M/S Bharat Petroleum Corporation Limited.

WILDLIFE CONSERVATION PLAN FOR SCHEDULE-I SPECIES

SUBMITTED BY

M/s Bharat Petroleum Corporation Limited,
Village- Salempur, Tehsil- Sikandra Rau,
District- Hathras, State- Uttar Pradesh.

2019

Prepared by

Vardan Environet
D-142, Sushant Lok-III
Sector -57, Gurgaon (Haryana)
Email- vardanenviro165@gmail.com
Contact-0124-4291036, 7042783282

BIOLOGICAL ENVIRONMENT:

Study of biological environment is one of the important aspects for the Environmental Impact Assessment, in view of the need for conservation of Environmental quality and biodiversity of particular geographical area. Ecological systems show complex interrelationship between biotic and Abiotic components including dependence, competition and mutualism. Biotic components comprises of plant and animal communities which interact not only within and between themselves but also with the Abiotic components viz. Physical and Chemical; components of the environment.

Generally, biological communities are the good indicators of climatic and edaphic factors. Studies on biological aspects of ecosystems are important in Environmental Impact Assessment for safety of natural flora and fauna. Information on the impact of environmental stress on the community structure serves as an inexpensive and efficient early warning system to check the damage to a particular ecosystem. The biological environment includes mainly terrestrial and aquatic ecosystems.

Any project has some impact on the flora and fauna in the project area. Plant and animal communities are indicators of the environment. They respond not only to one environmental factor, but also to an interacting group of factors. These communities influence and react sensitively to change in the balance of environmental stresses.

Therefore, a detailed knowledge of the diversity of the area definitely helps in managing the area properly following suitable practices. The study was conducted in the project area to assess all possible consequences on the biological environment.

Floral and faunal surveys conducted for assessing the biological diversity and its status over a period of time that forms an integral part of Impact Assessment Techniques. The present study is highlighting the various issues pertaining to floristic diversity and the faunal wealth including Ethno-botany and silvicultural issues in the submergence area and also the area beyond the limit of the submergence. Accordingly, for the Environmental Impact Assessment (EIA) studies, the total area has been sub-divided into the following areas;

- Core Zone: i.e. BPCL Plant Site
- 10 km radius buffer zone

- Natural vegetation in the study area (Core & Buffer Zone).

- Forest area (Protected/Reserved)
- Rivers and Ponds in vicinity

1.1 Objectives of Biological Study:

The biological study of the area has been conducted in order to understand the ecological status of the existing flora and fauna to generate baseline information and evaluate the probable impacts on the biological environment. The main objectives of biological study were:

Terrestrial Ecology:

The study was undertaken with a view:

- To assess nature and distribution of the vegetation in the area.
- To evaluate the dominant species of plant and animal. To list the endangered species of flora and fauna.
- To mark the wetlands and other ecologically sensitive areas such as national parks/ sanctuaries.
- To assess the effect of construction and operation of the project on existing ecology.
- To Asses the spawning and feeding habitats of aquatic species with respect to time and location.

Aquatic Ecology:

The study was carried out in the project site aiming at:

- Inventorization of different aquatic species (plankton (phyto & zoo), benthos, fishes).
- To identify the feeding and breeding grounds of economically important fishes.
- To assess the existing status of endangered species.

Table: 1. Mode of data collection and parameters considered during the Survey

Sr. No.	Aspect	Data	Mode of Data collection	Parameters monitored	Remarks
1.	Terrestrial Biodiversity	Primary data collection	By field survey	Floral and Faunal diversity	**For Floral Diversity:** Random survey, sapling survey/forest inventory, walking transect, collection and identification with the help of relevant literature. **For Faunal Diversity:** direct and indirect

					sampling, walking transect, point sampling and nest sampling etc.
2.		Secondary data collection	From authentic sources like Forests department and available published literatures from ZSI, BSI etc.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	Data collected from the working plan of the region, forest types from the authentic literature of Champion & Seth.
3.	Aquatic Biodiversity	Primary data	By field survey	Floral and Faunal diversity	**For Plankton Study-** Lackey's drops method and light microscope **For other aquatic-** Random survey, opportunistic observations
4.		Secondary data collection	From authentic sources like Forests department.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	Desktop literature review to indentify the representative spectrum of threatened species, population and ecological communities.

