Interim Report

Heritage and Biodiversity Conservation Programme

# An Inventory of Nepal's Terai Wetlands

Compiled by:
Dr. Bishnu Bhandari

IUCN–The World Conservation Union

IUCN
The World Conservation Union

# An Inventory of Nepal's Terai Wetlands

Compiled by:
Dr. Bishnu Bhandari



IUCN–The World Conservation Union

1996

Published by: IUCN Nepal



The role of the Swiss Agency for Development and Cooperation in supporting the IUCN Nepal is gratefully acknowledged.



Citation: IUCN Nepal. 1996. *An Inventory of Nepal's Wetlands*. IUCN Nepal, Kathmandu, xvi + 309 pp.

Design & Layout: Dilip K. Munankarmi

Cover Illustration: Ekaram

Available from: IUCN Nepal
P.O. Box 3923
Kathmandu, Nepal

*Dedicated*

*to*

*the Members of Informal Wetlands Group*
*and Wetland-dependent People of Nepal*

# *Preface*

Nepal is well-known for its terrestrial ecosystems, especially those in its mountain ranges. However, water remains to be the lifeblood of all ecosystems, terrestrial as well as aquatic. Wetland habitats serve key-stone functions in any ecosystem. The importance of wetlands whether lentic (lakes, ponds, bogs, meadows) and lotic (rivers, streams, springs) will quickly be realized as soon as hydrological changes occur in an ecosystem. Wetland conservation, therefore, stands at the door step of biodiversity conservation. It is more so in Nepal where wetlands are few and far between.

The Heritage and Biodiversity Conservation Program of IUCN Nepal has pushed forward the cause of wetlands conservation. The wetland inventory was developed in IUCN Nepal as a part of the National Conservation Strategy Implementation Project of the National Planning Commission, and was carried on further by IUCN Nepal Country Office as an on-going programme. The wetlands programme focuses on approaches to conserve wetlands for their wise use as well as ecosystem services. An informal group of professionals involved in aquatic biology and fisheries, hydrology, meteorological studies, wildlife ecology, protected area management, and socio-economical and anthropological studies was consulted to launch the wetland programme. It resulted into a National Workshop on Wetlands Management in Nepal, 3-5 March 1993. The workshop participants quickly realized the need of an inventory of Nepal's wetlands, especially those of the Terai region which is in a rapid process of transformation.

Thus, IUCN-Nepal responded to the current need of Nepal by conducting an inventory of wetland habitats through first hand reconnaissance surveys. Survey methodologies and earlier data were made available to the Biodiversity Profiles Project (1995) conducted under the aegis of the Department of National Parks and Wildlife Conservation. It is hoped that the inventory and associated results compiled herein will serve as a direct input to future activities on biodiversity planning and implementation, including the forthcoming IUCN Nepal's contribution on Nepal Country Report on Biodiversity and the National Biodiversity Action Plan to be prepared and endorsed by the His Majesty's Government of Nepal.

29 December 1996
IUCN Nepal

Dr. Tirtha Bahadur Shrestha
Coordinator
Heritage and Biodiversity Conservation Programme

# *Acknowledgements*

The author is grateful to the following persons for their help and assistance in collecting data and information for the inventory.

1. ACHARYA, Paras (Ecology)
2. BARAL, Hem Sagar (Fauna)
3. CHOUDHARTY, Shiv Narayan (Fisheries)
4. CHOUDHARY, (Dr.) Ram P. (Botany)
5. CHOUDHARY, Ram L (Wetland Ecology)
6. CHOUDHARY, Upendra Lal (Agriculture)
7. DANGOL, Dharma Raj (Aquatic Botany)
8. GURUNG, Tek Bahadur (Fisheries)
9. MAHARJAN, Ekaram (Cover Artwork)
10. McEACHERN, Preston (Limnology)
11. MUNANKARMI, Dilip Kumar (Design and Layout)
12. SHRESTHA , Bishnu Das (Geography/Hydrology)
13. SHRESTHA, Kanhaiya (Secretarial Services)
14. SHRESTHA, Rabin (Data inputting)
15. SHRESTHA, Sri Krishna (Field Driver)
16. THAPA, (Dr.) R. B. (Entomology)

The author also likes to express his deep gratitude to Mr. John McEachern (Past-Country Representative) for his intellectual guidance and inspiration. Without his inspiration and labour of love, this inventory would not have been possible at all. Also, the author is thankful to Mr. Anil Chitrakar (Head of Office), and Dr. Tirtha Bahadur Shrestha (Coordinator, Heritage and Biodiversity Conservation Programme) for their support and encouragement, and Mr. Andrew Spezowka (IUCN Consultant) for his editorial assistance.

Last but not least the author wishes to thank Dr. Tirtha Man Maskey, Director General of Department of National Parks and Wildlife Conservation for his continued support to promote the cause of wetland conservation in Nepal.

Despite this cornucopia of intellectual inputs, I remain responsible for any misinterpretations. I invite the users of this interim document to express their comments, concerns and suggestions for further improvement.

Dr. Bishnu Bhandari
Socio-economist
Wetland Programme

# *Executive Summary*

## The Inventory

Wetland inventory is the preliminary synthesis of data and information on wetlands and their resources collected directly from the site by the staff members of IUCN Nepal. Its users are researchers, wetland managers, development workers and general readers who are interested in the conservation of wetland ecosystem in Nepal. Detailed information is found in the National Wetland Database established by IUCN Nepal. The inventory contains wetlands, lakes, ponds, canals, marshes, swamps, reservoirs and river floodplain of the Terai region. It contains physical, hydrological, limnological, biological (faunal and floral) data. It also contains information about users, major threats, and socio-demographic characteristics of local communities.

## Objectives

The primary objective of this inventory is to document and characterize wetlands for their wise use and conservation. This inventory will also be used as tool to monitor and assess ecological change taking place in and around wetland sites.

## The Setting

The wetland of the Terai region of Nepal was selected for study because of the following reasons: high productivity, high population pressure, heavy dependence on wetland resources, vulnerability, and easy accessibility. The Terai according to the LRMP classification occupies 14 per cent of land and, in combination with the Siwalik region, represents 23% of total lands.

## Methodology

A reconnaissance survey form was developed and pre-tested prior to conducting field visits. Primary data were collected by a team of experts from diverse fields. The data collection techniques also included PRA and secondary sources. The data were collected between the period 1993-1996. Data and information were triangulated as far as possible in the field. In the course of reconnaissance survey, the survey team traveled over 10,000 km from east to west Nepal and collected data on 163 wetland sites from 19 districts of the Terai region of Nepal.

## Findings

1. The highest per cent (38%) of wetland sites are found in the Far-Western Development Region, followed by the Central Development Region. Of the total number of wetland sites, 48% are lakes and ponds and 33% are riverine floodplain. The data also indicate that 51% of the lakes are found in Far-Western Development Region.

2. A total of 172 species of major wetland plants along with their socio-economic value have been identified from these sites. A short description of about 33 species of major wetland plants have been given. Lists of wetland crops, plants and weeds are also presented.

3. A total of 841 species of birds have been recorded in Nepal, of which 193 species are wetland dependent. Some 187 Species have been identified as birds dependent on wetland habitat in the Terai, of which about 180 species are reported from Koshi Tappu Wildlife Reserve. Amphibians, reptiles, invertebrates, and fishes reported in the Terai region are also mentioned in the report.

4. Of the 183 species of mammalian fauna recorded, many species are found associated with the wetlands of Terai. Greater one-horned rhinoceros (*Rhinoceros unicornis)*, swamp deer (*Cervus duvauceli duvauceli)*, asiatic wild buffalo (*Bubalus bubalis*), ganges dolphin (*Platanista gangetica*), fishing cat (*Prionaliurus viverrinus*) and smooth-coated otter (*Lutrogale perspicillata)* are few of the mammals which depend on Terai wetlands. The National Parks and Wildlife Conservation Act-1972 has listed all above as protected animals. Other important mammals found in the Terai region are pygmy hog (*Sus salvinus*), hispid hare (*Caprolagus hispidus*), four-horned antelope (*Tetracerus quadricornis*), crab-eating mongoose (*Herpestes urva*), wild boar (*Sus scrofa*).

5. The population of Terai is escalating and currently hosts 46.7 % of the Nepal's total population. The population per sq. km is 254 and the annual population rate is 2.75% (the national average is 2.08%). Dhanusha District has the highest population density with 461 per sq. km. Some 9.6% of the population is urbanized. The net-migration to the Terai region is 65% of the total national migration.

6. Various uses of wetland resources in Terai are mentioned along with their place of use.

7. It was discovered that fishing is the primary human activity in wetlands, representing 94% of all activity. The second highest use is animal grazing, which is done in 70 % of wetland sites. Irrigation occupies third position with 69%. Plant harvest and domestic use occupy fourth and fifth positions respectively.

8. The data on conservation status of wetlands indicate that only 6% of the wetlands are in excellent condition. Approximately 35% of wetland sites are in fair condition.

9. Data on land tenure in the Terai region indicates that five types of wetland ownership, and seven types of land tenure system are existent. Three types of rent payment were also recorded. According to information on land utilization patterns eight types of land uses are found around the wetland sites, and socio-cultural values associated with wetlands are varied. Some 20 wetland-dependent ethnic groups have been identified.

10. With regard to people's perspective on the conservation of wetlands and their resources, it was discovered that people are willing to conserve the wetlands around their villages provided they are given the ownership and control over their management and use. External assistance would be useful by way of technical assistance, periodic site visits and advice in programme planning. However, respective roles and responsibilities should be well defined.

11. Wetland habitat loss is schematically described, accompanying by a description of the major threats and disturbances to wetlands and surrounding areas. Wetland filling was determined to be the primary threat to wetlands found in 66% of all wetland sites. Fundamental and symptomatic causal factors are described. Agricultural run-off and dredging/drainage are the second and third threats found in 62% and 39% of wetland sites respectively. Other problems include pollution and species evasion leading to monocultures.

12. The major problems in order of importance are drainage, over-fishing, over-grazing, harvesting building materials, fodder and fuelwood collection, pollution, vegetation succession, and siltation.

13. A short description of 163 sites is presented with major flora and fauna found in the area, along with brief description of socio-demographic information.
14. Regarding wetland conservation efforts in Nepal, there is no wetland legislation as such although four acts deal with water and water resources in Nepal. The review of literature reveals that there are numerous efforts by professionals and organizations to inventory wetlands and their resources.
15. About eight government agencies and seven autonomous bodies are involved in the conservation of wetland and their resources. Ten NGOs and nine professional organizations are also in the field of wetland conservation. Similarly, nine donor agencies and seven INGOs are also active in wetland conservation.
16. A brief summary of IUCN Nepal's wetland conservation efforts (mainly protection, promotion of wise use, participatory planning, and public awareness) are also highlighted.

## Policy Suggestions

In order to protect wetlands and promote the concept of their wise use through participatory techniques and holistic approach, policy recommendations are put forth for consideration including, the adoption of a bioregional management approach, active and informed participation of local communities, action research, and multi-tiered awareness raising and training programmes. Other recommendations are the continuation and expansion of demonstration projects in other eco-zones, identification of critical wetland habitats, encouragement of community-based ecotourism planning, development of comprehensive wetland legislation and national wetland policy, and expansion of the existing wetland inventory to include wetlands of mountains and mid-hill regions. Some 8 technical annexes provide detailed information.

# Contents

PREFACE ..... v

ACKNOWLEDGEMENTS ..... vii

EXECUTIVE SUMMARY ..... ix

LIST OF TABLES AND FIGURES ..... xv

CHAPTER ONE: WETLAND INVENTORY ..... 1
- Why This Inventory ..... 1
- Computerized National Wetland Database System ..... 2

CHAPTER TWO: SURVEY METHODOLOGY ..... 3

CHAPTER THREE: TERAI REGION OF NEPAL ..... 6
- Biogeographical Realm ..... 6
- Physiography of Nepal ..... 7
- Geography of Terai ..... 11
- Physiography ..... 11
- Hydrological Status ..... 13

CHAPTER FOUR: DISTRIBUTION OF WETLANDS IN NEPAL ..... 16
- Concept of Wetlands ..... 16
- Distribution of Wetlands ..... 19

CHAPTER FIVE: WETLAND RESOURCES ..... 23
- Wetland Flora ..... 23
- Wetland Fauna ..... 34
- Limnology ..... 42

CHAPTER SIX: SOCIAL ASPECTS ..... 46
- Socio-demographic Realities ..... 46
- Human Use ..... 51
- Land Tenure and Land-use ..... 53
- Religio-cultural Values ..... 56
- Wetland-dependent People ..... 58
- People's Perspectives on Wetland Conservation ..... 60

CHAPTER SEVEN: PROBLEMS AND THREATS ..... 63
- Wetland Habitat Loss ..... 63
- Principal Threats and Disturbances ..... 64
- Major Problems ..... 65

CHAPTER EIGHT: SITE DESCRIPTION ..... 67-237

CHAPTER NINE: CONSERVATION EFFORTS ..... 238
- Wetland Legislation ..... 238
- Wetland Inventorying Activities ..... 239
- Institutions Involved in Wetlands Conservation ..... 241
- IUCN Wetland Activities ..... 245

CHAPTER TEN: POLICY SUGGESTIONS ..... 248

REFERENCES ..... 249

ANNEXES

Annex 1 Members of the Informal Wetlands Group ..... 254
Annex 2. Rapid Reconnaissance Survey ..... 256
Annex 3. Itinerary of Field Visits ..... 263
Annex 4. Locational Characteristics of Wetland Sites in Terai ..... 268
Annex 5. Area, Use, Major Threats, Ranking and Population of Wetland Sites in Terai ..... 276
Annex 6. Floral Diversity in Terai ..... 287
Annex 7. Avifauna Found in Terai ..... 301
Annex 8. Insect Fauna of Beesh Hazar Tal ..... 307

