule-II, Part-II
4	Common house rat	<i>Rattus rattus</i>	Schedule-V
5	Common squirrel	<i>Funambulus pennantii</i>	Schedule-II, Part-II
6	Cobra	<i>Naja naja</i>	Schedule-II, Part-II
7	Indian Porcupine	<i>Hystrix indica</i>	Schedule-IV
8	Jackal	<i>Canis aureus</i>	Schedule -II, Part-II
9	Krait	<i>Bungarus caeruleus</i>	Schedule -II, Part-II
10	Monitor Lizard	<i>Varanus spp.</i>	Schedule-I, Part-II
11	Rhesus Monkey	<i>Macaca mulatta</i>	Schedule-II, Part-I
12	Viper	<i>Daboia russelii</i>	Schedule -II, Part-II
13	Wild cat	<i>Felis chaus</i>	Schedule -II, Part-II

The list is not exhaustive

Annexure 2.5

**CHECK LIST OF WILD BIRDS OF BIR BHADSON WILDLIFE
SANCTUARY, PATIALA**

Sr.No.	Common Name	Scientific Name
1	Pond Heron	<i>Ardeola grayii</i>
2	Cattle Egret	<i>Bulbulcus ibis</i>
3	Blackwinged kite	<i>Elanus caeruleus</i>
4	Brahminy kite	<i>Haliastur indus</i>
5	Shi-kra	<i>Accipitar badius</i>
6	Black partridges	<i>Francolinus francolinus</i>
7	Grey partridges	<i>Francolinus francolinus</i>
8	Pea fowl	<i>Pavo cristatus</i>
9	Red wattled lapwing	<i>Venellus leucurus</i>
10	Indian ring dove	<i>Streptopelia decocto decocto</i>
11	Spotted Dove	<i>streptopelia chirenis</i>
12	Large Indian Parakeet	<i>Psittacula egyptia</i>
13	Rose Ringed Parakeet	<i>Psittacula krameri</i>
14	Black drongo	<i>Dicrurus adsimiliss</i>
15	Pied Myna	<i>Strunus contra</i>
16	Bank Myna	<i>Acridotheres ginginianus</i>
17	House Crow	<i>Corvus splendens</i>
18	Indian Robbin	<i>Corvus corax</i>
19	Red vented Bulbul	<i>Pucnonotus café</i>
20	Common Babbler	<i>Turdoides caudatus</i>
21	Jungle Babbler	<i>Turdoides Striatus</i>
22	Magpie Robin	<i>Copsychus saularis</i>
23	Purple Sunbird	<i>Nectarinia asiatica</i>
24	House sparrow	<i>Passer domesticus</i>
25	Indian weaver bird	<i>Ploceas phillippinus</i>

26	Red Munia	<i>Estrilda amandava</i>
27	Brahmany Mynah	<i>Strunus pagodarun</i>
28	Tailor Bird	<i>Orthothomous sutorius</i>
29	Koel	<i>Eudyanamy scolopacea scolopacea</i>
30	Hoopoe	<i>Upupa epopus</i>
31	Cockoo	<i>Clamator jacobiana</i>
32	Pariah Kite	<i>Malvus migrana</i>
33	Red Vented Bulbul	<i>Pucnonotus badius</i>
34	Black Drongo	<i>Dicrurus adsimiliss</i>

The list is not exhaustive

Annexure 3.1
List of Plantations in Bir Bhadson Wildlife Sanctuary

Sr. No.	Year	Location/ Compartment	Area (Hac)	Species	Success/ Failure
1	1998-99	PLDRC area	100	Shisham, Safeda Siris, Safeda	Success (70%)
2	2000-01	PLDRC area	44	Shisham, Mesquite	Success (50%)
3	2002-03	PLDRC area	8	Shisham, Teak	Success
4	2003-04	PLDRC area	6	Shisham	Success
5	2003-04	C. No.-38,40	15	Shisham, Mesquite, Eucalyptus	Success
6	2003-04	C. No.-19,25	11	Shisham, Mesquite	Not successful (25%)
7	2003-04	PLDRC area	3	Shisham	Success
8	2003-04	C.No.-19	4	Jamoa	Not Successful (30%)
9	2004-05	PLDRC area	7	Shisham, Eucalyptus, Mulberry	Successful
10	2004-05	PLDRC area	5	Shisham, Eucalyptus	Success
11	2004-05	C.No.-11	10	Amla, Beri, Sukchain, Bel	Success
12	2004-05	C.No.-40	5	Beri, Jand, Mesquite	Success
		Total	218		

(Source: - Field data by staff of Bir Bhadosn WLS)

Annexure 3.2

Village wise list of No objection Certificate issued for Arms licence within 10 km of Bir Bhadson WLS

Sr. No	Name of village	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	Alowal	-	-		2	1	-	-	-	-	-	-
2	Agol	1	-	2	1	-	1	-	-	-	-	-
3	Alampur	-	-	-	-	-	-	-	-	-	-	-
4	Akalgarh	1	-	-	-	-	-	-	-	-	-	-
5	Bhadson	-	3	1	4	1	-	-	-	3	-	-
6	Bhari Panacha	-	1	-	1	-	-	-	1	-	-	-
	Bishanpura				-	1	-	-	-	-	-	-
7	Bugga Khurd	-	-	-	-	-	-	-	-	-	-	-
8	Babarpur	-	-	-	-	-	-	-	-	-	-	-
9	Behbal pur	-	-	-	2	-	-	-	-	-	-	-
10	Bhojo Majri	-	-	-		-	-	-	-	-	-	-
11	Jhambali	-	2	2	3	-	-	-	1	-	-	-
12	Chaswal	1	-	2	1	-	2	-	-	-	-	-
13	Channa Nathuwala	-	-	-	-	-	-	-	-	-	-	-
14	Chahal	-	-	2	-	-	2	-	-	-	-	-
15	Dittupur Jattan	-	-	-	-	-	-	-	-	-	-	-
16	Dadralla Khrauda	-	-	-	-	-	-	-	-	-	-	-
17	Dakonda	-	-	-	-	-	-	-	-	-	-	-
18	Durgapur	3	-	1	-	-	-	-	-	-	-	-
19	Fatehpur	-	-	-	-	-	-	-	1	2	-	-
20	Faizgarh	-	-	-	-	-	-	-	-	-	-	-
21	Ghundar	1	-	1	-	-	-	-	-	1	-	-
22	Gobindpura				1	1	-	-	-	-	-	-
23	Hakimpur	-	-	-	-	-	-	-	-	-	-	-
24	Halla	-	1	-	-	-	-	-	-	-	-	-
25	Halotali	-	-	-	-	-	-	-	-	-	-	-
26	Harigarh	-	-	-	-	-	-	-	-	-	-	-
27	Jatival	-	1	-	-	-	-	-	-	-	-	-
28	Jassomajra	-	2	-	-	-	-	-	-	-	-	-
29	Jindalpur	-	-	-	-	-	1	-	-	-	-	-