2. STUDY AREA:

M/s. Bharat Petroleum Corporation Limited (BPCL) has planned to enhance its storage capacity of LPG bottling plant at Salempur from existing 1063 MT to 1963 MT by construction of 3x300 MT MSV's. Capacity Expansion project of LPG Bottling Plant from 1063 MT TO 1963 MT is located at UPSIDC Industrial Area, village and P.O. Rati Ka Nagla, Tehsil: Sikandra Rao, Dist: Hathras, Salempur, UP by M/s BPCL. Corner Coordinates of the Project site are as follows:

A	$27^0 39' 55.6"$ N	$78^0 14' 52.1"$ E
B	$27^0 39' 41.1"$ N	$78^0 14' 52.1"$ E
C	$27^0 39' 44.4"$ N	$78^0 15' 52.1"$ E
D	$27^0 39' 56.0"$ N	$78^0 15' 52.1"$ E

3. BIODIVERSITY ASSESSMENT:

The Biodiversity conservation and habitat fragmentation are terms that are often used together because of the burgeoning human population and rapidly declining biodiversity all over the world. A logical consequence of an increasing human population and subsequent use of land for development projects is less space for flora and fauna and greater pressure on remaining habitat fragments.

4. SITE SELECTION CRITERIA:

Eight sampling locations were selected to study the terrestrial eco-system, with due consideration to the following points.

A. Major affected area
B. Natural vegetation in the study area.
C. National Parks, sanctuaries in the study area.
D. Natural Water Bodies in the study area

Terrestrial Study was conducted at eight locations across the Chainage. This study was conducted at two locations. The biological study of terrestrial flora, fauna and aquatic biota has been done for different transects. However, the surveys have also been created for the entire area in the vicinity of proposed Project.

5. METHODOLOGY FOR BIODIVERSITY:

5.1 Floral Diversity:

The present study on the floral assessment for the project activity is based on field survey of the area. Inventory Methodology was adapted to the baseline data of floral diversity in a corridor of 10km width on either side along the entire stretch of the proposed project using the relevant toposheets of scale 1:50000.

A forest inventory is **"an attempt to describe the quantity and quality of forest trees and many of the characteristics of the land area upon which the trees are grown."** The objective this floral inventory of the study area, is to provide complete checklist of floristic structure along the entire stretch of the proposed project for formulating effective management and conservation measures. The tree species, shrubs, herbs and climbers observed in the study area are represented in the **Table 2.**

5.2 Faunal Diversity:

1) Terrestrial Fauna:

A linear transect of 1.0 km each was chosen for sampling at each site. Each transect was trekked for 1.5 hr for the sampling of faunal diversity through following methods for different categories. For the sampling of butterflies, the standard 'Pollard Walk' method was employed and all the species recorded daily. Voucher specimens of the species that could not be identified in the field were collected using a butterfly net besides photographing them.

For bird's sampling, 'Point Sampling' along the fixed transect (Foot trails) was carried out. All the species of birds were observed through a binocular and identified with the help of field guide book and photographs.

For the sampling of mammals, direct count on open width (20m) transect was used. In addition, information on recent sightings/records of mammals by the villagers/locals was also collected. For carnivores, indirect sampling was carried out and the mammals were identified by foot marks, faeces and other marks/sign created by them. In case of reptiles mainly lizards were sampled by direct count on open width transects.

The study of fauna takes substantial amount of time to understand the specific faunal characteristic of area. The assessment of fauna has been done by extensive field survey of the area. During survey, the presence of wildlife was also inhabitants depending on animal sightings and the frequency of their visits in the project area which was later confirmed from forest department, Wildlife Department etc.

2) Aquatic Fauna:

a) Zooplankton:

For zooplankton analysis, 20L of subsurface water was strained through 53µ Nytex plankton net and the concentrate was transferred to labelled plankton bottle after rinsing the net with distilled water. The planktons were immediately preserved in 4% neutral formaldehyde solution for subsequent examination and quantification.