# *List of Tables and Figures*

TABLES:

CHAPTER: THREE
Table 1. Distribution of Lands By Physiographical Zone ..... 9
Table 2. Area Distribution of Terai Disricts ..... 9
Table 3. Major Basin Area and Run-off Information ..... 13

CHAPTER: FOUR
Table 1. Distribution of Wetlands in Terai by Development Region ..... 19
Table 2. Distribution of Wetlands in Nepal's Terai ..... 19
Table 3. Percentage Distribution of Wetland Types by Development Region ..... 20

CHAPTER: FIVE
Table 1. List of Wetland Plants and Their Uses ..... 26
Table 2. Some Wetland Products ..... 30
Table 3. Cultivation of Potential Wetland Crops and Their Uses ..... 31
Table 4. Vegetables Suitable for Wetland Sites ..... 32
Table 5. Major Herbaceous Weeds of Wetlands ..... 33

CHAPTER: SIX
Table 1. Population Distribution by Ecological Zone (1952/54–1991) ..... 46
Table 2. Population, Land, Arable Land & Population Density by Ecological Zone ..... 47
Table 3. Population Distribution by Ecological Zone (1952/54-1991) ..... 47
Table 4. Population Growth Rates of Terai by Development Region, 1991 ..... 47
Table 5. Population and Growth Rate of Terai Districts ..... 48
Table 6. Population Density of Terai by Development Region ..... 49
Table 7. Population Density in Terai by District ..... 49
Table 8. Urbanization by Ecological Zone (1981-1991) ..... 50
Table 9. Migration Status of Terai (In-migration and out-migration) ..... 51
Table 10. Uses of Wetlands in the Terai Region ..... 52
Table 11. Ranking of Wetland Sites in Terai (N = 163) ..... 53
Table 12. Land-use Status of Terai ..... 55

CHAPTER: SEVEN
Table 1. Major Threats to Wetland Sites (N = 163) ..... 65

FIGURES:

Figure 1. Physiographic Zones of Nepal ..... 10
Figure 2. Cross Section of Terai ..... 12
Figure 3. Cross Section of Terai River ..... 15
Figure 4a. Distribution of Wetlands in Nepal ..... 22
Figure 4b. Names of Wetland Sites ..... 23
Figure 5. The Process of Wetland Loss ..... 63

# Chapter One
# Wetland Inventory

## Why This Inventory

An essential step in sustainable development and use of resources is to understand what exists in the world. This knowledge is critical to analyzing how best to facilitate the process of sustainable development. In many cases, such analysis also leads to action. This inventory contributes to generating awareness and knowledge about the wealth of wetland resources in Nepal, which in turn will lead to action.

This inventory is a preliminary synthesis of relevant information for evaluating the importance of wetland ecosystems and assessing environmental threats which are occurring in Nepal's Terai. The inventory also serves as a tool to monitor changes in ecological characteristics of wetland sites. Since this contains baseline information, it can be used as a basis for subsequent work regarding in-depth wetland investigation.

### *Objectives*

The primary objectives of the inventory are as follows:

1. Document and characterize Nepal's wetland sites and their resources.
2. Identify the most important wetlands in terms of biodiversity, human pressure and management priority.
3. Gather preliminary information for the preparation of a national wetland action plan.

### *What It Contains?*

This inventory contains the following:

- Information on different types of wetlands (both natural as well as human-made) as identified by the first consultative meeting of the Informal Wetlands Group formed under the patronage of IUCN Nepal. These types of wetlands are: (1) lake, (2) pond, (3) river floodplain, (4) swamp, (5) marsh, (6) reservoir and irrigation , and (7) deepwater rice field. In the case of human-made wetlands, only those large enough to influence the functional characteristics of the ecosystem are included.
- Description of wetlands that are larger than five ha. in size, except those that are crucially important in maintaining critical functions of the ecosystem,
- Primary data on physical, biological (flora and fauna), limnological, hydrological and socio-economic information,
- Information on socio-cultural and socio-economic values and conservation status, and
- An overview of land tenure systems, people's perspectives on wetland conservation, uses, threats and disturbances.

### *Users*

The users of this inventory are principally researchers, students, professionals, managers, decision makers, academia, conservationists, environmentalists, policy

makers, and social and development workers interested in the conservation, management and wise use of wetlands in Nepal. It is also hoped that the inventory will be useful to raise public awareness about the ecological and socio-economic importance of wetland ecosystems.

## Computerized National Wetland Database System

In order to manage wetland information efficiently, IUCN Nepal has established a wetland database. This database system was developed on a Macintosh - Power PC (personal computer) with 44 MB (Mega Byte) RAM (Random Access Memory), 2 GB (Gega Byte) hard disk, and 7.5 operating system. The database software being used is 4th Dimension (4D) version 3.0.1, with Easy 4D version 4.0.1. The computerized database system has been designed as a relational database management system (RDBMS). In the current RDBMS, the wetlands of Nepal have been documented. However, this RDBMS is open-ended and has the facility to incorporate data on forests, protected areas, snowlands, wildlife trade, and other databases. Currently, IUCN Nepal is focusing on the database system for rare, endangered and threatened species, as well as habitats such as wetlands of Nepal (Shah and Shrestha, 1996).

The structure of the database was fully developed at IUCN Nepal. Geographical, socio-economic, limnological, and statistical data, including on flora and fauna in some 163 wetland sites are currently held in the relational database.

The wetland database has been developed on the software 4th Dimension to provide the facility of entering and modifying data in a very user friendly interface. There are several ways of querying for information, as there are various formats for customized reports with detailed information of each site, including maps and scanned photographs. Visual effects in the form of digitized photographs, topographic maps, sketches of the sites, pictures of flora and fauna, are included in the database along with audio effects. A Geographical Information System (GIS) is being linked to the database to display the locations of the wetland sites and to carry out studies on the basis of layering features available in GIS. This will enable the end-users to analyze the spatial variations of biodiversity information.

A common database of flora and fauna is linked relationally to the habitats to obtain a compact, yet comprehensive database. In this system, the user can perform simple searches as well as searches for information. Export and import of data are possible in Text, SYLK, DIF and ASCII formats. Individual records or any combination of records can also be printed in a list format. Scanned photographs of habitat sites, flora, and fauna have also been included in the database. Audio effects in the form of bird calls have also been incorporated. The MapInfo GIS software is being used to analyze the spatial distribution of data. The recommended memory to run this database is 12 MB.

The wetland database is used to produce the list and inventory of wetlands of Nepal. It is also linked to the GIS to show the location of wetland sites on the map of Nepal. The boundaries and surroundings of some important wetlands are in digital form in MapInfo software. For many small wetlands the sketches showing the shape of wetland, settlements, agricultural land, and roads near the wetlands are stored in the database in graphic form.

# *Chapter Two*
# *Survey Methodology*

### *Selection of the Site*

The following factors were taken into consideration while selecting Terai as the area for the wetland inventory:

1. high productivity in relation to other wetlands in the hill and mountain regions;
2. high degree of human dependence on wetland resources for sustenance;
3. housing of large natural lakes and floodplains;
4. easy accessibility throughout the year;
5. high degree of vulnerability due to immigration of hill people, deforestation in catchment areas in the hills and mountains, thereby causing siltation and subsidence to wetlands;
6. high pressures caused by rapid urbanization, road construction, industrial set up, other infrastructure developments, cultivation and reclamation of marginal forested lands;
7. relatively high significance in relation to biodiversity, and
8. wintering ground and stopover for migratory birds.

All natural wetlands larger than 5 ha, except Tara Tal which is about 3 ha in the middle of the cultivated lands, are included in the inventory. Only large human-made dams and reservoirs, that are likely to change the ecological characteristics of the area, are included in the study. Small human-made wetlands exclusively for fishery purposes have been omitted from the study.

### *Construction of Data Sheet*

The idea of preparing a wetland inventory for Nepal was raised in the first consultative meeting, convened under the auspices of IUCN, for wetland managers, scholars, researchers and academicians in April 1992. The meeting was first of its kinds held in Nepal. At this meeting, a preliminary version of the data sheet was developed and in subsequent meetings gaps were filled. The current data sheet is the culmination of a series of participatory exercises which were carried out by IUCN Nepal. IUCN Nepal extends its appreciation to the Informal Wetlands Group for their involvement in the preparation of the sheet (see Annex 1 for the list of members of the Informal Wetlands Group). The data sheet is primarily aimed at gathering information on important flora and fauna, limnology and hydrology information , conservation status, uses and threats to wetland resources, and information about people living in the vicinity.

### *Pre-testing of the Data Sheet*

The data sheet was pre-tested at various locations to keep it simple and reflective of its intended purposes. While formulating the sheet, the principle of optimum ignorance was taken into consideration to avoid redundant and unnecessary information. This helps in facilitating the respondents to answer questions promptly. Following final

reformatting, the sheet was titled a "rapid reconnaissance survey form" (see Annex 2 for details).

### *Formation of the Team*

The core team members were given intensive training on the forms. It was anticipated that at least one core member would accompany the survey team to the field. Other team members were given training at the time of the field visit. The core team of IUCN made a reconnaissance visit of the important wetland sites in early 1993 and then the rapid survey of the sites was conducted over a three year period. While forming the team, considerations were given to ensure its multi-disciplinary composition. Every effort was made for team members to understand the instruction manual and how to fill out the required forms.

### *Administration of Data Sheet*

Observation techniques were used to collect physical, geographical and floral information. Key informants were used to collect additional information. In each case one core member was present at the time of data collection. Geographical information was collected by the help of GPS (global positioning system) and an altimeter. Socio-economic information was collected by Participatory Rapid Appraisal (PRA) techniques and information was triangulated from multiple sources. Post-editing of the sheet was done in the field at the end of each visit.

In the course of data collection, the team traveled over 10,000 miles from east to west in the Terai over the period of 4 years (see Annex 3 for field itinerary) and visited 163 wetland sites from 19 districts of the Terai region (see Annex 4 for locational characteristics). Some of the sites were revisited to validate existing information.

### *Tools Used*

As mentioned above, Participatory Rapid Appraisal (PRA) techniques were used to collect data and information from the field, the common tools being: (1) secondary information, (2) key informant survey, (3) informal survey, (4) field observation, (3) census data, (6) field diary, (7) documentation process, (8) field visit, and (9) personal interviews. The paraphernalia of the team included a Rockwell Handheld GPS Receiver to calibrate coordinates of the sites, Pretel Alti Plus K2 altimeter, a camera , map and aerial photos.

### *Data Analysis and Presentation*

The data were inputted into the National Wetland Database. This database is linked with the Biodiversity Database maintained by IUCN Nepal. The database has all the information including the pictures of animals and birds and their vocal sounds. The data were processed for their presentation and interpretation. The brief presentation of information on each site can be found in Chapter Eight.

### *Ranking of Sites*

With a view to assist in conserving and managing wetlands and their resources, the sites were subjectively assessed according to the following criteria:

- Overall importance of wetlands in relation to plants, animals and fish;
- Uniqueness or representational value;
- Human dependence on resources;
- Obvious threats and disturbances to the ecosystem;

- Vulnerability due to closeness to settlements, roads, industrial zones, livestock grazing, and so forth;
- Conservation priority in relation to other wetland sites; and
- Population pressure

The subjective evaluation of the site is presented in a conservation continuum that is designed primarily to prioritize conservation actions. The continuum has four categories that run from excellent to poor. The meaning of each category is presented below.

- **Excellent** — no need of conservation. The site is in good condition.
- **High** — may need conservation to maintain ecological characteristics.
- **Average** — needs conservation measures to protect the site from further degradation and encroachment.
- **Fair** — needs immediate conservation measures, without which the ecological functions of the site may be irreparably damaged.
- **Poor** — the site has already lost its ecological characteristics and needs to be restored, or, the site may not deserve any conservation efforts owing to its irreversible natural state.

# *Chapter Three*
# *Terai Region of Nepal*

## Biogeographical Realm

Nepal is a tiny landlocked country located on the mid-Himalayan mountain section of Asia. It covers an area of 147,181 sq. km. It is about 500 km from the nearest sea. On average, Nepal stretches for 1000 km in an east-west direction and 150 km in a north-south direction. Its geographical coordinates are longitudes 80° 4' to 88° 12' East and latitudes 26° 22' to 30° 27' North. Wedged between India to the south and People's Republic of China to the north, it is a mountainous country with about 77% of its total area consisting of mountains, hills, gorges, canyons, and river valleys. In general, its topographic features increase from south toward north and is likened as a staircase.

Based on the distribution of mammals and birds, biogeographical realms (or regions) of the world have been classified into many parts. This classification is used for conservation purposes only. According to the unified system of natural regions of land and freshwater lakes of the world, Udvardy (1975:11) has recognized the following realms:

1. Palearctic Realm
2. Nearctic Realm
3. Africo-tropical Realm
4. Indo-malayan Realm
5. Oceanian Realm
6. Australian Realm
7. Antarctic Realm
8. Neo-tropical Realm

Since Nepal falls within the Palearctic and Indo-malayan realms, a brief description of these realms are given below.