30	Kansaha Khurd	-	-	-	-	-	-	-	-	-	-	-
31	Kameli	-	-	-	-	-	-	-	-	-	-	-
32	Kalar Majri	-	-	1	1	-	-	-	-	-	-	-
33	Kalsana	-	-	-	-	-	-	-	-	-	-	-
34	Khanoura	3	1	1	3	-	-	-	-	1	-	-
35	Kheri Jattan	-	-	-	-	-	-	-	-	1	-	-
36	Kishangarh	-	-	-	-	-	-	-	-	-	-	-
37	Khijarpur	-	-	-	-	-	-	-	-	-	-	-
38	Lubana Tekku	-	-	-	-	-	-	-	-	-	-	-
39	Lot	-	-	-	-	1	-	-	-	-	-	-
40	Mungo	-	-	-	-	-	-	-	-	-	-	-
41	Mangewal	-	-	1	1	-	1	-	-	-	-	-
42	Matorada	-	-	1	-	-	1	-	-	-	-	-
43	Malewal	-	1	-	-	-	-	-	-	-	-	-
44	Nanowal	-	-	-	-	-	1	-	-	-	-	-
45	Nanoki	-	-	-	-	-	-	-	-	-	-	-
46	Nohra	-	-	-	-	-	-	-	-	-	-	-
47	Palia	-	-	1	-	-	-	-	-	-	-	-
48	Puniwal	1	2	-	-	-	-	-	-	-	-	-
49	Pedni	-	-	-	-	-	-	-	-	-	-	-
50	Rampur Sahiwal	-	1	-	-	-	-	-	-	1	-	-
51	Ranno	-	-	-	-	-	-	-	-	-	-	-
52	Raisal	-	-	1	-	-	-	-	-	-	-	-
53	Ramgarh	-	-	2	-	-	-	-	-	-	-	-
54	Ramsingh nao	1	3	2	2	-	-	-	2	-	-	-
55	Shahpur	-	-	-	-	-	-	-	-	-	-	-
56	Saholi	-	-	-	-	-	-	-	-	1	-	-
57	Sudhewal	-	-	-	-	-	-	-	-	-	-	-
58	Sakrali	1	-	3	-	-	-	-	2	-	-	-
59	Simbro	-	-	-	-	2	-	-	-	-	-	-
60	Sadnoli	-	-	-	-	-	-	-	-	1	-	-
61	Toderwal	-	-	-	-	-	-	-	-	-	-	-
62	Tohra	1	-	-	1	1	-	-	-	-	-	-
63	Tarkheri	-	1	-	3	-	-	-	-	-	-	-
	Total	14	19	24	26	8	9	0	7	11	0	0

Annexure 3.3

Details of Staff in O/O DFO (WL) Patiala

S.No.	Designation	Sanctioned Cadre	Present strength	Required strength
1	DFO (WL)	-	-	1
2	Deputy DFO (EACF)	1	1	1
3	Range Forest Officer(RFO)	3	1	3
4	Dy Ranger	1	3	1
5	Community Development Officer	-	-	1
6	Assistant Medical Officer / veterinary pharmacist	-	-	1
7	Forester	5	5	7
8	Forest Guard	13	14	20
9	Surveyor	-	-	1
	Office Staff			
10	Office Superintendent	1	1	1
11	Sr. assistant	1	1	1
12	Clerk/ Jr. Assistant	3	3	0
13	Stenotypist (Senior Grade)	-	-	1
14	Accountants	-	-	1
15	Artist	-	-	1
16	Driver	1	1	2
17	Head Attendant	-	-	1
18	Multipurpose Worker	6	1	6
19	Mali	-	-	3
20	Peon	2	1	2
21	Chowkidar	-	-	1
22	Hygiene Worker	-	-	2
23	Water man	-	-	1
24	Office Cleaner	-	-	1
	Total	37	32	60

Annexure 3.4

Abstract of Fire Line/Pheriphery in Bir Bhadson WLS

Sr. No	C. No.	Length (Mtrs)	Sr. No	C. No.	Length (Mtrs)
1	21,24,	974	44	22	457
2	24,28,31,33,35	1519	45	21,17	300
3	44	770	46	3,5	567
4	40,42	610	47	29,26	400
5	40,38	663	48	13	617
6	36,38	849	49	24	1186
7	38,34,36	645	50	1,3,2,4,5,6,8,9,12	1290
8	32,34	1123	51	17,18,14,19,15	2186
9	36,34	920	52	19	1260
10	29,30,32	1358	53	19	705
11	26,29,	1223	54	19,25	920
12	40,38,36,34,32	1391	55	15,11	915
13	42,40,38,36,34,32	1784	56	15,19,25	1640
14	42,40,38,36,34,32	1836	57	Pheri Pheri	15725
15	42,40,38,36,34,32	1755		Total	71458
16	35,37,39,41,43	1442			
17	39,37	506			
18	37,35	626			
19	35,33	776			
20	33,31	1115			
21	24,28,25	1440			
22	29,32,30,27,23,20,16	1781			
23	4,6,7,9,10,13,14	1407			
24	4,10,7,14	1410			
25	4,7,10,11,14,15,18,19	2497			
26	14,18,21	696			
27	27,30,32	923			
28	23,27,30	798			
29	6,4,7	1438			
30	6,9,7,10,11	1798			
31	11,15	1287			
32	9,13,14,10	1113			
33	8,5	510			
34	8,12	431			
35	30,27	871			
36	27,23	611			
37	20,23	235			
38	20,16	374			
39	16,	287			
40	23	395			
41	26,29	560			
42	29	129			
43	22,26	645			