Zooplankton samples were observed in a sedimentation chamber under an inverted plankton microscope. Planktons were identified with the help of standard keys and references.

b) Phytoplankton:

Similarly, for phytoplankton analysis, water sample were taken directly from the sites in 100 ml sampling bottles and preserved with Lugol's solution immediately. Then the samples were centrifuged in the laboratory followed by removal of desired amount of supernatant from the centrifuge tube to make the required concentration.

c) Benthos:

For the benthic organism study, sediment samples were taken from the bottom of river manually and brought to laboratory for analysis. The samples were washed through sieves to harvest the organisms and then preserved in sampling vials using formal dehyde as preservative. Benthic organisms were enumerated using a simple microscope/ hand lens.

d) Fishes:

Fisheries data has been collected through consultation with local fishermen and throwing nets.

6. FLORAL DIVERSITY:

Generally survey of flora has been carried out in 10 km buffer area. On the basis of Survey and secondary data collected from forest office a large variety of Trees, herbs and shrubs found suited to climatic condition. The structure and type of vegetation depends on climatic conditions and physiographic conditions, as well as requirements of the local inhabitants of the area. The vegetation in the study area is deciduous in nature. Mainly three types of forests were found in the study area.

I. Tropical Moist Deciduous Forests:

These forests are found in the moist region of Terai. They grow in regions that record 100 to 150 cm. of rainfall annually, have an average temperature between 26˚-27˚ C. and have considerable degree of humidity.

A special feature of the forests is that deciduous trees of uneven size grow in higher altitude regions. Lower regions have several species interspersed with Bamboo, Climbers, Cand and ever green shrubs. Main trees are Sal, Ber, Gular, Jhingal, Palas, Mahua Semal, Dhak, Amla, Jamun, etc.

II. Tropical Dry Deciduous Forests:

These forests are found in all parts of the plains, and usually in central eastern and western regions. The trees are mostly deciduous. Since sunlight reaches the ground in abundance, shrubs and grasses also grow here. Large tracts of these forests have been cleared for cultivation. Important trees are Sal, Palas, Amaltas, Bel, Anjeer etc. Neem, Peepal, Sheesham, Mango, Jamun, Babool, and Imli (Tamarind) etc. grow along riverbanks and in other moist regions.

III. Tropical Thorny Forests:

These are mostly found in south-western parts of the State. Such forests are confined to the areas with low annual rainfall (50-70 cm), mean annual temperature between 25˚C to 27˚C and low

humidity (less than 47%). Widely scattered thorny trees, such as Babool, Thorny, Legumes and Euphorbias, are found here. During rains, short grasses are also found here. The trees are generally small, forming open dry forests. Important trees of these regions are

Phulai, Khair, Kokke, Dhaman, Danjha, Neem, etc. Various types of resin and gum are also obtained from these trees.

The study area enjoys sub-tropical climatic conditions with one season, post monsoon season (October to December, 2018). List of plant species and its ecological importance based on secondary data is listed below.

Table 2: Checklist of Natural Vegetation (Core & Buffer Zone)

Plant Species	**Vernacular Name**	**Enthanobotanical Values**
Azadirachta indica	Neem	Medical, Timber, Fuel
Acacia nilotica	Kikar	Timber, Fuel
Acacia leucophloea	Babul	Timber, Fuel
Albizzia lebbek	Siras	Timber, Fuel
Acacia catechu	Khair	Medical, Timber, Kattha
Aegle marmelos	Bel	Food, Timber, Mythological
Bauhinia variegate	Kachnar	Ornamental
Cassia fistula	Amaltas	Aesthetic, Fuel
Dalbergia sissoo	Shisham	Timber, Fuel
Delonix regia	Gulmohar	Aesthetic, Recreational
Eucalyptus hybrid	Safeda	Timber, Fuel
Emblica officinalis	Amla	Mythological, Fuel Timber,
Polyalthia longifolia	Ashok	Aesthetic, Recreational
Prosopis julifera	Kabuli kikar	Timber, Fuel
Phoenix dactylifers	Khajur	Food, MFP (Fan)
Populus sp.	Poplar	Timber
Pongamia glabra	Karanj	Medicinal
Ficus religiosa	Papal	Mythological, Timber
Ficus benghalensis	Bargad	Timber, Fuel