### *Indo-malayan Realm*

This realm, called Oriental Region by Wallace or Indian Region by Sclater (Udvardy, 1975:30), extends from the Indian region to Indonesia and the Pacific Islands. It consists of Asia south of the temperate-Palearctic Himalayan chain and the continuing Szechwan Mountains, southern coastal China particularly south of Nanking range, Sri Lanka, Pakistan and Nepal. This realm is characterized by clean forests which extend to an altitude of 3000 m along the slopes of the Himalayas. In this realm there are 27 biogeographic provinces under which two fall in Nepal: the Bengalian Rainforest and Indus-Ganges Monsoon Rainforest. The usual species of large game animals found in this realm are: sambar, hog, barking deer (muntjac), buffaloes, wild cattle, serow, blue bull, black buck, gazelle, elephant, and rhinoceros.

### *Palearctic Realm*

This realm includes the Macronesian islands, Mediterranean North Africa and the Sahara, Arabia, the eastern half of the North Atlantic and the Himalayan chain of Asia. The palearctic realm of Nepal consists of Tibetan, Himalayan Highland and Hindu-Kush Highland biogeographic provinces.

Nepal can be divided into three faunal zones: a) Cis-Gangetic (Indian) Zone, b) Central or Trans-Gangetic (Himalayan) Zone, and c) Northern or Palearctic Zone.

From a floristic point of view, the regions have been divided into six regions: 1) Boreal Region, 2) Paleotropical Region, with subdivisions as African, Indo-malayan, and Polynesian, 3) Neo-tropical Region, 4) South African Region, 5) Australia Region, and 6) Antarctic Region. According to Good, Nepal lies in the Indo-malayan subdivision of paleotropic region (Majpuria, 1981-82).

### *Habitat Classification*

The following habitats are found in the Terai region of Nepal:

- Sal forest
- Tropical Deciduous Riverine Forest
- Tropical Evergreen Forest
- Subtropical Evergreen Forest
- Saj forest
- Sisso -Khair forest
- Simal forest
- Euphorbia royleana scrub
- Pinus roxburghii forest

The common grasslands found in the region are:

- Saccharum - Phragmitis Type
- Saccharum - Typha Type
- Sccharum Type
- Imperata Type
- Cymbopogon Type

The common wetlands are:

- Riverine floodplain wetlands
- Lacustrine wetlands
- Palustrine wetlands
- Reservoirs
- Deepwater rice paddies

## Physiography of Nepal

Nepal is drained mainly by three rivers and their tributaries -- the Koshi in the east, the Gandaki in central Nepal and the Karnali in the west. Other rivers that originate

from the Mahabharat range include the Mechi, Kankai, Kamala, Bagmati, Tinau, Rapti, Babai, and Mahakali.

Five different types of climate on the basis of topographic features have been recognized: 1) sub-tropical climate, 2) warm temperate climate, 3) cool temperate climate, 4) alpine climate, and 5) tundra climate. Natural vegetation zones are as follows: 1) sub-tropical evergreen forest, 2) deciduous monsoon forest, 3) evergreen coniferous forest, 4) alpine grassland, and 5) tundra vegetation.

The Kingdom of Nepal covers about 0.1% of the earth's land surface. More than 80% of its land is rugged hills and mountains. The Master Plan for the Forestry Sector in Nepal reports that the number of ecosystems per unit area is probably greater than in any other country in the world (HMG, 1988:8). In this report, the physiographic zones are modeled after the Forest Sector Master Plan, which are: 1) High Himal, 2) High Mountains, 3) Middle Mountains, 4) Siwaliks, and 5) Terai (see Figure 1: Physiographic Zones of Nepal). Their description is given below (HMG, 1988:8).

1. **High Himal Zone** — the High Himal Zone is an area of rocks, ice-covered massifs, snow fields, valley glaciers, and meadow lands. It lies between the upper limits of forest vegetation and the crests of the Himalayas. Most of the High Himal is in a natural state, but many meadows on the slopes of glacial valleys have been overgrazed, with resulting sod breakage and soil movement.
2. **High Mountain Zone** — the High Mountain Zone lies between the heavily populated Middle Mountains and the almost unpopulated High Himal and generally starts from the forest line at about 4000 m. The Master Plan describes it as the footslopes of the High Himal. The slopes in this region are long, straight and steep, and therefore sensitive to erosion.
3. **Middle Mountain Zone** — this zone comprises the central belt of Nepal, mostly a network of ridges and valleys. Less than 5% is flat land. The lowest parts are bottomlands in the east, at about 200 m and the highest points are on the ridges that extend down from the High Mountains, at about 3000 m. Long and intensive use of the land is attested by the intricate, extensive terrace system, and inevitably by a large number of land slide scars, areas of eroded soil, and loss of forest land.
4. **Siwalik Zone** — the Siwaliks are locally known as Inner Terai (Bhitri Madesh = the area enclosed between the Chure and the Mahabharat Lekh), or Duns, and are a series of low, hogback ridges in a sinuous pattern that run the length of Nepal. The Siwaliks are also called Chure. It is the continuation of extra Himalayan hills formed during the last upheaval of the Himalayan orogeny and lies between 120 to 2000 m. They are the lowest ridges of the Himalayan mountain system. Most of the ridges remain under forest because of their coarse-textured, stony, shallow soils. Steep slopes make this zone unsuitable for cultivation.
5. **Terai Zone** — the zone lying between the Siwaliks on the north and Indian border on the south is a plain whose elevation ranges from 60 to 330 m, with a gentle southward slope of less than 1%. Along its northern edge lies the Bhabar (or Bhabar Terai). The Bhabar Zone is characterized by boulders and gravel, and very freely drained soils. Unlike the Terai zone, the Bhabar zone is unsuitable for agriculture.

The altitude range and approximate areas of these zone are given in Table 1.

## *The Terai Zone*

The Terai region is the plain region in the southern part of Nepal and provides homes for over half of the total population of the country. It covers some 27 % of the total area of Nepal. Administratively, 20 districts lie in the Terai region, of which seven are in the Central Development Region, and five in the Eastern Development Region. The rest are distributed in three other development regions. Some parts of Dadeldhura, Surkhet, Arghakhanchi, Illam, and Udaipur districts also fall in the Terai

region. In terms of area, the largest districts are Kailali, Morang and Kapilbastu respectively (see table 2 for details)

**Table 1. Distribution of Lands By Physiographical Zone**

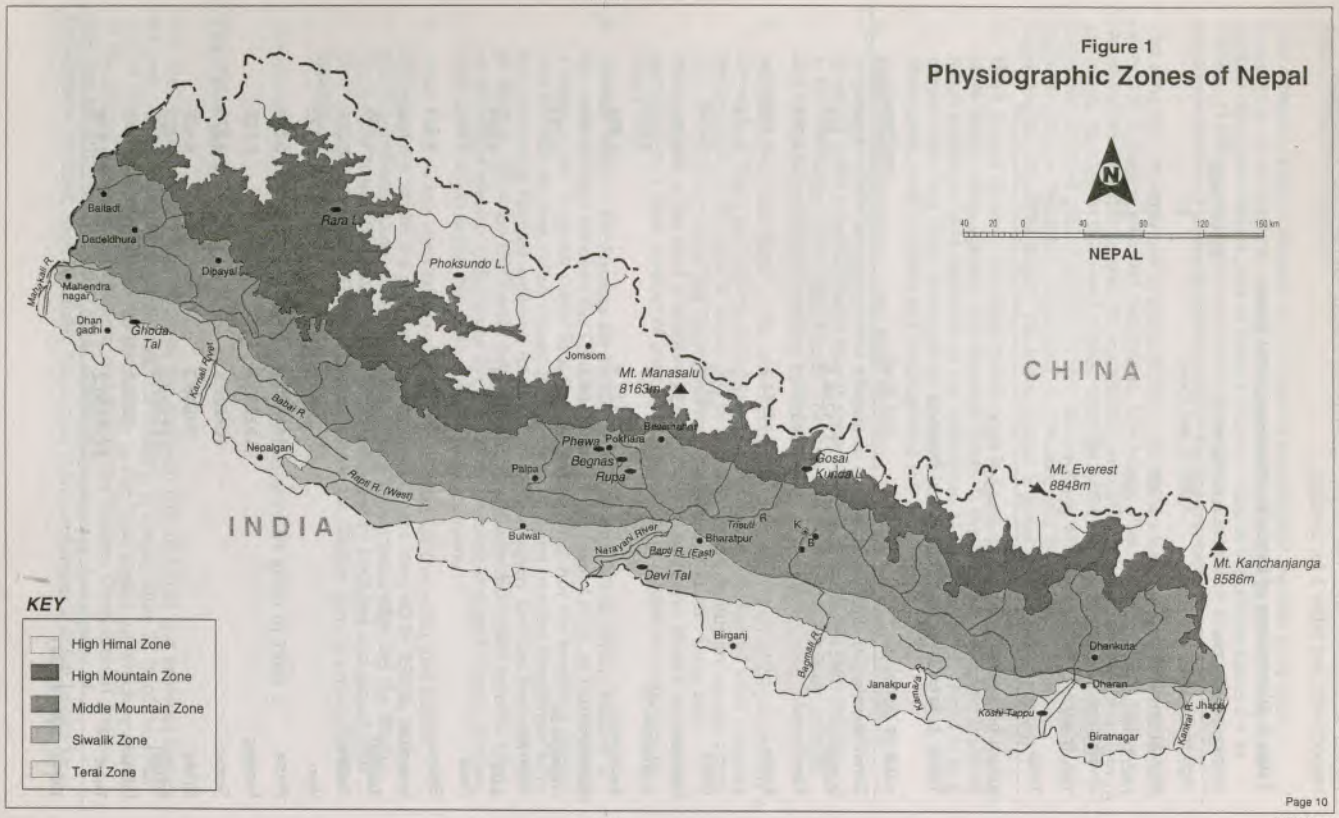
| PHYSIOGRAPHIC ZONE | ALTITUDE RANGE | PERCENTAGE |
|---|---|---|
| High Himal Zone | 4,000 m and above | 23 |
| High Mountain Zone | 3,000 | 20 |
| Middle Mountain Zone | 2,000 | 30 |
| Siwalik Zone | 120-2,000 | 13 |
| Terai Zone | 60-330 | 14 |
| **Total** | | **100** |

*Source: His Majesty's Government of Nepal, 1988.*

**Table 2. Area Distribution of Terai Districts**

| NAME OF DISTRICTS | AREA IN HA. | PERCENTAGE |
|---|---|---|
| Dandeldhura | 137.5 | 0.006 |
| Kailali | 194206.6 | 9.086 |
| Kanchanpur | 143221.3 | 6.701 |
| Banke | 116751.3 | 5.462 |
| Bardia | 141036.0 | 6.598 |
| Dang | 392.2 | 0.018 |
| Surkhet | 121.5 | 0.006 |
| Arghakhanchi | 8.0 | 0.000 |
| Kapilbastu | 147172.9 | 6.886 |
| Rupandehi | 120106.7 | 5.619 |
| Nawalparasi | 55517.2 | 2.597 |
| Chitwan | — | — |
| Bara | 112944.2 | 5.284 |
| Parsa | 105375.6 | 4.947 |
| Dhanusa | 91295.3 | 4.271 |
| Mahottari | 82041.2 | 3.838 |
| Rauthat | 95920.8 | 4.488 |
| Sarlahi | 106897.9 | 5.001 |
| Ilam | 2609.0 | 0.122 |
| Jhapa | 146735.1 | 6.865 |
| Morang | 152238.8 | 7.123 |
| Saptari | 104289.8 | 4.879 |
| Siraha | 94888.2 | 4.439 |
| Sunsari | 115887.8 | 5.422 |
| Udaipur | 7275.3 | 0.340 |
| **Total** | **2137430.2** | **99.998** |

*Source: LRMP (1986)*


84°00'
Figure 1
Physiographic Zones of Nepal
N
40 20 0 40 80 120 160 km
NEPAL
CHINA
INDIA
Bailadi
Dadeldhura
Mahakali R.
Mahendra nagar
Dhan gadhi
Ghoda Tal
Karnali River
Dipayal
Rara L.
Phoksundo L.
Jomsom
Mt. Manasalu 8163m
Babai R.
Nepalgani
Rapti R. (West)
Phewa
Pokhara
Begnas
Rupa
Palpa
Gosai Kunda L.
Mt. Everest 8848m
Bulwal
Narayani River
Bapti R. (East)
Devi Tal
Tribuli R.
Bharatpur
Mt. Kanchanjanga 8586m
Birganj
Bagmati R.
Janakpur
Kamala R.
Dhankuta
Dharan
Koshi Tappu
Biratnagar
Kankai R.
Jhapa
KEY
High Himal Zone
High Mountain Zone
Middle Mountain Zone
Siwalik Zone
Terai Zone
84°00'

## Geography of Terai

Sharma (1977) states that the Himalayas took their present shape during the alpine orogeny. The rivers originated from these Himalayas and began flowing to the midlands. These rivers are now termed old pre-Himalayan rivers. Geologically, these rivers are grouped into four types: new (new rivers of the Terai region), very young (rivers coming from the Churia hills), young (rivers coming from the Mahabharat range such as Kankai, Kamala, Bagmati, Tinau, Babai), and old (pre-Himalayan rivers such as Koshi, Gandaki, Karnali). The older the river, the wider the main channel. The old rivers started depositing sediments in the shallow area, giving rise to the Churia hills. After the creation of the Churias, depressions of the Indo-Gangetic plain formed; soon after they received sediments from the rivers flowing from the southern and northern side of the Himalayas, creating basins in the south. Shrestha (1991) reports that about 6,000 rivers have been identified in Nepal, carrying about 174 billion cubic meters of run-off annually. These rivers have created major river basins at the foothills of the Churias called the Terai.