Annexure 4.1

LIST OF VILLAGE AROUND 10 KM BHADSON

Sr.No.	Name of Village	Hadbast No.	Total 2011	Male	Female	Families	SC Family Members
1	Alowal	349	1791	965	826	345	531
2	Agol	166	1874	1006	868	375	450
3	Alampur	129	71	34	37	15	0
4	Akalgarh	125	730	384	346	141	157
5	Bhadson	142	7260	3869	3391	3122	1973
6	Bhari Panacha	131	1531	793	738	287	312
7	Bishanpura	112	321	169	152	64	112
8	Bugga Khurd	94	776	413	363	159	383
9	Babarpur	107	1544	840	704	321	456
10	Behbal pur	139	1126	603	523	219	444
11	Bhojo Majri	172	673	363	310	127	292
12	Jhambali	132	339	186	153	67	120
13	Chaswal	145	1604	856	748	300	498
14	Channa Nathuwala	133	377	211	166	80	124
15	Chahal	126	1926	1028	898	394	896
16	Dittupur Jattan	345	2051	1106	945	402	740
17	Dadrula Khrauda	148	2819	1514	1305	533	781
18	Dakonda	319	1751	926	822	347	750
19	Durgapur	123	1028	559	469	198	275
20	Fatehpur	83	698	364	334	143	318
21	Faizgarh	11	1141	600	541	217	373
22	Ghundar	122	1009	532	477	187	329
23	Gobindpura	160	1395	737	658	280	369
24	Hakimpur Ramgarh	316	456	230	226	94	339
25	Halla	82	738	382	356	137	314
26	Halotali	118	639	338	301	122	308
27	Harigarh	216	559	291	268	109	200
28	Jatival	138	847	458	389	156	446
29	Jassomajra	161	1789	953	836	345	288
30	Jindalpur	134	1130	603	527	209	400
31	Kansuha Khurd	153	877	474	403	182	295
32	Kameli	212	880	467	413	166	396
33	Kalar Majri	357	1039	552	487	204	555

34	Kalsana	159	659	354	305	128	175
35	Khanoura	121	1826	942	884	350	572
36	Kheri Jattan	346	957	522	435	192	384
37	Khijarpur	130	389	200	189	67	52
38	Lubana Tekku	162	2342	1237	1105	455	1105
39	Lot	149	2249	1186	1063	412	755
40	Mungo	96	685	337	348	142	139
41	Mangewal	113	1188	639	549	235	315
42	Matorada	150	1961	1048	913	375	667
43	Malewal	158	2124	1108	1016	394	270
44	Nanowal	144	786	429	357	139	412
45	Nanoki	116	56	34	22	13	0
46	Nohra	104	2065	1079	986	406	543
47	Palia	95	783	423	360	138	179
48	Puniwal	120	810	434	376	142	441
49	Pedni	150	526	270	256	94	29
50	Rampur Sahiwal	317	883	465	418	164	357
51	Ranno	315	744	385	359	131	116
52	Raisal	119	1148	604	544	222	338
53	Ramgarh	127	730	387	343	144	483
54	Shahpur	319	448	230	218	87	279
55	Saholi	114	2136	1122	1014	404	584
56	Sudhewal	117	1239	651	588	230	437
57	Sakrali	115	1498	803	695	288	651
58	Simbro	355	1225	625	573	256	435
59	Sadnoli	137	938	495	443	171	614
60	Toderwal	106	1030	547	483	212	510
61	Tohra	135	2109	1121	988	414	721
62	Tarkheri	314	1118	595	523	222	441

(Source: Field data by staff of Bir Bhadson WLS)

Annexure 4.2

Land Holding Pattern of House Holds in adjoining Villages of WLS Bhadson

Sr.No.	0-3 Km.	Total House-holds	Land Holding house- holds	Landless house-holds	Cattle Populations
1	Agol	618	416	202	678
2	Alampur	22	19	3	297
3	Bhadson	3241	998	2243	2122
4	Bhari Panacha	576	349	227	558
5	Bishanpura	129	97	32	234
6	Behbal pur	371	190	181	542
7	Jhambali	158	53	105	266
8	Chaswal	499	172	327	783
9	Channa Nathuwala	137	79	58	196
10	Chahal	607	179	428	619
11	Durgapur	377	195	182	968
12	Ghundar	278	204	74	405
13	Gobindpura	252	160	92	451
14	Halotali	204	106	98	230
15	Jatival	306	99	207	427
16	Jassomajra	625	282	343	630
17	Jindalpur	501	136	365	534
18	Kalar Majri	311	134	177	885
19	Kalsana	231	176	55	321
20	Khanoura	742	372	370	586
21	Kheri Jattan	352	184	168	493
22	Khijarpur	123	72	51	1008
23	Mangewal	341	218	123	423
24	Mallewal	695	282	413	853
25	Nanowal	240	117	123	398
26	Nanoki	19	14	5	151
27	Punniwal	293	207	86	424
28	Rampur Sahiwal	379	173	206	752
29	Ranno	233	156	77	223
30	Raisal	373	244	129	290
31	Ramgarh	222	94	128	451
32	Sudhewal	451	353	98	486
33	Sakrali	475	277	198	752
34	Sadhnauli	323	172	151	641

(Source: Field data by staff of Bir Bhadson WLS)