Plant Species	**Vernacular Name**	**Enthanobotanical Values**
Holoptelea intgrifolia	Papri	Timber, Medicinal
Morus alba	Shahtoot	Food, Timber
Morus raphii	Philkhan	Timber, Fuel
Mangifera indica	Aam	Mythological, Timber, Fuel
Syzygium cumini	Jamun	Food, Timber
Tarminalia arjuna	Arjuna	Aesthetic, Recreational
Teminalia belerica	Baheda	Medicinal, Timber
Anisomeles ovata	Jangali Tulsi	Medicinal
Achyranthes aspera	Apmarg	Drugs, Medicinal
Calotropis procera	Aak	Medicinal
Mimosa pudica	Chiumui	Aesthetic
Nerium indica	Kaner	Aesthetic, Recreational
Opuntia dillenii	Nagphani	Medicinal
Sathura matel	Datura	Poison, Medicinal
Tribulus terrestris	Gokharu	Medicinal
Zizyphus numularia	Jahrberi	Food, Fodder
Cynodon dactylon	Dub	Fodder
Desmostachya bipinnata	Dab	Huts
Erianthus munja	Munj	Huts
Saccharum spontaneum	Kans	Huts
Cuscuta reflexa	Amarbel	Medicinal
Butea monosperma	Palash	Aesthetic
Tectona grandis	Teak	Timber
Ocimum gratissimum	Ram Tulsi	Medicinal
Delonix regia	Gulmohar	Ornamental
Calotropis procera	Akman	

7. Fauna Diversity:

To prepare a detailed report on the status of wildlife biodiversity within 10 km radial area along the proposed project to assess the impacts due to the project activity and evolve suitable mitigation measures to protect and conserve wildlife biodiversity following components were studied:

a) Wildlife Survey (Diversity)
b) Habitat Study (Feeding, Breeding and Roosting areas)
c) Distribution/Status of Birds
d) Rare & Endangered species of Fauna
e) Specific local characteristics of biodiversity in the study area.

The domestic animals observed in the study area are mainly mammals and aves as listed in the **Table 3**. In absence of natural forest (National parks and Sanctuary), there is a dearth of wild animals in the study area. Peacocks can be easily seen in the study area, even in villages. Infect, peacocks are treated as pet birds in this area. A list of birds, reptiles, amphibians and rodents based on information gathered from local enquiries and Forest department is presented in table-**3.**

Table 3: Faunal Diversity observed along core and buffer zone

Sr. No.	Scientific Name	Common Name	Schedule
1.	*Bendicota bengalensis*	Field Rat	Schedule-IV
2.	*Boselaphus tragocamelus*	Nilgai	Schedule-III
3.	*Funambulus pennanii*	Five Striped Palm Squirrel	Schedule-IV
4.	*Herpestes edwerdsii*	Common Mangoose	Schedule-II
5.	*Lepus nigricollis*	Indian Hare	Schedule-IV
6.	*Maccaca mulata*	Monkey	Schedule-II
7.	*Mus booduga*	Indian field mouse	Schedule-V
8.	*Presbytis entellus*	Hanuman Langoor	Schedule-II
9.	*Rattus rattus*	Black Rat	Schedule-V
10.	*Rousettus leschenaultia*	Bat	Schedule-V
11.	*Suncus murinus*	Chachundar	Schedule-IV
12.	*Sus scrofa*	Wild Boar	Schedule-III
AMPHIBIANS			
13.	*Duttaphrynus melanosticus*	Common Indian Toad	Least Concern
14.	*Bufo stomaticus*	Marbled Toad	Least Concern
15.	*Rana tigrina*	Indian Bull Frog	Schedule-IV
REPTILES			
16.	*Hemidactylus triedrus*	Indian Termite Hill Gecko	Least Concern
17.	*Hemidactylus frenatus*	Asian House Gecko	Least Concern
18.	*Calotes versicolor*	Indian Garden Lizard	Least Concern
19.	*Ptyas mucosus*	Indian Rat Snake	Least Concern