Jha (1993) reports that the word "Terai" is relatively of recent origin and is used interchangeably for "Madesh", which is derived from the Sanskrit word "Madhyadesh" meaning the mid-country between the foothills of the Himalayan mountain in the north and the Bindhya mountain in the south. People living in this region have been called Madheshis or Madheshiyas. In the Hindi language, Terai means a marshy ground or a meadow and is synonymous with the centre of Hindu culture and civilization. According to K.C. (1989), Terai means "marsh" and consists of fine and fertile alluvial soil. The middle land between the Gangetic belt on the south and the hills on the north is called *Madhesh* and consists of the Churias (geologically called the Siwaliks). The area usually gets flooded in the rainy season. The elevation of the Terai including the Siwalik hills ranges from 60 m in the south to 1000 m in the north. Because the water that percolates into the Bhabar region of the Terai reappears in this area, the area is moist with clay soils which do not permit water percolation. It consists of fine and fertile alluvial loamy soils deposited by the rivers that flow from the northern mountains. Agriculturally, these soils are of tremendous significance. Hence, the Terai is also known as the granary of Nepal, and the expansion of cultivation is placing pressure on natural wetlands. The soil is rich and porous, and is forested with a luxurious growth of trees, mostly sal (*Shorea robusta*), due to the reappearance of water in the Bhabar region.

Biogeographically, the region falls in the Indo-Malayan region and is characterized by tropical climatic conditions. The area is rich in natural resources and houses a number of habitats such as wetlands, grasslands, forests, riverine floodplains and so forth. These habitats support endangered species of mammals, reptiles, avifauna, and plants. Also, these areas serve as grounds for wintering and staging migratory birds. Rain occurs in Nepal through the summer monsoon blowing from a south-east direction. The rain decreases from central Nepal towards the west. The intra-Himalayan high basins located in Mustang, Dolpa and Manang districts are rain shadow areas which receive the least amount of rain (<500 mm). On the other hand, there are several pockets in the hilly and mountainous zones of central and eastern Nepal where the total rainfall is exceptionally high (>3,000 mm).

The climatological records of 1986 suggest that Pokhara has an annual average precipitation of 3,907 mm with a decreasing trend towards the west, 1,931 mm in Surkhet, 1,009 mm in Nepalgunj, 1,444 mm in Dhangadhi, and 1,578 mm in Dipayal. Thus, the perennial source of water are the three main rivers: Koshi, Gandaki and Karnali.

## Physiography

The Terai is a continuation of Gangetic alluvial plain and extends from east to west along the southern part of the country. The Terai region is the "granary of Nepal".

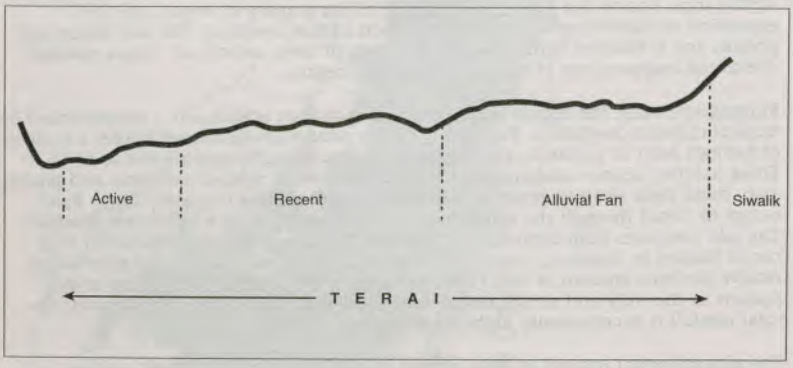
The Terai consists of deep alluvial deposits of recent and post-pleistocene age. These materials are deposited in the foredeep of the Himalayas during the process of Himalayan orogeny. The depth of Terai alluvium varies from place to place. The regularity of the Terai belt has been fragmented at two places, Dang and Chitwan, because of the presence of the Chure range. The Western Terai covers Kanchanpur, Kailali, Bardia and Banke Districts. The central Terai includes Kapilbastu, Rupandehi, Chitwan and Nawalparasi Districts. The Eastern Terai, being the largest area of the region, includes Parsa, Bara, Rauthat, Sarlahi, Mahottari, Dhanusa, Siraha, Saptari, Sunsari, Morang and Jhapa Districts. Rauthat District has the maximum width about 40 km. The Terai region contains different landscapes with large number of undeveloped drainage systems. The main soil of Terai is loam, i.e. sand and clay mix, with a yellowish brown color. In Terai rivers lay down new deposits on the river beds. These new alluvia are called Dhab. The Dhab areas are prone to flooding during the rainy season (Sharma, 1990; NPC, 1994).

## *Topographical Features*

The Terai region consists of alluvial deposits of recent to pleistocene age. It is bordered by the Indo-Nepal border in the south and Siwaliks in the north. Elevation ranges from 60 to 330 m with slope gradients of 2 to 10 m per km from south to north. The land is generally flat with minor relief caused by on going river action and tectonism.

Terai region can be divided into following three parts based on its cross-section from North to South (see Figure 2): i) Active Layer, ii) Recent Alluvial Plain, and iii) Older Alluvial Plain. Active layers are the areas on lower ground adjacent to major rivers. Flooding is a problem in such areas. Soils show pedogenetic development and coarse texture. The recent alluvial plain is more elevated than the active alluvial plain and supports a large proportion of Terai people. Water tables are high throughout the year and rain fall ponding commonly occurs. Older alluvial deposits have the best developed soils (Zollinger, 1980; Sharma, 1990).

**Figure 2. Cross Section of Terai**




Terai is the "Bread Basket of Nepal". Recent studies show that the deepest alluvial sediments are found near Chure hill up to a depth of more than 500 m. The Himalayas are rising and erosion is occurring. Vast quantities of sediments are removed from mountains and deposited in the Terai. The most devastating flash floods in Terai are often a result of heavy rainfall of long duration, combined with landslide-blocked rivers and eventual dam collapse. Change in river course is one of the concerns of Terai region.

The whole length of Terai has similar geomorphic history. But land systems and land unit types and land-uses are different in different places, e.g. rice is cultivated more in the east than in the west. Based on the type of loamy soils, climate, gentle slope, availability of surface or ground water, and easy accessibility, the Terai demonstrates tremendous natural potential to meet human resource needs. However, presently more forest is available in the western, mid-western and far-western development region than in the central and eastern development regions.

### *Geomorphological Features*

Terai region is a continuation of Indo-Gangetic alluvial plain. The elevation ranges from 60 to 330 m above mean sea level. Slope gradient ranges from 0.2% to 1%. The length from east to west is about 870 km, the narrowest point being near at Koilabas. Generally, slope gradient is 2 to 10 m per km. The Terai may be divided into three parts. The *Bhabar Zone* lies at the foothills of Churia and is on average 12 km wide and composed of boulders, cobbles and pebbles of sandstone, quartzite and dolomite rocks from Churia and Mahabharat. The *Marshy Area* lies south of Bhabar zone, separating Bhabar with southern Terai in terms of lithology, porosity, permeability and change in elevation. The lithology is similar to Bhabar zone and sand beds are loose, brownish to greenish with black and red shale fragments. Clay is mostly blackish grey and yellow in some places. Thirdly, the *Southern Terai* is generally flat, not well drained and found between marshy areas in the north and Indo-Nepal border in the south. This area is composed of sand, clay silt and less of pebble.

## Hydrological Status

Nepal is considered to be the second richest country in terms of water resources in the world, containing 2.27% of the world's water resources. Drainage density is approximately 0.3 sq. km/km. Based on discharge, the rivers of Nepal are grouped into three kinds. The first one is Karnali, Narayani and Sapta Koshi. The second one is originating from the Mahabharat and third one originates from the Siwalik. The third type of rivers are not suitable for perennial irrigation and hydro-power generation. The major basins are outlined in Table 3.

**Table 3. Major Basin Area and Run-off Information**

| NAME OF BASIN | DRAINAGE AREA SQ. KM | | RUN-OFF CU. M/SEC | |
|---|---|---|---|---|
| | TOTAL | IN NEPAL | TOTAL | FROM NEPAL |
| Mahakali | 15,260 | 5,410 | 730 | 260 |
| Karnali | 44,000 | 41,550 | 1,440 | 1,360 |
| Babai | 3,270 | 3,270 | 95 | 95 |
| W. Rapti | 6,500 | 6,500 | 160 | 160 |
| Narayani | 34,960 | 30,090 | 1,820 | 1,570 |
| Bagmati | 3,610 | 3,610 | 180 | 180 |
| Sapta Koshi | 60,400 | 28,140 | 1,670 | 780 |
| Kankai | 1,575 | 1,575 | 851 | 851 |
| **Total** | | | | |

*Source: (?)*

Hydrology of the Terai region can be divided into two parts: surface water and ground water (Zollinger, 1979).

**Surface Water** — eight major rivers and many minor rivers flow through the Terai region. They are as follows:

- Mahakali River Basin: the estimated yearly mean run-off is 730 cu. m/sec.;
- Karnali River Basin: it has many tributaries and the estimated yearly mean run-off from Karnali, Seti and Bheri is 1440, 303 and 428 cu. m/sec. respectively;
- Babai River Basin: originates in Nepal and has an annual run- off of approximately 95 cu. m/sec.;
- West Rapti River Basin: the estimated yearly mean run-off of the west Rapti River is 160 cu. m/sec.;
- Narayani River Basin: Kali Gandaki, Trisuli, Marsyangdi, Seti, Myagdi, Buddhi Gandaki are some of the tributaries of this basin. Its annual run-off is approximately 1820 cu. m/sec.;
- Bagmati River Basin: the total drainage area and the estimated annual mean run-off of the Bagmati basin are 3610 sq. km and 180 cu. m/sec. respectively;
- Sapta Koshi River Basin: as the name of the River suggests, it has seven major tributaries. Out of the total drainage area of Sapta Koshi Basin, only 46.6 % lies in Nepal. Its estimated yearly mean run-off is 1670 cu. m/sec.;
- Kankai River Basin: the whole Kankai River Basin (about 1575 sq. km) lies in Nepal. Its estimated yearly mean run-off is 83 cu. m/sec.; and
- Other River Basins: about 21,432 sq. km of other minor river basins are present in Nepal. Their estimated average annual run-off is 851 cu. m/sec.

Of the total 7029 cu. m/sec. of run-off water, approximately 5339 cu. m/sec. takes place from Nepal.

**Groundwater Hydrology** — There is ample scope for developing groundwater sources in Terai region for drinking, irrigation and industries. The depth of the watertable varies from 30 to 90 m in Bhabar zone. Generally at about 15 m it is available in the northern part of Terai as well as in the south where there is a spring line. In many middle parts of the Terai, there are high pressure artesian conditions. These artesian conditions are generally found at a depth of 24 m and also at 100 to 200 m from the surface. Most of the aquifers found in the marshy land of the western Terai are artesian below 30 m. Transmissivity of the aquifers varies from 1476 sq./day in the boulder zone to 443 sq./day in the middle parts and less than 177 sq. m/day in the southern and fan areas.

### *Sedimentation*

The rivers within the Terai are ephemeral in nature, braided and meandered in shape. Watercourses are practically dry from November to May. Most of the rivers change their course after entering Terai and form a braided pattern. Later they change to the meandering form (Zollinger, 1989). Prior to entering the Terai, most of the rivers have a high gradient which enables them to transport their bed load. Due to the decrease in gradient these rivers show three characteristics: a) deposition of bed load, b) frequent flood, and c) change in the river course (braiding and river cutting).

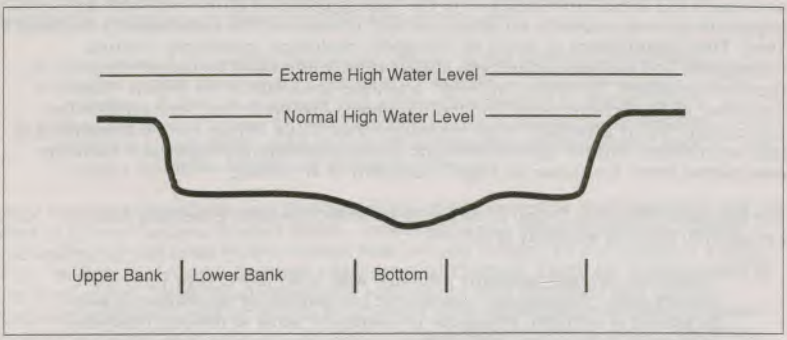
Sedimentation load from soil erosion is very high. The evidence of sediments are found on the streams and rivers along the east-west highways. Most of the bridge pillars have been covered by the sediments. Carson (1985) has reported that during the monsoon rapid fluctuation in the sediment load of the Narayani River is as high as 25,000 ppm. Terai Rivers are poor in terms of water resources, water supply and flood protection.

Nepal is said to export 240 million cubic metres of sand, silt and soil annually to the Bay of Bengal. Out of its total export, 75 million cubic metres are said to have

originated from the Karnali catchment area, 115 million cubic metres from the Sapta Koshi and rest from the Narayani and others.

Because of the low gradients in the Terai, transport capacity of the rivers is not high enough initially for boulders nor later for gravel. The boulders break down and become gravel, or they remain in the Bhabar zone (Boulder zone of the northern Terai). After some distance sand and silt are the only sediment found in southern Terai. Each Terai river does not flow in equilibrium throughout the year (see Figure 3). Erosion balance and deposition change depending on the rate of discharge and type of bed load. Many rivers erode and undercut their banks during floods, but still dry up at the end of monsoon. The river beds of Nepal are estimated to rise in the range of 10 to 30 cm per year.

**Figure 3. Cross Section of Terai River**




It has been estimated that the Sapta Koshi River has shifted 125 km west ward within a period of 250 years (1731-1979). At the Indo-Nepalese border the overall shift of the river since 1892 has been only 25 km. Denudation rate of various watersheds show that the highest rate of denudation is from Tamur River. The rate is 2.56 mm/year, i.e. the average sediment contribution over the watershed is 38 ton/ha/year. But the denudation rate of Arun watershed is only 7.5 ton/ha/year.