Annexure 4.3

Socio-Economic Details of adjoining Villages of WLS Bhadson

Sr. No.	Villages	Elementary School (5th Class)	Elementary School (8th Class)	High & Sen. Sec. School	Vetrinary Hospital Present/ Absent	Households Nos.	Popula- tion Nos	Agricul- ture Area (in Ha.)
1	Agol	Y	Y	Y	Y	618	1874	856
2	Alampur	N	N	N	-	22	71	88
3	Bhadson	Y	Y	Y	-	3241	7260	
4	Bhari Panacha	Y	Y	Y	-	576	1531	959
5	Bishanpura	Y	N	N	-	129	321	240
6	Behbal pur	Y	N	N	-	371	1166	441
7	Jhambali	Y	N	N	-	158	339	104
8	Chaswal	Y	N	N	-	499	1604	648
9	Channa Nathuwala	Y	N	N	-	137	377	202
10	Chahal	Y	N	N	-	607	1926	402
11	Durgapur	Y	N	N	-	377	1028	324
12	Ghundar	Y	Y	N	Y	278	1009	499
13	Gobindpura	Y	N	N	-	252	1395	538
14	Halotali	Y	N	N	-	204	639	273
15	Jatival	Y	N	N	-	306	847	353
16	Jassomajra	Y	Y	Y	-	625	1789	752
17	Jindalpur	Y	Y	N	-	501	1130	494
18	Kalar Majri	Y	N	N	-	311	1039	352

19	Kalsana	Y	N	N	-	231	659	503
20	Khanoura	Y	Y	N	Y	742	1826	1060
21	Kheri Jattan	Y	Y	N	-	352	957	312
22	Khijarpur	Y	Y	N	-	123	389	233
23	Mangewal	Y	Y	Y	Y	341	1188	802
24	Mallewal	Y	N	N	Y	695	2124	1442
25	Nanowal	Y	N	N	-	240	786	305
26	Nanoki	N	N	N	-	19	56	224
27	Punniwal	Y	N	N	-	293	810	437
28	Rampur Sahiwal	Y	N	N	-	379	883	273
29	Ranno	Y	Y	Y	-	233	744	417
30	Raisal	Y	N	N	-	373	1148	599
31	Ramgarh	Y	N	N	-	222	730	279
32	Sudhewal	Y	Y	N	-	451	1239	492
33	Sakrali	Y	Y	N	-	475	1498	823
34	Sadhnauli	Y	N	N	-	323	938	954

(Source: Field data by staff of Bir Bhadson WLS)

Annexure 4.4

Immunization of Cattle details within 5km

Sr.No.	Name of Village	2015-16	2016-17	Total
1	Ramgarh	659	703	1362
2	Jhambali	425	420	845
3	Alampur	415	403	818
4	Khijarpur	300	280	580
5	Channa Nathuwalia	265	285	550
6	Jhambali Khas	185	190	375
7	Jindalpur	821	920	1741
8	Ranno Khurd	509	530	1039
9	Ranno Kalan	292	290	582
10	Hakimpura	241	280	521
11	Behbalpur	705	785	1490
12	Jatiwal	107	185	292
13	Raimal Majri	343	358	701
14	Nanowal	521	566	1087
15	Chaswal	801	820	1621
16	Sakrali	323	348	671
17	Nanoki	121	130	251
18	Sudhewal	441	447	888
19	Bhadson	861	860	1721
		8335	8800	17135

Annexure 6.1

COMPARTMENT WISE VEGETATION COMPOSITION

(BIR BHADSON WLS, PATIALA) Year 2016-17

Compartment No.	Name of Species			
	Eucalyptus	Prosopis	Shisham	Misc.
1	35%	45%		2%
2	50%	45%		1%
3	60%	25%		4%
4	50%	45%		3%
5	50%	45%		2%
6	50%	45%		1%
7	50%	45%		3%
8	50%	45%		4%
9	50%	45%		1%
10	50%	45%		2%
11	10%	20%	2%	3%
12	16%	20%		2%
13	50%	45%		3%
14	35%	55%		5%
15	40%	50%		1%
16	7%	15%	2%	2%
17	30%	65%		4%
18	10%	80%		2%
19	10%	70%		3%
20	7%	10%	8%	1%
21	10%	80%		3%
22	5%	7%	8%	2%
23	8%	7%	2%	2%
24	30%	65%		3%
25	50%	40%		1%
26	5%	5%	5%	3%
27	7%	4%	4%	2%
28	40%	50%		5%
29	12%	2%	2%	2%
30	16%	5%	6%	4%
31	35%	45%	2%	7%
32	10%	15%	2%	5%
33	30%	45%		1%

34	50%	40%		5%
35	30%	60%		5%
36	65%	25%		4%
37	30%	65%		2%
38	55%	40%		2%
39	33 %	55%		3%
40	45%	50%		3%
41	30%	60%		5%
42	60%	30%		2%
43	62%	30%		1%
44	35%	65%		5%

Annexure 6.2

Wildlife Population in Bhadson WLS

The census of wild animals was done on 2004. The following population was recorded-

Sr. No.	Name of animals/bird	Census			Total
		Male	Female	Unsexed	
1	Blue Bull	200	270	32	502
2	Indian Hare	20	27	10	57
3	Jackal	30	34	12	76
4	Parakeet	15	18	10	43
5	Partridge	40	50	9	99
6	Jungle Cat	6	9	3	18
7	Bush Quail	10	15	6	31
8	Porcupine	2	2	1	5
9	Monkeys	3000	5300	270	8570
	TOTAL	3323	5725	353	9401

The list is not exhaustive

Population of Wild Animals and Birds in Bir Bhadson WLS (2014)

Sr. No.	Name of animals/bird	Census			Total
		Male	Female	Unsexed	
1	Blue Bull	250	285	41	576
2	Indian Hare	30	35	20	85
3	Jackal	40	50	28	118
4	Parakeet	25	34	25	84
5	Partridge	155	162	28	345
6	Jungle Cat	15	20	10	45
7	Bush Quail	25	35	15	75
8	Porcupine	7	8	3	18
9	Monkeys	3045	5320	300	8665
10	Sambar	2	1	1	4
	TOTAL	3594	5950	471	10015

The list is not exhaustive

Annexure 6.3

17

GOVERNMENT OF PUNJAB
DEPARTMENT OF FORESTS AND WILDLIFE PRESERVATION
(FOREST BRANCH)

Notification

No. 34/18/2009-FT-5/458568/1 Dated Chandigarh, the 10-4-2011.