Sr. No.	Scientific Name	Common Name	Schedule
20.	*Bungarus caeruleus*	Common Indian Krait	Least Concern
21.	*Daboia russelli*	Russell's Viper	Least Concern
BUTTERFLIES			
22.	*Ixias marianne*	White orange tip	Common
23.	*Papilio demoleus*	Lime butterfly	Common
24.	*Euploea core*	Common crow	Common
25.	*Cyrestis thyodamas*	Common map	Common
26.	*Papilio polytes*	Common mormon	Common
27.	*Eurema hecabe*	Common Grass Yellow	Fairly Common
28.	*Danaus genutia*	Stripped Tiger	Common
29.	*Hypolimanas misippus*	Danaid Egg Fly	Common
30.	*Mycalesis perseus*	Common Bush Brown	Common
AVES			
31.	*Antigone antigone*	Sarus Crane	Schedule-I
32.	*Corvus splendens*	House Crow	Schedule-V
33.	*Columba livia*	Rock Pigeon	Common
34.	*Francolinus pondicerianus*	Gery francolin	Least Concern
35.	*Turoides striatus*	Jungle babbler	Schedule-IV
36.	*Acridotheres tristis*	Common Myna	Schedule-IV
37.	*Merops orientalis*	Green bee-eater	Least Concern
38.	*Coracias benshalensis*	Indian roller	Schedule-IV
39.	*Dicrirus macrocercus*	Black Drongo	Schedule-IV
40.	*Microcarbo niger*	Little cormorant	Schedule-IV
41.	*Apus apus*	Common swift	Schedule-IV
42.	*Apus affinis*	House swift	Schedule-IV
43.	*Accipiter badius*	Shikra	Schedule-IV
44.	*Bubulcus ibis*	Cattle Egret	Schedule-IV
45.	*Egretta garzetta*	Little Egret	Schedule-IV
46.	*Ardeola grayii*	Pond heron	Schedule-IV
47.	*Vanellus indicus*	Red wattled lapwing	Schedule-IV
48.	*Pseudibis papillosa*	Black Ibis	Schedule-IV
49.	*Streptopelia decaocto*	Ring dove	Schedule-IV
50.	*Streptopelia chinensis*	Spotted Dove	Schedule-IV
51.	*Halcyon smyrnensis*	White Breasted Kingfisher	Schedule-IV
52.	*Merops persicus*	Blue Cheeked Bee Eater	Schedule-IV
53.	*Eudynamys scolopacea*	Asian Koel	Schedule-IV
54.	*Srniculus lugubris*	Drongo Cuckoo	Schedule-IV
55.	*Pavo cristatus*	Indian peafowl	Schedule-I
56.	*Gallus sallus*	Red Jungle Fowl	Schedule-IV
57.	*Amaurornis phoenicurus*	White breasted water hen	Schedule-IV
58.	*Gallinule chloropus*	Common Moorhen	Schedule-IV
59.	*Corvus corax*	Raven	Schedule-IV
60.	*Dendrocitta vagabunda*	Tree Pie	Schedule-IV

Sr. No.	Scientific Name	Common Name	Schedule
61.	*Saxicoloides fulicata*	Indian Robin	Schedule-IV
62.	*Saxicola caprata*	Pied Bush Chat	Schedule-IV
63.	*Nectarinia asiatica*	Purple Sun Bird	Schedule-IV
64.	*Nectarinia minima*	Small Sun Bird	Schedule-IV
65.	*Passer domesticus*	House Sparrow	Schedule-IV
66.	*Parus major*	Grey Tit	Schedule-IV
67.	*Pycnonotus cafer*	Red Vented Bulbul	Schedule-IV
68.	*Acridotheres ginginianus*	Bank Myna	Schedule-IV
69.	*Turdoides caudatus*	Common Babbler	Schedule-IV
70.	*Orthotomus sutorius*	Tailor Bird	Schedule-IV
71.	*Psittacula krameri*	Rose Ringed Parakeet	Schedule-IV
72.	*Ploceus philippinus*	Baya	Schedule-IV
73.	*Bubo bubo*	Owl	Schedule-IV

8.0 Endangered Species:

As per list of **The Indian Wildlife (Protection) Act, 1972,** Fauna coming under the **schedule - I** is treated as endangered species. The **schedule - I** fauna as per reconnaissance survey are *Pavo cristatus,* and *Antilope antilope.* Although these are very common species and found in every locality, even in villages, certain steps should be taken to conserve the critical wild life:

I. Programs for the conservation of wildlife will be formulated and implemented outside the protected areas by educating the local communities with help of local public agencies, and other stakeholders including the environment division officers of our company, in order to reduce the scope of man-animal conflict.
II. It will be ensured that human activities on the fringe of the protected areas do not degrade the habitat.