## *Irrigation*

In the Terai, both surface and groundwater can be used for irrigation. Surface water irrigation schemes are quite expensive and not functioning well due to siltation problems. At present the Sunsari-Morang, Kamala, Narayani, and Babai possess some of the surface water irrigation schemes running in Nepal. Ground water irrigation can be done by installing tube wells, but to get continuous ground water, its recharge zone should also be good. For this Bhabar zone should be kept under protected forest. At present more than 266,000 ha of cultivated land is irrigated. More cultivated land is irrigated in the eastern Terai. About 7,75,000 ha of cultivated land is irrigated during rainy season from rain water. Still about 13,38 000 ha of cultivated land can be irrigated.

## *Hydro-Power*

There are very few hydro-power stations in the Terai due to low slope gradients. There is a Surajpura hydro-power station of 8-10 MW capacity in Nawalparasi District. There was a hydro-power station at Letang in Morang district. At present this hydro-power station is not functioning. There is a 26 MW Diesel plant at Duhabi in Sunsari District. Fuelwood and cowdung are the main sources of domestic energy in Terai, although there is tremendous potential to expand wind and solar energy supplies.

# Chapter Four
# Distribution of Wetlands in Nepal

## Concept of Wetlands

Wetlands – lakes and ponds, riverine floodplains, water storage areas, swamps, marshes and deepwater agricultural lands – are the most productive ecosystems and are important natural resources for economic and developmental sustainability in Nepal's Terai. Their significance in terms of biological, ecological, economic, cultural, recreational and aesthetic values has always been appreciated by people involved in their conservation. The term "wetland" translates into 'simsar' in Nepali. 'Sim' is a derivative of the Persian word 'Sih', which means low-grade land not suitable for cultivation. 'Sar' is a Sanskrit word meaning water. Thus, simsar can be interpreted as land with water. 'Simsar' means different things to different people, and there are over twelve terms for simsar in Nepal (Bhandari et al., 1994).

The Informal Wetlands Group of Nepal in its first consultative meeting held in Kathmandu defined wetlands as follows:

> *"Wetlands represent landmass saturated with water due to high water table through either groundwater, atmospheric precipitation or inundation, it may be natural or artificial, permanent or temporary, static or flowing, freshwater or brackish." (Bhandari et al., 1994).*

The important points of the definition are:

1. **Water saturation** — the area should be saturated with water either permanently or seasonally.
2. **Inundation** — the inundation can be natural like Phewa Tal (Kaski District) or artificial like Indra Sarobar (Makwanpur District).
3. **Water flow** — the area can have stagnant water like in Piparawa Tal and Lalpani Tal (Kanchanpur District) or running water like in Nakharodi Tal (Bardia District).
4. **Nature of water** — water can be freshwater or saline (or brackish).

Wetlands in Nepal are broadly classified into two categories: natural and human-made. The natural wetlands are (i) lakes and ponds, (ii) riverine floodplains, (iii) swamps, and (iv) marshes, whereas human-made wetlands consist of (i) water storage areas, and (ii) deepwater agricultural lands. The sub-categories of natural wetlands are briefly described below.

### *Lakes and Ponds*

A water body is called a lake when it covers an area of more than 8 ha, and it may be both permanent as well as seasonal. A pond covers less than 8 ha of land, or, in some cases, the water depth is less than 2 m. Some examples of lakes are Phewa Tal (Kaski District), Beesh Hazar Tal (Chitwan District), Ghodaghodi Tal (Kailali District), Halkhoria Daha (Bara District), Rani Tal (Kanchanpur District), Devi Tal (Chitwan District) and Tau Daha (Kathmandu Valley).

Lakes and ponds are common and found all over the country. Depending upon their nutrient content, they are called eutrophic (high nutrient), mesotropic (medium

nutrient), and oligotrophic (least nutrient). The high altitude mountain lakes are oligotrophic, whereas low area lakes are eutrophic in nature. Examples of oligotrophic lakes are Rara Tal (Mugu District), Tilicho Tal (Manang District), Gosaikund (Rasuwa District) and Shey-Phoksundo Tal (Dolpa District). The mid hill lakes such as Phewa Tal and Rupa Tal (Kaski District) and Bedkot Tal (Kanchanpur District) are mesotropic, whereas Badhaia Tal (Bardia District), Banda Tal (Kanchanpur District), Puraina Tal (Kailali District), Tara Tal (Kanchanpur District) and other low land lakes are categorized as eutrophic lakes. Some of the ponds that receive direct sewage from the city are categorized as hypereutrophic (extremely high nutrient). These ponds are mostly found within the Kathmandu Valley.

### *Riverine Floodplains*

Floodplains are sometimes called inland deltas. Land between a river channel that is periodically flooded, and raised land on the edge of a river valley are defined as floodplains. According to Howard (1992) floodplains are:

> *'Flat areas of river valleys that become flooded by the waters of a river when its flow exceeds the drainage capacity of its channel. A floodplain usually contains a distinct river channel and a plain that stretches to terraces which limit the flood. The river in most floodplains takes a sinuous course (because of a very low gradient) and can produce oxbows, floodplain lakes and back swamps that often remain wet throughout the year.'*

Large rivers are spread out over floodplains far inland, many of them covering vast areas of grassy marshes, flooded forests, oxbow lakes and other depressions. These floodplains are flat areas of river valleys that become flooded by the waters of a river when its flow exceeds the drainage capacity of its channel. These are mostly found in the Terai region. These floodplains have ecosystems with abundant and diverse resources, which are used by people in different ways. Floodplains include numerous types of wetlands such as freshwater lakes, water storage reservoirs, ponds, marshes, swamps and deepwater rice paddies. They are very important from a biodiversity point of view.

In Nepal, there are over three dozen floodplain wetlands that house endangered species of wildlife such as the one-horned rhinoceros, Gangetic dolphin, otter, royal Bengal tiger, swamp deer, wild elephant, gharial, mugger, turtle, and many species of birds. The Koshi Tappu Wildlife Reserve, which is situated at the floodplain of the Koshi River, supports the last remnant population of Asiatic wild buffalo. These floodplains house two national parks and three wildlife reserves. The riverine floodplains are also known as riparian wetlands.

Some of the common and fertile floodplains are Koshi, Narayani and Karnali floodplains. These floodplains house at least one protected area. The Narayani floodplain has the Royal Chitwan National Park, which supports the endangered one-horned rhinoceros and crocodile, whereas the floodplain of the Karnali River provides refuge for the endangered black buck and Gangetic dolphin. The Koshi River floodplain houses the Koshi Tappu Wildlife Reserve, which is a habitat for the last remaining population of Asiatic wild buffalo.

### *Swamps*

Swamps develop in stillwater areas around lake margins and in parts of floodplains, such as oxbows, where the water remains for long periods of time. Swamp areas have fresh water and woody communities throughout, or variably during, the growing seasons. This type of wetland is dominated by trees or shrubs. Swamps are also found as margins around lakes. Wild species of rice such as Tinny, Tinna and Tumina and many wild plant relatives of cultivated crop plants are found in swampy lands. Swamps are known by different names: shrub swamp, freshwater swamp forest, wooded swamp, and so forth. Rani Tal, Tarbaria Tal, Bantaria Tal and Aanp Tal of

Kanchanpur District, Sonia Tal, Rupia Tal, Ghor Tal and Nakharodi Tal of Kailali District, Devi Tal and riverine floodplains of the Narayani and Rapti Rivers of Chitwan District, Khasre Tal of Banke district, and areas along the Karnali and Koshi Rivers are excellent examples of swamps in the Terai region of Nepal.

### *Marshes*

Marshes exist where groundwater, surface springs, streams or run-off are common and frequently cause flooding, and are more or less permanently shallow. Some marshes are dominated by reeds, cattails, *thetcher* or *besharam* (*Ipomea fistulosa*), *Aeschynomene* sp., *Carex* sp., in the Terai region.

Marsh types of wetlands are common throughout the country. They are particularly extensive in the floodplains of the Terai region near streams and rivers. In many places in Chitwan, the marsh lands are the abandoned oxbows, called *ghol*. These *ghols* attract a large number of wildlife, especially waterfowl and fish species. These ghols are also called dhaps. These marshes are known by different names, i.e., fens in Europe, potholes in North America, Vernal pools in California, and playas on the high plain of northern Texas and eastern New Mexico.

Marshes are found in the Koshi Tappu Wildlife Reserve, Royal Chitwan National Park, and Royal Bardia National Park. Also, good examples of marshes can be found near the lakes of Kailali, Kanchanpur, Rupandehi and Kapilbastu districts.

The sub-categories of human-made wetlands are briefly presented below:

### *Water Storage Areas*

Water storage areas include hydrodams, reservoirs and barrages. These areas hold water for irrigation, human consumption, and/or hydropower production. Well-known reservoirs in the Terai region are: Jagadishpur Reservoir, Koshi Barrage, Gandak Barrage and Tanakpur Barrage.

### *Agriculture Lands*

Agriculture lands include permanently flooded lands lying below the deepwater boundary of wetlands, irrigated lands or seasonally flooded lands. Irrigated channels, rice fields, canals, fish ponds, farm ponds, small lakes and ditches are some examples of this category. Deepwater rice paddies also include *ghols* and *dhaps* found in Chitwan and Nawalparasi districts.

### *Wetland Creation*

In addition to human-made wetlands, they are also created by natural factors, which are given below:

1. **Topographical depressions** — low elevation areas are located in the eastern Terai. The lowest parts lies in Janakpur and south of Birat Nagar where most of the wet areas can be seen.
2. **Old meanderings** — air photos clearly show the existence of old meanderings of rivers. Most of these lands are wetlands.
3. **Old braided rivers** — some of the braided rivers change their course in the Terai area. The old river courses of braided rivers also become wetlands.
4. **Land subsidence** — land subsidence due to natural causes, mining or brick making saturates the area due to the decrease in elevation.
5. **River cutting** — prevalent in the middle part of the Terai region.

## Distribution of Wetlands

The distribution of 163 wetland sites according to development region are presented in Table 1 below. The data indicate that 62% of wetlands are found in the Far-Western Development Region, followed by 37% in the Central Development Region. The number of wetlands decreases towards the east, except the Mid-Western Development Region, which houses 12%.

The highest number of wetland sites is represented by lakes and ponds (48%), followed by riverine floodplain (33%) of the total wetland sites in Nepal. Reservoirs and swamps make the lowest percentage, which is only 3% (Table 2). The Terai region houses three reservoirs, Koshi Barrage, Jagadishpur Reservoir and Gandak Barrage, whereas only two seasonal wetlands -Titara Tal and Nunkhaini Tal - are recorded in Kanchanpur District of the Far-Western Development Region.

**Table 1. Distribution of Wetlands in Terai by Development Region**

| DEVELOPMENT REGION | NUMBER | PERCENTAGE |
|---|---|---|
| Eastern | 18 | 11 |
| Central | 37 | 23 |
| Western | 34 | 21 |
| Mid-Western | 12 | 7 |
| Far-Western | 62 | 38 |
| **Total** | **163** | **100** |

*Source: National Wetland Database, IUCN Nepal.*

An overview of Terai's wetlands including their types, area, use, threats, ranking and population situation is given in Annex 5.

**Table 2. Distribution of Wetlands in Nepal's Terai**

| WETLAND TYPE | NUMBER | PERCENTAGE |
|---|---|---|
| Lakes and Ponds | 78 | 48 |
| Marshes | 13 | 8 |
| Swamps | 5 | 3 |
| Floodplain | 53 | 33 |
| Reservoirs | 6 | 3 |
| Canal | 8 | 5 |
| **Total** | **163** | **100** |

*Source: National Wetland Database, IUCN Nepal*

Table 3 shows that Far-Western Development Region houses the highest percentage of lakes, swamps and floodplain, whereas Western Development Region contains 50% of reservoirs. The Central Development Region has the highest proportion of marshes (54%). See the map of Nepal for the distribution of wetlands in Nepal, including those of mountain and mid-hills (Figure 4)