The Government of Punjab vide its notification No. F-150/50 dated 28.2.1952 declared 1022.63 hac. (2656.78 acres.) area of Government Protected Forests of Bir Bhadson as Wildlife Sanctuary in Distt. Patiala. In exercise of powers conferred by section 33B (I) of the Wildlife (Protection) Act, 1972 (as amended upto 2006), the Governor of Punjab is pleased to constitute an Advisory Committee for Bir Bhadson Wildlife Sanctuary, Distt. Patiala. The committee shall consist of following members: -

1. **Official Members**
Conservator of Forests (Wildlife),
Parks & Protected Area Circle, Punjab. Chairman
2. **Member of State Legislature**
Sh. Sadhu Singh M.L.A. Nabha Member
3. **Three Representatives of Panchayati Raj Institution**
 - (i) Smt. Harvinder Kaur, Sarpanch
Gram Panchayat, Sudhewal Member
 - (ii) Sh. Pardaman Singh, Sarpanch
Gram Panchayat, Puniwal Member
 - (iii) Smt. Krishna Kaur, Sarpanch
Gram Panchayat, Ramgarh Member
4. **Members from Dept. of Home and Veterinary (one from each)**
 - (i) Sh. Amrinder Singh, Incharge PP
Vill. Bhadson. Member
 - (ii) Sh. Anand Goyal, Veterinary Officer
Vill. Bhadson, Distt. Patiala Member
5. **Two Representatives of N.G.O.**
 - (i) Sh. Harbans Singh S/o Sh. Laxman Singh
President F.D.A. Committee
Vill. Raisal. Member
 - (ii) Sh. Vikramjeet Singh S/o Sh. Hardas Singh
President F.D.A. Committee, Vill. Sudhewal. Member
6. **Three individuals Active in field of Wildlife Conservation**
 - (i) Sh. Didar Singh S/o Sh. Bhag Singh
Vill. Ramgarh Member
 - (ii) Sh. Amrik Singh S/o Sh. Sant Singh
Vill. Khanora. Member

- | | | | |
|----|-------|---|------------------|
| | (iii) | Sh. Jagtar Singh S/o Sh. Santa Singh
Vill. Sudhewal. | Member |
| 7. | (i) | Sh. Abjinder Singh Grewal
S/o Sh. Abninder Singh Grewal,
Village Nanoki, P.O. Sakrali, The.
Nabha, Distt. Patiala | Member |
| | (ii) | Sh. Jeevan Dutt Shelly
S/o Hari Dev Shelly, Shelly N Home,
VPO Badshahpur Mandi, Teh. Patran, Distt.
Patiala. | Member |
| 8. | | Divisional Forest Officer, Patiala | Member Secretary |
| 1. | | The Committee shall render advice on measures to be taken for better conservation and management of the sanctuary including participation of the people living within and around the Sanctuary. | |
| 2. | | The Committee shall regulate its own procedure including quorum. | |
| 3. | | The ex-officio members mentioned at Sr. No. 5 and 6 shall be nominated for only two years. | |
| 4. | | No T.A./D.A. shall be paid to the members of this committee for performing their duties as members. | |
| 5. | | The Committee shall meet at least once in a three months and will submit its report to Chief Wildlife Warden, Punjab. | |

VISWAJEET KHANNA

Financial Commissioner (Forests) and
Principal Secretary to Govt. of Punjab
Deptt. of Forests and Wildlife
Preservation, Punjab.

Endst. No. 34/18/2009-FT-5/458568/3 Dated Chandigarh, the 10-4-2013

A copy is forwarded to the following for information and necessary action:-

1. Principal Chief Conservator of Forests, Punjab, S.A.S. Nagar.
2. Chief Wildlife Warden, Punjab, S.A.S. Nagar.
3. Deputy Commissioner, Patiala.
4. Sr. Superintendent of Police, Patiala.
5. A copy with a spare copy is forwarded to the Controller, Printing and Stationary, Punjab, Chandigarh for its publication in ordinary Gazette with the request to supply 20 copies of the printed notification to this department.

2
Special Secretary, Govt. of Punjab,
Department of Forests and Wildlife Preservation.

Annexure 7.1

LIST OF SUGGESTED TREES, GRASSES IN BIR BHADSON WLS

Trees Grasses

1. Amla 1. Ginni
2. Barh 2. Kanna
3. Beri 3. Kali
4. Bel 4. Khabbal
5. Dhak 5. Panni
6. Gular 6. Colocassia
7. Jamoa 7. Jainter
8. Jand 8. Ipomea
9. Pilkham 9. Asparagus
10. Peepal 10. Arundo denax
11. Simal
12. Subabool
13. Kusum
14. Karonda
15. Lasura
16. Kachnar
17. Amb
18. Jamun
19. Amrood
20. Siris
21. Toot
22. Kikar
23. Shisham
24. Bamboo

Bir Bhadson WLS

Annexure 11.1

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
Management Plan	The WLS requires a comprehensive management plan, to carry out any approved technical intervention	3	2									5
Total of 1		3	2									5
Survey & Demarcation												
Fencing of Sanctuary along roads	A fresh joint survey & demarcation with revenue department before fencing work in unfenced area	5	5	8	8	8	8	10	10	10	10	82
Repair of Boundary fencing (16 Km)	Approx.16 km boundary fenced using angle iron post and chain link fencing along compartments 1-44	5	5	3	3	3	3	2	3	4	5	36
Raising thorny hedges like Capparis along both side of chain link fence	Planting of 15000 thorny plant species including both side @ a distance of 3 mt on each side	5	5	3	3	3	3	4	4	4	5	39
Raising Agave & Cactus bulbils along Fire lines	Planting of 20000 bulbils @ distance of 2mt for entire 17 km fire line	2	2	2	2	2	2	2	2	2	2	20
Total of 2		1	7	5	5	2	5	2	3	4	5	39
Infrastructure & communication improvement												
Buildings												
	one block officer residence			20	-	-	-	-	-	-	-	20
	two wild life guard residence			30	-	-	-	-	-	-	-	30
	store room			5	-	-	-	-	-	-	-	5
	one class four residence			7	-	-	-	-	-	-	-	7
Check Posts 4	Creation of new 4 check posts in C.No.1-2, 44-42, 43-44 and 8-12	6	6	-	7	7	-	-	-	-	-	26