Over all, the status of wildlife in a region is an accurate index of the state of ecological resources, and thus, of the natural resources base of human well-being. This indicates the interdependent nature of ecological entities (the web of life), in which wild life is a vital link and a base of eco-tourism. Thus, the importance of conserving and protecting wildlife will be spread among the local people.

9.0 AQUATIC ECOLOGY:

The biological species are the best indicators of environmental quality. This includes different species, such as, phytoplankton, zooplankton, benthos, fishes etc. Studies on biological aspects

of certain ecosystems are an important part of any environmental impact assessment in view of the need for conservation of environmental quality and safety of aquatic life.

From the baseline survey on existing aquatic environmental conditions in and around the proposed Project on the Sengar River, Upper Ganga Canal, Haidar Nagar Distributary and other small canals and drainages the following data's were generated:

- Biological characteristics of river water
- Estimation of coliform organisms
- Inventorization of phytobenthos and Zoobenthos
- Present status of riverine fish fauna: Identification of fish species
- Migratory pattern, feeding and breeding grounds of the fish fauna
- Assessment of local catches during the field trips to assess the fish fauna

9.1Assessment of Aquatic diversity:

The samples for qualitative and quantitative analysis of planktons were collected from the sub surface layer at knee depth. Water samples were filtered through plankton net of 20µ mesh size (APHA, 1971). The filtered samples were concentrated by using the centrifuge. By using Lackey's drops method and light microscope (Lackey, 1938), the qualitative analysis was carried out for phytoplankton and zooplankton (**Table 4**). The standard flora and other literature were followed for the qualitative evaluation of Plankton.

Table 4: Phytoplankton and Zooplanktons Recorded in the Study Area

NAME OF THE GENUS	CLASS
(A)PHYTOPLANKTON	**(B)ZOOPLANKTON**
AMPHORA	ALONA
CYMBELLA	NAUPLINS
FRAGILLARIA	EUGLYPHA
GOMPHONEMA	CENTROPYXIS
GYROSIGMA	TICHOCERA
NAVICULA	EPIPHANES
ANKISTRODESMUS	EUGLYPHA
MICROSPORA	

9.2 Fish:

Fish occurrences were determined by collecting samples using different fishing gears like cast net, scoop net, hand net, hook-line, pot and open local devices methods. Also visual observations in different habitats were made. Fishes were identified up to the species level with the help of

keys of Jayaram (1981), Menon (1987) and Talwar and Jhingran (1997). IUCN red data list (2006) was compared to assess threatened, endangered and vulnerable species in the study area.

9.3 List of Fishes in the Study Area

Fish species reported in the area are listed in **Table 5**. Main fishes are *Notopterus notopterus, Catla catla, Labeo calbasu, Labeo rohita, Labeo bata, Mystus vittatus, Rita rita, Barbus spp*. and *Cirrinus raba*.

Table 5: List of Fishes Reported in the Study Area

S. No.	Fish Species	S. No.	Fish Species
1	*Notopterus notopterus*	9	*Wallago attu*
2	*Catla catla*	10	*Heteropneustres fossiliis*
3	*Labeo calbasu*	11	*Mystus vittatus*
4	*Labeo rohito*	12	*Mystus aor*
5	*Labeo bata*	13	*Hilra ilisha*
6	*Cirrihinus mrigala*	14	*Barbus spp.*
7	*Cirrihinus raba*	15	*Rita rita*
8	*Clarius batrachus*		

10.0 Riperian Diversity:

Major River under this proposed project is the Sengar River, Upper Ganga Canal, Haidar Nagar Distributary and other small canals and drainages. The river Ganga, life line for millions of people is aptly called the “River of India”. This river is the most widely written about and worshipped of all the renowned rivers throughout the world.