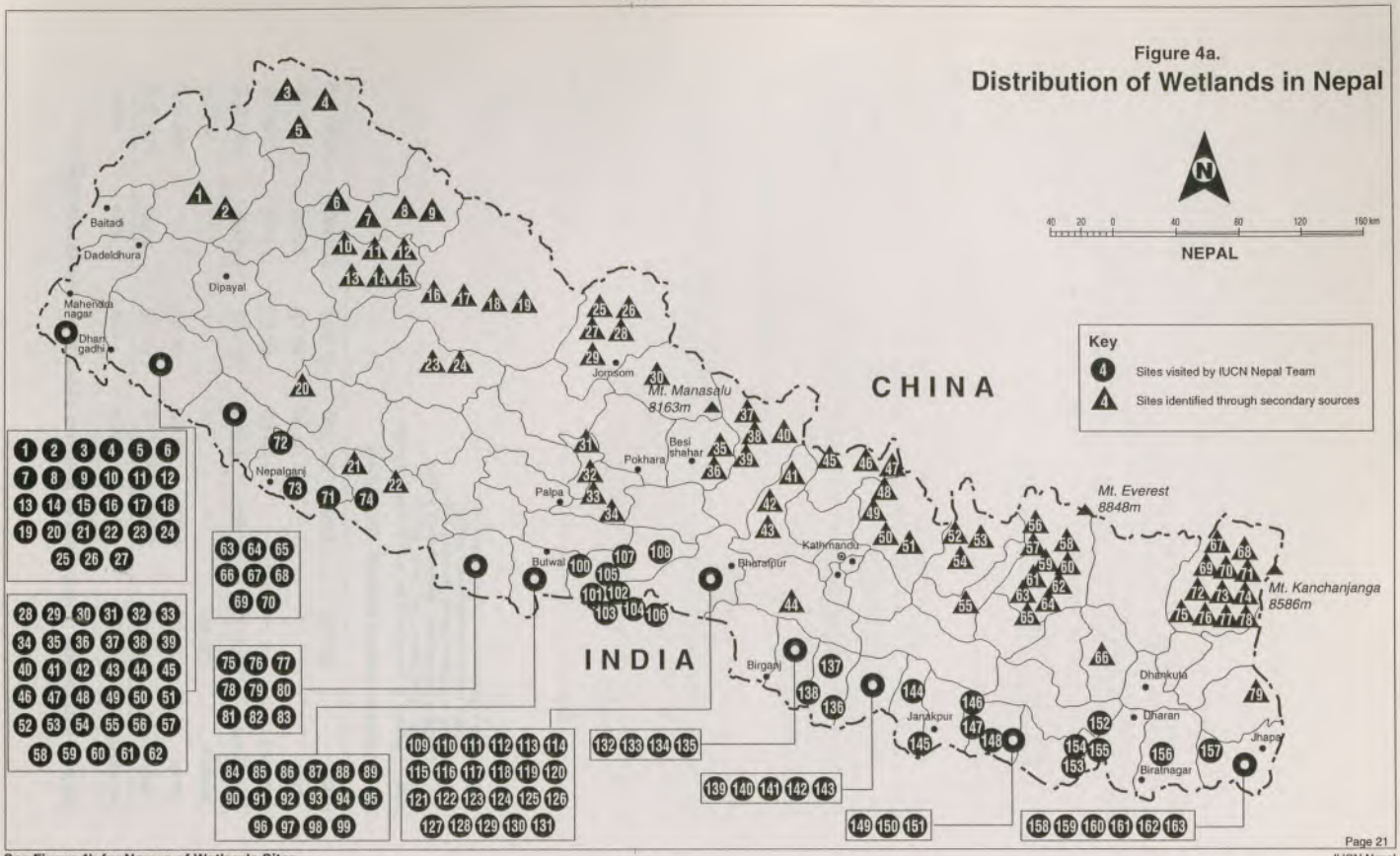
**Table 3. Percentage Distribution of Wetland Types by Development Region**

| WETLAND | FDR | MDR | WDR | CDR | EDR | TOTAL |
|---|---|---|---|---|---|---|
| Lakes | 51 (40) | 6 (5) | 22 (17) | 17 (13) | 4 (3) | 100 (78) |
| Marsh | 15 (2) | 8 (1) | 23 (3) | 54 (7) | — | 100 (13) |
| Swamps | 100 (5) | — | — | — | — | 100 (5) |
| Floodplain | 28 (15) | 11 (6) | 19 (10) | 23 (12) | 19 (10) | 100 (53) |
| Reservoir | — | — | 50 (3) | 33 (2) | 17 (1) | 100 (6) |
| Canal | — | — | 10 (1) | 40 (3) | 50 (4) | 100 (8) |
| **Total** | **38 (62)** | **7 (12)** | **21 (34)** | **23 (37)** | **11 (18)** | **100(163)** |

*Source: National Wetland Database, IUCN Nepal*

Note: Figures in parenthesis are actual number of sites
FDR = Far-Western Devilment Region
MDR = Mid-Western Development Region
WDR = Western Development Region
CDR = Central Development Region
EDR = Eastern Development Region

84°00'




84°00'

See Figure 4b for Names of Wetlands Sites

Figure 4b.

# Names of Wetland Sites

## 4 Sites identified through secondary sources

**Seti Zone**

| | | |
|---|---|---|
| 1. | Khaptad Daha | Achham+Bajura |
| 2. | Chhuphu Lake | Bajhang |

**Karnali Zone**

| | | |
|---|---|---|
| 3. | | Humla |
| 4. | Chhagsa Daha | Humla |
| 5. | Naulotirtha Daha | Humla |
| 6. | Rara Lake | Mugu |
| 7. | | Mugu |
| 8. | | Mugu |
| 9. | Banjh Tal | Mugu |
| 10. | Dauli Daha | Jumla |
| 11. | Giri Daha | Jumla |
| 12. | Jogi Daha | Jumla |
| 13. | Rinigabas Tal | Jumla+Mugu |
| 14. | Dahatheki Daha | Jumla |
| 15. | Lamo Daha | Jumla |
| 16. | Dudh Kunda | Dolpa |
| 17. | Phoksundo Lake | Dolpa |
| 18. | Sun Daha | Dolpa |
| 19. | | Dolpa |

**Bheri Zone**

| | | |
|---|---|---|
| 20. | Bulbule Tal | Surkhet |

**Rapti Zone**

| | | |
|---|---|---|
| 21. | Darhakune Tal | Dang |
| 22. | Tapta Tal | Dang |
| 23. | Syarpu Lake | Rukum |
| 24. | | Rukum |

**Dhaulagiri Zone**

| | | |
|---|---|---|
| 25. | Damodar Kunda | Mustang |
| 26. | | Mustang |
| 27. | Pokal Tal | Mustang |
| 28. | | Mustang |
| 29. | | Manang |

**Gandaki Zone**

| | | |
|---|---|---|
| 30. | Tilicho Lake | Manang |
| 31. | Rupa Tal | Kaski |
| 32. | Maidi Tal | Kaski |
| 33. | Begnas Tal | Kaski |
| 34. | Phewa Tal | Kaski |
| 35. | Barha Pokhari | Lamjung |
| 36. | Mai Pokhari | Lamjung |
| 37. | Dudh Pokhari | Gorkah+Lamjung |
| 38. | Rukche | Gorkha |
| 39. | Narte Pokhari | Gorkha |
| 40. | Kalchhaman Tal | Gorkha |

**Bagmati Zone**

| | | |
|---|---|---|
| 41. | Jageswar Kunda | Dhading |
| 42. | Kalo Lake | Dhading |
| 43. | Seto Lake | Dhading |
| 45. | Sarsmati Kunda | Rasuwa |
| 46. | Gosain Kunda | Rasuwa |
| 47. | Ganesh Kunda | Rasuwa |
| 48. | Bhairab Kunda | Sindhupalchok |
| 49. | Panch Pokhari | Sindhupalchok |
| 50. | Syabaliya Pokhari | Sindhupalchok |
| 51. | Surya Kunda | Sindhupalchok |

**Narayani Zone**

| | | |
|---|---|---|
| 44. | Indra Sarobar | Makawanpur |

**Janakpur Zone**

| | | |
|---|---|---|
| 52. | Jata Pokhari | Dolakha |
| 53. | Chhyangima Pokhari | Dolakha |
| 54. | Kalo Pokhari | Dolakha |
| 55. | Bhale Pokhari | Ramechhap |

**Sagarmatha Zone**

| | | |
|---|---|---|
| 56. | Panch Pokhari | Solukhumbu |
| 57. | Dudh Pokhari | Solukhumbu |
| 58. | Dudh Kunda | Solukhumbu |
| 59. | | Solukhumbu |
| 60. | | Solukhumbu |
| 61. | Thonak Lake | Solukhumbu |
| 62. | Nagojumbe Lake | Solukhumbu |

**Koshi Zone**

| | | |
|---|---|---|
| 63. | Kal Pokhari | Sankhuwasabha |
| 64. | | Sankhuwasabha |
| 65. | | Sankhuwasabha |
| 66. | Salpa Pokhari | Bhojpur |

**Mechi Zone**

| | | |
|---|---|---|
| 67. | Lua Pokhari | Taplejung |
| 68. | Jaljale Pokhari | Taplejung+ Sankhuwasabha |
| 69. | Suke Pokhari | Taplejung |
| 70. | Lam Pokhari | Taplejung |
| 71. | Panch Pokhari | Taplejung |
| 72. | Lam Pokhari | Taplejung |
| 73. | Tin Pokhari | Taplejung |
| 74. | Nag Pokhari | Taplejung |
| 75. | Hur Pokhari | Taplejung |
| 76. | Samdo Pokhari | Taplejung |
| 77. | Nupchu Pokhari | Taplejung |
| 78. | Nangma Pokhari | Taplejung |
| 79. | Mai Pokhari | Ilam |

## 4 Sites visited by IUCN Nepal Team

**Mahakali Zone**

| | | |
|---|---|---|
| 1. | Titara Tal | Kanchanpur |
| 2. | Padereni | Kanchanpur |
| 3. | Banda Tal | Kanchanpur |
| 4. | Sano Banda Tal | Kanchanpur |
| 5. | Naini Tal | Kanchanpur |
| 6. | Tarbaria Tal | Kanchanpur |
| 7. | Bantaria Tal | Kanchanpur |
| 8. | Piyari Tal | Kanchanpur |
| 9. | Bichki Tal | Kanchanpur |
| 10. | Aanp Tal | Kanchanpur |
| 11. | Bedkot Tal | Kanchanpur |
| 12. | Mahakali Floodplain | Kanchanpur |
| 13. | Chaudhar River FP | Kanchanpur |
| 14. | Banara River FP | Kanchanpur |
| 15. | Donda River FP | Kanchanpur |
| 16. | Mohana River FP | Kanchanpur |
| 17. | Gusta Tal | Kanchanpur |
| 18. | Shova Tal | Kanchanpur |
| 19. | Rani Tal | Kanchanpur |
| 20. | Bahunne Nala | Kanchanpur |
| 21. | Shikari Tal | Kanchanpur |
| 22. | Lalpani Tal | Kanchanpur |
| 23. | Kalikitch Tal | Kanchanpur |
| 24. | Tara Tal | Kanchanpur |
| 25. | Peli Tal | Kanchanpur |
| 26. | Nun Khaini Tal | Kanchanpur |
| 27. | Dhaderi Khola | Kanchanpur |

**Seti Zone**

| | | |
|---|---|---|
| 28. | Ojhuwa Tal, Narayanpur | Kailali |
| 29. | Dhudhwa Tal | Kailali |
| 30. | Kusaiya Tal | Kailali |
| 31. | Piparawa Tal | Kailali |
| 32. | Sonia Tal | Kailali |
| 33. | Ghor Tal | Kailali |
| 34. | Badka Tal | Kailali |
| 35. | Louka Bhouka Tal | Kailali |
| 36. | Shahadev Tal | Kailali |
| 37. | Mahadev Tal | Kailali |
| 38. | Rupia Tal | Kailali |
| 39. | Koilia Tal | Kailali |
| 40. | Puraina Tal, Hasulia | Kailali |
| 41. | Sunhara Tal | Kailali |
| 42. | Jugeda Tal | Kailali |
| 43. | Larbarai Tal | Kailali |
| 44. | Purnaina Tal, Lalbhoji | Kailali |
| 45. | Gadbhijala Tal | Kailali |
| 46. | Budi Nakharodi Tal | Kailali |
| 47. | Singrowa Tal | Kailali |
| 48. | Godavari River FP | Kailali |
| 49. | Khairena Khola FP | Kailali |
| 50. | Khutia Khola FP | Kailali |
| 51. | Shiva Ganga FP | Kailali |
| 52. | Chaumala Khola FP | Kailali |
| 53. | Gauri Ganga FP | Kailali |
| 54. | Lekma River FP | Kailali |
| 55. | Kandra River FP | Kailali |
| 56. | Patharaiya River FP | Kailali |
| 57. | Kanda River FP | Kailali |
| 58. | Ghodaghodi Tal | Kailali |
| 59. | Chiraiyo Tal | Kailali |
| 60. | Nakharodi Tal, Darakh | Kailali |
| 61. | Ojhuwa Tal | Kailali |
| 62. | Bainshawa Tal | Kailali |

**Bheri Zone**

| | | |
|---|---|---|
| 63. | Tara Tal, Bardia | Bardia |
| 64. | Bhagairia Tal | Bardia |
| 65. | Kaurahi River FP | Bardia |
| 66. | Aurahi River FP | Bardia |
| 67. | Badhaiya Tal | Bardia |
| 68. | Karnali Floodplain | Bardia |
| 69. | Babai Floodplain | Bardia |
| 70. | Bathuwa Ghol | Bardia |
| 71. | Khasre Tal | Banke |
| 72. | Man Khola FP | Banke |
| 73. | Kanti Pokhari | Banke |

**Rapti Zone**

| | | |
|---|---|---|
| 74. | Rapti Floodplain | Dang |

**Lumbini Zone**

| | | |
|---|---|---|
| 75. | Lohraula Tal | Kapilbastu |
| 76. | Sakhunla Tal | Kapilbastu |
| 77. | Buddhi Tal | Kapilbastu |
| 78. | Ajingara Tal | Kapilbastu |
| 79. | Lambu Sagar | Kapilbastu |
| 80. | Jagadishpur Reservoir | Kapilbastu |
| 81. | Baniganga FP | Kapilbastu |
| 82. | Laxman Ghat Barrage | Kapilbastu |
| 83. | Niglihawa Tal Cluster | Kapilbastu |
| 84. | Bakulla Ghat | Rupandehi |
| 85. | Matiyara Tal | Rupandehi |
| 86. | Gajedi Tal | Rupandehi |
| 87. | Lausa Tal | Rupandehi |
| 88. | Danda Khola | Rupandehi |
| 89. | Tinau Floodplain | Rupandehi |
| 90. | Dano Floodplain | Rupandehi |
| 91. | Karbalaha Tal | Rupandehi |
| 92. | Amlahawa Tal | Rupandehi |
| 93. | Siktihawa Tal | Rupandehi |
| 94. | Padarhawa Tal | Rupandehi |
| 95. | Gularia Tal | Rupandehi |
| 96. | Sagrahawa Tal | Rupandehi |
| 97. | Gaidahawa Tal | Rupandehi |
| 98. | Harahawa Floodplain | Rupandehi |
| 99. | Telar Floodplain | Rupandehi |
| 100. | Khaireni Khola FP | Nawalparasi |
| 101. | Nandan Ghol | Nawalparasi |
| 102. | Hulasi Ghol | Nawalparasi |
| 103. | Dhanewa Khola Floodplain | Nawalparasi |
| 104. | Gandak Barrage | Nawalparasi |
| 105. | Narsahi Ghol | Nawalparasi |
| 106. | Nepal Gandak Western Canal | Nawalparasi |
| 107. | Bhumahi Khola | Nawalparasi |
| 108. | Narayani Floodplain | Nawalparasi |