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
Watch towers 5	One each in compartments 31, 25, 21, 19 and 29	12	14	-	16	-	-	20	-	22	-	84
Submersible pump sets 6	Compartment No. 15,19,30,36,40 and 43	3	3	3	-	4	4	5	-	-	-	22
Development of paths & fire lines, compartment boundaries	Improvement of path all along the periphery in the form of a periphery road; new fire lines within the compartments need to be created.Total length of path along boundary approx 16 km, and length of proposed fire lines and compartment boundaries is approx.50 km, width of pathways along boundary and firelines is 4.0 m,Total area involved 17.4 ha, Creation of fire lines and pathways @ 1.5 lacs Ha	10	10	10	10	10	10	12	12	15	15	114
Patrolling kits 5 @ 30000/kit	Consisting of Powerful torch, raincoat, sling bag (waterproof), gumboots, hat/cap Swiss knife, measuring tape, compass, notebook and pen	1	1	1	1	1	1	1	1	1	1	10
Wireless Communication/Mobile phones	3 mobile phones for 1 Forester and 2 Guards & future replacement	-	2	-	-	-	2	-	-	-	2	6
Development of electric supply	Electricity connection at check posts	3	3	-	3	-	-	-	3	-	3	15
Entrance gate	Creation of new entry gate in comptt. 1 & 2	3	-	-	-	-	-	-	-	-	-	3
Binoculars	Four of 8x40 magnification	1.5	1.5	1.5	1.5	-	-	-	-	-	-	6

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
Vehicle / Tractor	One Tractor with Trolley and water tanker	15	-	-	-	-	17	-	-	-	-	32
Total of 3		4.5	27.5	92.8	26.4	16	16	23.5				206.7
Habitat Development												
Improvement of existing water feature	An existing distributary and minor runs through the middle of the WLS											
Water holes	Creation of 5 stone pitched/Kacchawater hole of 40 mt. diameter in comptt. 15,30 & 23 stone pitching of existing water body in all comptts	9	9	9	-	-	-	-	-	-	-	27
	drudging and desiltation of minor/ distributary is needed											
	Mtc. of water holes	5	5	5	5	5	5	5	5	5	5	50
Drudging & deeping of water channel and existing kachha water hole and Creation of new water channels to connect water holes from tube wells		6	6	6	6	6	6	6	6	6	6	60
Restoration of Bhadson Sanctuary (50 Ha per year)	Uprooting of Mesquite in Bir Bhadson Sanctuary	50	50	50	50	50	60	60	60	70	70	570
	Estimated cost per hectare for tall plants plantation of saline & alkaline areas Bir Bhadson Sanctuary	90	120	120	120	120	120	130	130	130	140	1220
	Chainlink Fencing	30	30	30	30	30	30	30	30	30	40	310
	Cost of Tubewell, tubewell room, tanker etc.	5	5	5	5	5	5	5	5	5	8	53
Grassland development (5 Ha per year)	Grassland development work in Bir Bhadson Sanctuary with chainlink	23	23	25	28	31	31	31	31	31	31	285

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
Plantation of fruit/fodder trees and shrubs (approx. 20 ha.)	In phased manner in all compartments @ 2 ha/yr											
Land leveling, dig pitting	@ 0.1/ha	2	2	2	2	2	2	2	1	1	1	17
Plantation	@ 0.3/ha	20	3	3	3	3	3	3	3	3	3	47
Irrigation of 3 years	@ 0.05/ha	5	2	2	2	2	2	2	2	2	2	23
2 weeding in first year	@ 0.05/ha	3	3	3	3	3	3	3	3	3	3	30
1st year Maintenance	@ 0.51/ha	3	3	3	3	3	3	3	3	3	3	30
2nd Year Maintenance	@ 0.44600/ha	3	3	3	3	3	3	3	3	3	3	30
Development of saltlicks	Artificial saltlicks to be developed near each water hole and check dam	2	2	2	2	2	3	3	3	5	5	29
Control of stray cattle & dog	All the cattle need to be captured/driven out of the PA once the boundary wall and fencing is completed to prevent their re-entry	2	2	2	2	2	2	2	2	2	2	20
Control of monkey population	Strict vigil proposed all over the WLS for not allowing people to feed the monkeys. Castration of males seems to be an appropriate strategy to control their population	2	1	1	3	2	1	1	1	2	1	15
Total of 4		260	269	271	267	269	279	289	288	301	323	2816
Wildlife Health management												
Establishing wildlife health Lab	Construction of Wild Life Health Lab	-	15	-	-	-	-	-	15	-	-	30
	Construction of Veterinary Enclosures (C.No.2)	-	50	-	-	-	-	50	-	-	-	100

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
	Purchase of histopathological Chemicals	1	1	1	1	1	1	2	2	2	2	14
	Purchase of Remote Injection Gun	4	-	-	-	5	-	-	6	-	7	22
	Purchase of Pistal Short Range	2	2	-	-	-	3	-	1	3	-	11
	Purchase of Blow Pipe 2 No.	2	1	1	1	1	1	1	1	1	1	11
	Purchase of tranquilizes	2	2	2	2	2	2	2	2	3	3	22
	Purchase of rescue Van	15	-	-	-	-	-	-	-	-	15	30
	Purchase of trapping cages	2	2	2	2	2	2	2	2	2	2	20
	Purchase of squeeze cages	3	3	1	1	3	1	3	1	3	1	20
	Purchase of glass container	1	1	1	1	1	1	2	2	2	2	14
	Purchase of injecting vials	1	1	1	1	1	1	1	1	1	1	10
	Purchase of Tags	1	1	1	1	1	1	1	1	1	1	10
	Purchase of Vaccines	2	2	2	2	2	2	2	2	2	2	20
	Purchase of Preservatives	1	1	1	1	1	1	1	2	2	2	13
	Purchase of containers	1	1	1	1	1	1	2	2	2	2	14
	Purchase of essential surgical and lab equipments	1	1	1	1	1	1	1	1	1	1	10
	Wildlife census	4	4	4	4	4	4	4	4	6	8	46
	Total of 5	43	88	19	19	26	22	74	45	31	50	417
Ecotourism, Interpretation and Awareness												
Nature Interpretation Centre												