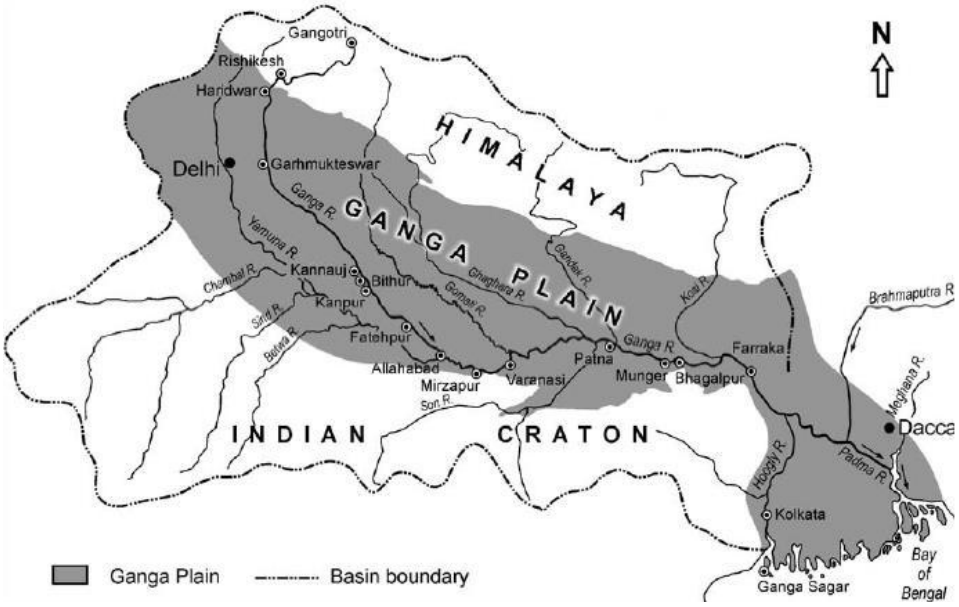

Fig: Ganga plains in India

10.1 The riparian flora of Ganga basin

River bank vegetation is ecologically termed as riparian flora, and is highly dynamic. It links terrestrial and aquatic habitat, under the influence of waterways such as rivulet banks or riverbanks, is represented by a particular type of vegetation that grows along the sides of rivers, which are called the river's riparian zone. Riparian plant habitats and communities are characterized by hydrophilic plants. Riparian vegetation consists of macrophytes, native grasses, sedges, climbers, shrubs and trees. Riparian zones are significant in ecology and environmental management, because of their role in soil conservation, their habitat biodiversity, and the influence they have on fauna and aquatic ecosystems, including grassland, woodland, wetland or even non-vegetative. Buffer strips of riparian vegetation are effective in reducing sediment and nutrient loads.

Figure 2: Riparian flora of upper Ganga canal

The canopy of riparian flora in Hathras region is mainly composed of *Shorea robusta, Diospyros melanoxylon, Boswellia serrata, Terminalia tomentosa, Terminalia bellayoica, Terminalia arjuna, Pterocarpus marsupium, Madhuca indica, Justicia peploides, Rungia pectinata, Achyranthes aspera* and *Ipomoea*. The important species of this land were *Justicia peploides, Rauwolfia serpentine, Eclipta prostrate, Leucas aspera, Desmodium gangeticum, Lippia javanica* and *Scoparia dulcis*.

CONSERVATION MEASURES

It is critical that urgent efforts are made to understand the habitat and population status of the species through field based research and *in situ* conservation projects. A meeting of the Indian Board for Wild Life (held on 19 June 2006) underlined the need for such efforts. The actions required are:

1) Mapping of habitat and distribution status of the species across the country, inside and outside protected areas;
2) Time series analysis of habitat change to quantify the rate of change and identify high-risk areas and potential sites for further affirmative action;
3) Estimation of population size by established count methods such as line transect, call counts and roost counts;
4) Intensive ecological investigations in representative sites in major biogeographic zones with focus on the effects of threats in relation to breeding success and survival probability;
5) Quantification of trade, with details on source and people involved; and
6) Undertaking outreach activities to sensitize local communities, this may be carried out by a network of ‘student clubs’ (e.g. National Green Corps) throughout the country. These people could be trained to collect population data and undertake monitoring within their localities, and the reliability of the results could be ensured by adopting rigorous protocols.

11.0 FINANCIAL PROJECTION

Rs. 20.00 Lakhs has been allocated towards conservation of scheduled fauna in the area for the implementation of conservation proposal.

Table 11.1: Budget for Conservation/Management Plan

S. No.	Component	Budget in Rs (Lakh)
1	Planting of trees groves in surrounding area and Promotion of agro forest in villages planting fruits trees	**5.00**
2	Artificial nests, feeding and watering arrangement for animals	**2.00**
4	Workshops, Training and awareness programs	**2.00**
5	Water supply	**2.00**
6	Salt Licks	**2.00**
7	Contingency	**2.00**
Total		**15.00**