**Narayani Zone**

| | | |
|---|---|---|
| 109. | Rampur Ghol | Chitwan |
| 110. | Khageri Canal | Chitwan |
| 111. | Khageri Floodplain | Chitwan |
| 112. | Panchakanya Ghol | Chitwan |
| 113. | Budhi Rapti Floodplain | Chitwan |
| 114. | Chitwan Rapti Floodplain | Chitwan |
| 115. | Beesh Hazar Tal | Chitwan |
| 116. | Jaya Mangala Ghol | Chitwan |
| 117. | Devi Tal | Chitwan |
| 118. | Reu Floodplain | Chitwan |
| 119. | Tamar Tal | Chitwan |
| 120. | Lami Tal | Chitwan |
| 121. | Nandan Tal | Chitwan |
| 122. | Chamka Floodplain | Chitwan |
| 123. | Dhakre Tal | Chitwan |
| 124. | Kamal Tal | Chitwan |
| 125. | Munda Tal | Chitwan |
| 126. | Nanda-Bhauju Tal | Chitwan |
| 127. | Sapnawati Ghol | Chitwan |
| 128. | Simaron Ghol | Chitwan |
| 129. | Rani Pokhari | Chitwan |
| 130. | Gobreni Ghol | Chitwan |
| 131. | Kerunga Ghol | Chitwan |
| 132. | Pasaha Floodplain | Bara |
| 133. | Halkhoria Daha | Bara |
| 134. | Bakeya Floodplain | Bara |
| 135. | Gandak Nepal East Canal | Bara |
| 136. | Barahawa Tal | Rautahat |
| 137. | Chandi Floodplain | Rautahat |
| 138. | Kishauria Chour | Rautahat |

**Janakpur Zone**

| | | |
|---|---|---|
| 139. | Bagmati Floodplain | Sarlahi |
| 140. | Bagmati Canal | Sarlahi |
| 141. | Manusmara FP | Sarlahi |
| 142. | Hirapur Barrage | Sarlahi |
| 143. | Manpur Barrage | Sarlahi |
| 144. | Ratu Floodplain | Mahottari |
| 145. | Badhari Floodplain | Dhanusha |

**Sagarmatha Zone**

| | | |
|---|---|---|
| 146. | Kamala Canal | Siraha |
| 147. | Kamala Floodplain | Siraha |
| 148. | Balan Floodplain | Siraha |
| 149. | Bhokari Daha | Saptari |
| 150. | Trijuga Floodplain | Saptari |
| 151. | Chandra Canal | Saptari |

**Koshi Zone**

| | | |
|---|---|---|
| 152. | Chatara Canal | Sunsari |
| 153. | Koshi Barrage | Sunsari |
| 154. | Koshi Tappu Wildlife Reserve | Sunsari |
| 155. | Koshi Floodplain | Sunsari |
| 156. | Bakra Floodplain | Morang |

**Mechi Zone**

| | | |
|---|---|---|
| 157. | Ratuwa Floodplain | Jhapa |
| 158. | Gaura Daha | Jhapa |
| 159. | Kankai Floodplain | Jhapa |
| 160. | Biring Floodplain | Jhapa |
| 161. | Mechi Floodplain | Jhapa |
| 162. | Kachan Kabal | Jhapa |
| 163. | Kankai Canal | Jhapa |

**Key**

FP = Floodplain

# *Chapter Five*
# *Wetland Resources*

## Wetland Flora

### *Ecology of Wetland Flora*

The Terai region comprises about 15% of the land area of Nepal. It is made up of recent- to post-pleistocene alluvium. Northern Bhabar is an irregular band of fans and out-wash gravel. Slope gradients range from 0% to 2%. The climate is subtropical. The Terai was originally covered by a continuous forest but agricultural development has reduced this to discontinuous blocks and strips.

A very large number of streams enter and cross the Terai. The Siwalik group is by far the most abundant, numbering over one hundred streams. Siwalik streams are ephemeral and many absorbed in the Terai, entering the ground water aquifer from their channels. The channels of nearly all the streams are braided in their upper reach, then meander a considerable distance after moving across the Terai. The floods on the Sapta Koshi and numerous Terai streams are major challenges to landuse in Nepal.

The predominant vegetation in the Terai region are summarized below:

**Western Terai** — Shorea robusta, Butea frodosa, Anogeissus latifolia, Lannea grandis, Aegle marmelos and Acacia gageana.

**Central Terai** — Shorea robusta, Terminalia, Bombax, Acacia and Dalbergia.

**Eastern Terai** — Terminalia spp., Adina spp., Scheleichera trijuga, Dillenia spp., Eugenia jambolana, Salimalia malabarica, and Shorea robusta.

**Floral diversity in the Terai region** — In the present report, a total of 471 species (7 Pteridophytes, 464 Angiosperms: 341 Dicotyledones and 123 Monocotyledones) have been listed. They belong to 335 genera and 98 families. Fabaceae (Leguminosae), Poaceae (Gramineae) are the largest families amongst the Dicotyledones and Monocotyledones respectively. Fabaceae, the largest family is represented by 62 species and Poaceae 52 species. Floral diversity of Terai is presented in Annex 6.

A detailed study is required to properly document the plant species in the Terai region of Nepal and their status with an emphasis on the protected areas.

### *Wetland Plants*

Wetland dependent flora include the plants that flourish well in wetland habitats. Wetlands support a wide variety of habitats for aquatic life. Aquatic and marshy plants that are common in Nepal include: lotus *(Nelumbo nucifera), Nymphaea nouchali, N. stellata,* water chestnut *(Trapa quadrispinosa), Ipomoea aquatica, Pistia statiotes, Nymphoides indica, Hydrilla verticillata, Vallisneria natans, Monochoria vaginalis, Acorus calamus, Typha angustifolia, Saccharum spontaneum, Polygonum hydropiper, Fimbristyis dichotoma, Ceratophyllum demersum,* duck weed *(Lemna perpusilla),* water hyacinth *(Eichornia crassipes), Potamogeton crispus, P. nodosus,* and so forth. The plant species

commonly found in the floodplain or river beds include *Dalbergia sissoo, Acacia catechu, Bombax ceiba,* and *Trewia nudiflora.*

## *Description of Important Wetland Plants*

*Acorus calamus* L. (**Araceae**) Bojo, Sweet flag. A semiaquatic perennial herb with a creeping and much branched aeromatic rhizome. Used medicinally in dyspepsia and chronic diarrhea. It also clears voice instantly and is used as insecticides.

*Alpinia allughas* (Retz.) Roscoe (**Zingiberaceae**). An aromatic herb, with perennial rhizome. Used for rheumatism relief.

*Ceratophyllum demersum* L. (**Ceratophyllaceae**). A fragile algae like herb. Fruit smooth, muricate or minutely tubercled. Used as antidote for scorpion bites. Fruit eaten by wild duck.

*Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth. (**Scrophulariaceae**). An erect, very slender herb with pink flowers which grows in rice fields.

*Eichhornia crassipes* (Mart.) Solms.(**Pontederiaceae**). A floating herb with a very short leafy main stem. Leaves radical, rosullate, emerged, petioles spongy, inflated near the middle portion into bladder which aids the plant to float. Used for nutrient removal and water pollution control.

*Elaeocharis dulcis* (Burm.f.) Trin. ex Henschel (**Pyperaceae**). Tuber edible, widely cultivated in China, common in rice fields, eaten in China Japan and Phillipines. Sold under the name of keysur in Calcutta and eaten raw as salad. (Anonynous, WOI). Used in Nepal as human food (Shrestha, 1994).

*Euryale ferox* Salibs. (**Nymphaeaceae**). Gorgon nut, Makhan. Stemless prickly aquatic herb. Leaves floating, elliptic or orbicular. Fruits round and prickly. Cultivated in China and India for its edible sweets. Used as human food and used for religious and medicinal purposes.

*Hydrilla verticillata* (L.f.) Royle (**Hydrocharitaceae**). A slender submerged weed up to 45 cm long, with fibrous roots. When abundantly found, it is used as a manure. Eaten by fishes, it is also a good oxygenator

*Hygrorhiza aristata* (Retz.) Nees. ex Wt and Arn. (**Poaceae**). A perennial floating glabrous grass with culms. Leaves subcoreaceous, ovate to narrowly ovate-oblong, base cordate with inflatted sheaths. A wild relative of rice useful for genetic conservation.

*Ipomoea aquatica* Forssk (**Convolvulaceae**). An aquatic, trailing or floating perennial herb with long hollow stem rooting at nodes. Leaves ellitic or ovate oblong, cordate or hastate at the base. Flowers infundibuliform. both wild and cultivated. Young shoots used as vegetable or salad. It is relished by cattle and pig, and used as fish food.

*Ipomoea carnea* Jacq. (**Convolvulaceae**). A large diffuse or straggling shrub with a milky juice. Leaves ovate-cordate, entire, acuminate. Flowers large, campanulate, pale rose. This fast growing shrub is used as hedge and green manure crops in some parts of India. In Nepal it is used as hedge plant.

*Lemna perpussila* Torrey. (**Lemnaceae**). Duck weed. A cosmopoliton weed. A floating aquatic herb. Duck weeds become pests in garden ponds and fields. Known as good food source for wetland birds (BPP, 1995).

*Limnophila repens* (Benth.) Benth. (**Scrophulariaceae**). An aquatic herb found in marsh, often aromatic. Leaves with transparent, opposite or whorled toothed or incised. No direct human value.

*Monocharia hastata* (L.) Solms. (**Pontederiaceae**). A robust aquatic herb with erect or obliquely erect stem, bearing pale blue flower. Leaves are used as tonic and cooling agent.

*Monochoria vaginalis* (Burm.f.) C. Pres (**Pontederiaceae**) Aquatic herb with short sub-erect, spongy root stocks. Leaves long petioled, linear to ovate long petioled and ovate cordate or subreniform. Flowers blue usually spotted with red in subspicate raceme. The entire plant, except its roots, is eaten as a vegetable.

*Nasturtium officinale* R.Br. (**Brassicaceae**). A perennial much branched aquatic herb with creeping or floating stem. Leaves pinnate, leaflets sessile, ovate-oblong, sinuately lobed. Flowers white in short raceme. Fruit siliqua. It is cultivated as salad plant in England and in parts of USA. Water cress is eaten to improve appetite, good source of vitamins and minerals.

*Nelumbo nucifera* Gaertn. (**Nymphaeaceae**). Lotus, an ornamental aquatic herb, with stout creeping rhizome. Leaves peltate, orbicular, glaucous, more than 50 cm in diameter. Flowers solitary white or rosy, fruit large, top shaped. Often cultivated for its elegant sweet scented flower. Lotus is cultivated in China and Japan for its edible rhizomes and seeds. It is also a crop plant yielding 3600-4600 kg rhizomes per hectare, which are sold as a vegetable. Fresh rhizomes are eaten after roasting and can be also pickled. Fruiting lotus is often sold for edible carpel. Used as ornament and as offering in temples. Leaves used as dish plate. Lotus perfume is highly prized. Young leaves are also eaten as vegetables.

*Nymphaea nouchali* Burm. (**Nymphaeaceae**) Indian red water lilly. A large aquatic herb with short, erect roundish tuberous rhizome. Leaves peltate, orbicular or reniform, sagittate. Flowers variable in colour, deep red to pure white. Fruit spongy berry. All plants of parts are eaten in times of scarcity. Edible seeds can be eaten raw or, after making flour, made into a variety of breads.

*Nymphaea stellata* Willd. (**Nymphaeaceae**). Indian blue water lilly. Neelkamal. A large perennial herb with a short ovoid acute rootstock. Leaves paltate, orbicular or ellitic, sagittate. Flowers solitary blue, white, purple or pink. Fruits are spongy berries. Various parts of plants (rhizome, tender leaves) are edible. In Sri Lanka, efforts have been made to cultivate this species as an economic crop in paddy fields. Seeds can be eaten raw or after making flour and made into a variety of breads.

*Nymphoides hydrophyllum* (Lour.) O. Kuntze (**Gentianaceae**). A large plant with orbicular deeply cordate floating leaves. Pedicel are long, numerous, unequal and densely fascicled at the nodes. Plants are used as substitute for *Swertia chirayita* in fever and jaundice.

*Oryza rufipogon* Griff. (**Poaceae**). An annual herb growing in water and swampy places with long erect culm and deciduous spikelet. It is a noxious weed, much like cultivated rice in vegetative characters. Human food, and religious values (Shrestha, 1994). Food for wetland birds and wild animals (BPP, 1995)

*Ottelia alismoides* (L.) Pers. (**Hydrocharitaceae**). A succulent fleccid aquatic herb. Leaves variable in shape, submerged leaves narrow or oblong, tapering to the base; floating leaves oblong or orbicular, cordate or rounded at the base. Flower white in atubular spathe. The leaves and petioles possess an excellent flavour, and are used as vegetable. Its fruit is eaten by children.