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
1 building for Interpretation Centre cum Library	Construction of one new building	20	-	-	-	-	25	-	-	-	-	45
Multi-media / LCD projector	One for Centre	2	-	-	-	-	-	-	-	3	-	5
Audio visual Device, Printed laminated panels	6 panels @ 5'x4' & 10 panels @ 3'x3, & 100 panels@ 2'x2'	2	-	2	-	2	-	-	2	-	2	10
Models & Dioramas	5 models & 5 dioramas	5	-	5	-	8	-	10	-	12	-	40
Other equipments	One Digital camera & other items	2	2	2	2	2	2	2	2	2	2	20
Awareness	Generation of mass support	1	1	1	1	1	1	1	1	1	1	10
Signage & Boards	25 signage @ 5000 each & 8 signboards @ 20000	3	3	3	3	3	3	4	4	4	4	34
Library	One library with collection of 500 books	4	4	4	5	5	5	5	5	5	5	47
Education camps/workshops	Covering nearby areas @ 50 camps per year	5	5	5	5	5	5	5	5	5	5	50
Publicity material	Publicity material, films, brochure, pamphlets, hoardings, website development, booklets, checklists	2	1	1	1	1	1	1	1	2	2	13
Ecotourism												0
Development of nature trail for tourists	First Nature Trail starting from C.No.3 and Second starting from compartment 19 the trail would be about 8 km and will wound through compartments 1 to 22.	5	5	5	5	5	5	5	5	5	5	50
Machan and hides, view points		2	2	2	2	2	2	2	2	2	2	20

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
Vehicles for tourism	Provision of vehicles like Mini bus for tourists to go for a round inside sanctuary	15	-	-	-	-	30	-	-	35	-	80
Tour programmer for school children	Special arranged tours for local school children	2	2	2	2	2	2	2	2	2	2	20
Total of 6		70	25	32	26	36	81	37	29	78	30	444
Eco development – Details of physical and financial targets given in chapter 8												
Total of 7		14.85	20	20	20	20	20	20	20	20	20	194.85
Research, Monitoring & Training												
Research												
Short term research	Wildlife/ biological research	2	2	2	2	2	2	3	3	3	4	25
Long term research	Habitat change, landscape conservation, socioeconomic research & survey	2	2	2	2	3	3	4	4	5	6	33
Monitoring												
Wildlife population monitoring	Regular census	2	2	2	-	-	1	1	1	-	3	12
Wildlife health monitoring	Health protocol	3	3	2	2	2	2	2	2	3	3	24
Vegetation monitoring plots	Regular sampling & study	1	1	1	1	1	1	2	2	2	2	14
Learning Centre	Documentation of all information, systemic collection of relevant details. Co-ordination-dissemination of information	2	2	1	1	1	2	2	2	3	3	19
	Generation of database in GIS domain, software, exercises, documentation	6	3	3	3	3	4	4	4	5	5	40
Training												

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
In house training	Holding regular workshops by senior and already tarined officers for other staff. Training in areas such as conducting wildlife census, identification of avian fauna etc could be arranged using already available departmental expertise	2	2	2	2	2	2	2	2	2	2	20
External training	Suitable organizations such as WII, BNHS, and other resource persons should be requested for imparting training in areas such as estimating habitat quality, monitoring of introduced species, behavioral ecology of wild ungulates etc	2	2	2	2	2	2	2	2	2	2	20
Total of 8		22	19	17	15	16	19	22	22	25	30	207
Recurring expenditure												
Boundary	Repair & maintenance	2	2	2	2	2	2	2	2	2	2	20
Check post	-do-	1	1	1	1	1	1	1	1	1	1	10
Watch tower	-do-	1	1	1	1	1	1	1	1	1	1	10
Fire line	-do-	40	40	40	40	40	40	40	60	60	60	460
Pump sets (old and new)	-do-	0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	2	8
Culverts/ Check dams	-do-	1	1	1	1	1	1	2	2	2	2	14
water holes	-do-	10	10	10	10	10	10	10	10	10	10	100

Description of works	Proposed details	Year wise phasing of the financial forecast (in Lakhs)										Grand Total (in lakhs)
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Non Recurring												
wireless / patrolling kit	-do-		-	0.5	-	0.4	-	0.5	-	0.5	0.6	2.5
Nature Interpretation Centre Building	-do-	-	-	0.5	0.5	0.6	0.6	0.8	0.8	1	1	5.8
Electronic items in NIC	-do-	-	-	0.2	0.2	0.4	0.4	0.6	0.6	0.8	0.8	4
Staff Amenities	Awards/ incentives		6	4	4.5	5	5.5	6	7	8	9	55
one pickup van and one minitruck / POI /equipment	Repair & maintenance	2	2	2	3	3	4	4	5	5	5	35
Staffing												
Wildlife Guard	@ Rs 50000/month (Approx)	6	6	6	6	6	6	6	6	6	6	27
Multimedia operator	1 @ Rs 15000/month(Approx)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	14.4
Driver	1 @ Rs 40000/month(Approx)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	16.2
Sweeper	1 @ Rs 5000/month(Approx)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.8
Total of 9		70.1	76.7	75.9	76.9	78.1	79.2	82.1	103	105.5	107.6	786.7
Grand total		488.45	534.2	532.7	455.3	463.1	521.2	549.6	510	564.5	565.6	5116.25

FORM WM-1
CREATION OF NEW ARTIFICIAL WATERHOLES

Sr.No.	Category	Year	Location	Cost	Performance
1	2	3	4	5	6

The Control forms

Note: Category : Masonry anicut, earthen bund, lined depression, borewell and pump, reservoir, spring fed, guzzler, aquifer, permanent or temporary

Location : By compartment or by a named feature and name given if any

Performance : Successful, partially successful, failure (give reasons for the latter two)

FORM-2.2
RESTORATION OF HABITAT: CONTROL OF REGNERATION OF WOODY SPECIES IN GRASSLANDS

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

Note : Location
 : By compartment, site name, etc
 : Species controlled
 : List the species.
 : Operation
 : Uprooting, cutting, burning etc. manual or mechanised methods.
 : The measure of success, suitability of methods, problems encountered

**FORM WM-2.3
RESTORATION OF HABITAT : PRESCRIBED BURNING**

Sr.No.	Location & name of site	Year	Extent of area (ha)	Area treated (ha)	Period	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9

Note: Location : By compartments or name of site.
 Period : Date of starting operation and completion
 Remarks : Mention resultant structure e.g a mosaic, % burnt, % intact.
 : Problems encountered in conducting the operation- e.g . Fire escape.

FORM WM-2.4
RESTORATION OF HABITAT : SOIL CONSERVATION MEASURES -INITIAL
OPERATIONS AND SUBSEQUENT MAINTENANCE

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

The Control forms

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 : Structure involved such as gully plugs, trench-cum-mound, terracing, spurs and bunds etc. quote quantity nos. and cmt. Of earthwork.

Remarks : Mention if intial work of maintenance

**FORM WM-2.5
RESTORATION OF HABITAT: PLANTING, SOWING-INITIAL OPERATION**

Sr. No.	Location	Year	Extent of area (ha)	Species	Planting Stock	Spacing	Operations	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9	10	11

The Control forms

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

Planting Stock Operation : Kind and condition e.g. root shool, naked root seeding in polythene bags, age or average size.

Remarks : 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.

FORM WM-3
ANIMALS: MEASURING TRENDS IN POPULATION (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

The Control forms

Note : Population Estimation : e.g pugmark, line transect; scan, roadside counts etc., area covered, sampling intensity. data treatment, extrapolation where involved. In case of Indices of density or dung count mention those figures under the remarks' colum: 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.

FORM WM-3.6

ANIMALS : WILDLIFE DAMAGE TO PRIVATE OR PUBLIC PROPERTY

Sr. No.	Range	Month	The Category of property	Extent of damage	Species involved and number	Remarks

The Control forms

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.

Annexure-12.2

COMPARTMENT HISTORY

Protected Area name	Census counting unit number
Range	Last described (year):
Block	Current description (year) :
Compartment number year	Last forestry operations during the

COMPARTMENT DESCRIPTION

Boundaries and their state: N
E
S
W
(Write the state of the boundaries:
e.g. clearly defined, not clear, disputed etc.)

Altitude above MSL: Varies from ----m to --- m

Aspect If not applicable write e.g. not specific
Gradient:-
e.g . moderate to precipitous

Configuration: e.g. plain or hilly, cut by streams/ravines

Geology, rock and soil e.g. system of formation, principal rock formation, water table, presence of aquifers, drainage, soil types, depth, soil moisture, stable/eroded areas etc.

Forest Describe by type, site quality, density of overwood, if grassland mention as such or shrubland as applicable.
Describe the principal tree species and associates. Describe vertical structure e.g top canopy, single under storey or multiple layers , 247
ground cover of herbs, grasses etc. Describe principal species associations from top to

ground cover, (recording the layers as I,II,III etc.) whether ground cover is sparse, patchy or dense etc.gaps in woodland –open areas (1/2 ha or more).Weeds and their distribution: (if important)

Plants & Animals

Plants: Endangered, threatened, rare and endemic species,

Specified plants:

Key areas: by name/location e.g Jauraha riparian area; teen is mestic woodland etc. Snags/den trees present/absent

Sample/Preservation plot (s): Name/number, location as per the record, extent (ha), year of establishment, cross reference to any records, measurements etc. Any other relevant information provide information separately for each plot.

Animals: Endangered rare, threatened, endemic Speices

Water: A general comment on the water regime e.g all streams are ephemeral and dry by mid February except stagnant pools.

Springs: by name

Seeps: by name

Pools: by name

lake, pond, reservoir,: by name

anicut: by name

other artificial sources: by name

Caves/overhangs/dens by name, or any specific identification

Significant cliffs and talus by name

Key areas for animals by name /landmarks

Wetlands with significant values e.g. species, habitat and extent, current use if any

Evidence of tiger

Record sightings record also the presence of the number of separate tigers if any by sex, age (i.e. adult sub-adult or cub) as might have been recorded by their pug marks.

GLOSSARY

<u>Local</u>	<u>Meaning</u>
Bir	Dense Forest Patch
Chow	Seasonal drain or water channel
Darkhat	Trees
Tahli	Shisham
Dunga	Deep
Pind	Village
Safeda	Eucalyptus
Rajbaha	Water drain
Dakar	local soil of poor quality
Kallar	alkaline soil
Loo	hot dry winds of summer
Tobba	Water hole

ABBREVIATIONS USED

Act	Wildlife (Protection) Act 1972
BNHS	Bombay Natural history society
BPL	Below Poverty line
CF (PPA)	Conservator of forests (Parks & Protected Area)
CCF(WL)	Chief Conservator of forests (Wildlife)
CWLW	Chief Wildlife warden
Dy.DFO	Deputy Divisional Forest Officer
DFO (WL)	Divisional Forest Officer (Wildlife)
EDC	Eco-development committee
FMD	Foot and Mouth Disease
GIS	Geographical Information system
GPS	Geographical positioning system
IRDP	Integrated Rural development Project
NGO	Non Governmental organization
NGI	Non Governmental Institute
NTFP	Non Timber forest produce

PA	Protected Area
PDA	Personnel Digital Assistant
RFO	Range Forest Officer
RS	Remote sensing
SMC	Soil and Moisture Conservation
TCM	Trench cum Mound
WPA	Wildlife (Protection) Act
WII	Wildlife Institute of India
WL (P) Act1972	Wildlife Protection Act 1972
WLS	Wildlife Sanctuary
ZI	Zone of Influence

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