*Persicaria barbata* (L.) Hara (**Polygonaceae**). An erect annual with conpicuous long fimbriate ciliae on the ochreae. Leaves lanceolate. Flowers white. Used as cooling agent.

*Persicaria hydropiper* (L.) Spach (**Polygonaceae**). Water pepper. A glabrous, often glandular, reddish annual or perennial herb. Leaves linear lanceolate or oblong lanceolate with resinous cavities. Flowers pink or red.

*Persicaria lapathifolia* (L.) S.F.Gray (**Polygonaceae**). A very variable annual herb. Leaves elliptic ovate or lanceolate or glabrous or densely tomentose beneath. Flowers greenish white in dense spike and can poison fish.

*Pistia stratiotes* L. (**Araceae**). Water lettuce or tropical duck weed. A floating aquatic stoloniferous herb. Leaves sessile, ovate to obovate, cuneate, densely pubescent, spath tubular at its base, free and spreading above, slightly constricted above the middle. Flowers minute, sessile spadix. Fruits ovoid. Plants are eaten in parts of tropical Africa and in India in times of femine. Young leaves cooked and eaten by Chinese. Food for fish, birds, and wild animals.

*Polygonum plebeium* R.Br. (**Polygonaceae**). A very variable, diffusely branched suberect or prostrate herb, often with woody rootstock. Leaves variable, linear oblong to obovate. Flowers pinkish nor greenish, soliatry, axillary. No direct use.

*Potamogeton crispus* L. (**Potamogetonaceae**). An aquatic herb with creeping rootstock. Leaves floating. Flowers minute in axillary spike. Food for rhinoceros.

*Potamogeton nodosus* Poir (**Potamogetonaceae**). A slender aquatic herb with creeping rootstock. Food for rhinoceros.

*Tamarix dioica* Roxb. (**Tamaricaceae**). A gregarious shrub, on river beds, swamps, branch drooping. Leaves obliquely truncate and acuminate, sheathing with a broad white margin. Flowers pink or purple, in dense peduncle spike. No use recorded.

*Trapa quadrispinosa* Roxb. (**Trapaceae**). Water chest-nut. A very variable, handsome rooted aquatic herb. Stems long and flexible. Submerged portions possessing pairs of green pectinate spreading organs. Fruits bony, terminate, 2-4 cm long, and broad, 4-angled, two opposite angles each with a scabrous spine. Plants cultivated for its fruits in tanks, lakes and ponds.

*Vallisneria nattans* (Lour.) Hara. (**Hydrocharitaceae**). A common weed rooting at the bottom of tanks, pools, and lakes. Leaves narrow with only five nerves. Flowers unisexual. In the female flower, the spathe covers only the base of the ovary. Sepals are acute and styles fringed. Food for rhinoceros (BPP, 1995).

*Zannichellia palustris* L. (**Zannichelliaceae**). A submerged fresh or brachis water perennial herbs with slender simple or cymosely branched leafy stem. Rootstock slender. Leaves mostly opposite, linear or filiform. Food for fish and other aquatic animals.

## *Economic Value of Major Wetland Fauna*

About172 species of the major wetland plants are presented in Table 1. The plants were collected and identified during the field visits. Their economic values are extracted from different publications of ethnobotany in Nepal and India.

**Table 1. List of Wetland Plants and Their Uses**

| SPECIES | USES (VALUES) |
|---|---|
| *Acacia catechu* | Timber |
| *Anthocephalum cadamba* | Timber |
| *Achryranthes aspera* | Medicinal |
| *Adina cordifolia* | Timber |
| *Aeschynomene aspera* | Fodder |
| *Aeschynomene indica* | Fodder |
| *Ageratum houstonianum* | Poisonous to livestock |
| *Alisma plantato-aquatica* | Unknown |

| SPECIES | USES (VALUES) |
|---|---|
| *Alternanthera sessilis* | Fodder, medicinal, vegetable |
| *Amischophacelus axillaris* | Fodder, medicinal |
| *Arundo donax* | Construction |
| *Azolla imbricata* | Green manure |
| *Bambusa sp.* | Building material |
| *Barleria cristata* | Aesthetic value |
| *Boehmeria platyphylla* | Fodder, medicinal |
| *Bombax ceiba* | Timber, medicinal, flowers edible |
| *Caesulia axillaris* | Fodder |
| *Callicarpa microphylla* | Medicinal |
| *Calotropis gigantea* | Medicinal, fibers(seeds) for making pillow |
| *Carex aequatilis* | Fodder |
| *Careya arborea* | Medicinal |
| *Cassia fistula* | Medicinal, avenue tree |
| *Cassia tora* | Medicinal, seeds used as coffee |
| *Cassia occidentalis* | Medicinal |
| *Centella asiatica* | Medicinal, vegetable, fodder |
| *Centipeda minima* | Medicinal |
| *Centranthera nepalensis* | unknown |
| *Ceratophyllum demursum* | Medicinal, fish food |
| *Ceratophyllum submersum* | Medicianl, fish food |
| *Ceratopteris thalictroides* | Potherb |
| *Chara spp.* | Unknown |
| *Chromalaena odorata* | Medicinal, fuel, ornamental flowers |
| *Chrysopogon aciculatus* | Fodder, soil binder, baskets making |
| *Cleome viscosa* | Medicinal, seeds edible |
| *Colebrookea oppositaefolia* | Medicinal, used for ripening the bananas |
| *Colocasia esculenta* | Corms edible |
| *Commelina diffusa* | Fodder |
| *Croton sparsiflorus* | unknown |
| *Cymbopogon martinii* | Fodder, oil yielding grass |
| *Cynodon dactylon* | Fodder, religious plant, |
| *Cyperus brevifolius* | Fodder |
| *Cyperus compactus* | Fodder |
| *Cyperus cuspidatus* | Fodder |
| *Cyperus distans* | Fodder |
| *Cyperus globosus* | Fodder |
| *Cyperus halpan* | Fodder |
| *Cyperus iria* | Fodder, medicinal, |
| *Cyperus rotundus* | Fodder, medicinal |
| *Cyperus sanguinolentus* | Fodder |
| *Dactyloctenium aegyptium* | Fodder |
| *Dalbergia sissoo* | Tiber, fodder, medicinal |
| *Datura stramonium* | Medicinal |
| *Delonix regia* | Avenue tree, fuel |
| *Desmodium triflorum* | Soil binder, medicinal |
| *Dichandthium annulatum* | Fodder |
| *Dysophylla auriculata* | Fodder |

| SPECIES | USES (VALUES) |
|---|---|
| *Echinochloa colona* | Fodder, grains edible |
| *Echinochloa crus-galli* | Fodder, grains edible |
| *Echinochloa glabrescens* | Fodder, grains edible |
| *Eclipta prostrata* | Medicinal, fodder, vegetable |
| *Eichhornia crassipes* | Fertilizer, biogas, raw material for paper & |
| *Eleocharis dulcis* | Fodder |
| *Enydra fluctuans* | Potherb, blood purifier |
| *Equisetum debile* | Medicinal |
| *Eucalyptus spp.* | Medicinal, timber, fuel, oil source |
| *Eulalipsia binnata* | Fodder |
| *Evolvulus nummularius* | Soil binder |
| *Ficus glomerata* | Fodder |
| *Fimbristylis dichotoma* | Fodder |
| *Fimbristylis miliacea* | Fodder |
| *Flocospa scandens* | Fodder |
| *Gonostegia pentandra* | Fodder |
| *Hedyotis corymbosa* | Medicinal |
| *Hedyotis diffusa* | Medicinal |
| *Hemarthria compressa* | Fodder |
| *Hydrilla verticillata* | Fish food, oxygenator |
| *Hydrocotyle rotundifolia* | Medicinal |
| *Hygrophilla auriculata* | Medicinal |
| *Hygrorrhiza aristata* | Medicinal, fodder |
| *Imperata cylindrica* | Fodder, soil binder, medicinal, flood |
| *Ipomoea aquatica* | Vegetable, medicinal |
| *Ipomoea fistulosa* | Medicinal, poisonous to livestock, hedge |
| *Isachne globosa* | Fodder |
| *Juncus spp.* | Unknown |
| *Justicia procumbens* | Unknown |
| *Justicia quinqueangularis* | Flowers attractive |
| *Lagerstromea parviflora* | Flowers attractive |
| *Lantana camera* | Ornament, hedge, medicinal |
| *Leersia hexandra* | Fodder |
| *Lemna perpusilla* | Fish food |
| *Lipocarpha chinensis* | Fodder |
| *Lindernia anagallis* | Unknown |
| *Lindernia antipoda* | Unknown |
| *Lindernia pusilla* | Unknown |
| *Ludwigia adscendens* | Medicinal, flowers attractive |
| *Ludwigia hyssopifolia* | Medicinal |
| *Ludwigia octavalvis* | Medicinal, flowers attractive |
| *Ludwigia perennis* | Medicinal |
| *Mallotus philippinensis* | Fodder, medicinal, dye |
| *Marsilea quadrifolia* | unknown |
| *Monochoria hastata* | Potherb |
| *Monochoria vaginalis* | Potherb |
| *Murdannia nudiflora* | Medicinal |
| *Najas graminea* | Fish food |

| SPECIES | USES (VALUES) |
|---|---|
| *Nelumbo nucifera* | Rhizomes edible, attractive plant |
| *Nymphaea indica* | Aesthetic value |
| *Nymphaea stellata* | Aesthetic value |
| *Nymphaea nouchali* | Aesthetic value |
| *Nymphoides cristata* | Aesthetic value |
| *Oenanthe stolonifera* | Medicinal |
| *Oplismenus burmannii* | Fodder |
| *Oryza rufipogon* | Seeds edible and religious |
| *Ottelia alismoides* | Fish food, fruits edible, medicinal |
| *Ougeinia dalberginoides* | unknown |
| *Panicum repens* | Fodder |
| *Parthenium hysterophorus* | Medicinal, allelopathic plant |
| *Paspalidium geniculatum* | Fodder |
| *Paspalum distichum* | Fodder |
| *Paspalum scrobiculatum* | Fodder |
| *Phragmites karka* | Hedge, thatching and basket weaving |
| *Phyllanthus simplex* | Medicinal |
| *Phyllanthus urinaria* | Medicinal, piscicide |
| *Pistia stratiotes* | Potherb |
| *Pogostemon parviflora* | Medicinal |
| *Polygonum barbatum* | Piscicide |
| *Polygonum (red flower)* | Piscicide |
| *Polygonum hydropiper* | Piscicide |
| *Polygonum glabrum* | Piscicide |
| *Polygonum lapanthifolium* | Piscicide |
| *Potamogeton crispus* | Fish food |
| *Potamogeton nodosus* | Fish food |
| *Potamogeton pectinatus* | Fish food |
| *Pterocarpus marsupium* | Timber, fuel |
| *Ranunculus sceleratus* | Seeds taken as pickle, plants consumed |
| *Rotala indica* | Unknown |
| *Rotala rotundifolia* | Unknown |
| *Rottboellia exaltatta* | Fodder |
| *Rumex dentatus* | Vegetable |
| *Saccharum spontaneum* | Fodder, soil binder, thatching |
| *Saccharum munja* | Fodder |
| *Sacciolepis indica* | Fodder |
| *Sagittaria quayanensis* | Medicinal |
| *Sarothra japonica* | Unknown |
| *Schleicheria trijuga* | Timber, fuel, fruits edible |
| *Scirpus juncoides* | Fodder |
| *Scirpus mucronatus* | Fodder |
| *Semicarpus anacardium* | Poisonous |
| *Setaria pallide-fusca* | Fodder |
| *Smithia sensitiva* | Fodder |
| *Sphenoclea zeylanica* | Plants edible |
| *Spillanthus acmella* | Flowers (heads) edible |
| *Spirodella polyrrhiza* | Green manure, fish food |

| SPECIES | USES (VALUES) |
|---|---|
| *Sporobolus diander* | Fodder, raw material for basket |
| *Syzigium cumini* | Fruit edible, fodder |
| *Terminalia tomentosa* | Timber, medicinal |
| *Themeda arundinacea* | Thatching material |
| *Thevetia peruviana* | Medicinal, aesthetic value |
| *Trapa bispinosa* | Fruits edible |
| *Trewia nudiflora* | Fodder, fuel |
| *Tridax procumbens* | Fodder, medicinal |
| *Triumfetta rhomboidea* | Fiber |
| *Typha angustifolia* | Raw material for weaving mats and roofing |
| *Typha latifolia* | Raw material for weaving mats and roofing |
| *Urena lobata* | Bark fiber used as cord, flowers attractive |
| *Utricularia aurea* | Insectivorous plant |
| *Vallisneria spiralis* | Fish food |
| *Veronica anagallis-aquatica* | Unknown |
| *Vetivera zizanoides* | Soil binder, essential oil yielding plant |
| *Vitex negundo* | Medicinal, hedge |
| *Woodfordia fructicosa* | Medicinal, aesthetic value |
| *Xanthium strumarium* | Medicinal |
| *Ziziphus nummularia* | Fruits edible |

*Source: IUCN Field Survey, 1993-1996*

## *Wetland Products*

Wetlands provide important products to both human beings as well as to domestic and wild animals.

The direct use of the floodplains includes fuel wood collection, grazing of floodplain pastures, floodplain agriculture and fishing, recreation, settlement, and transport. Indirect use values of wetlands include other nontimber products that are vital for rural household economy in developing countries. Mats, baskets, ropes are sold in the local market, but owing to lack of market and low prices, there has been no compensation of the labour input of the local people and the local resources are not sustainably harvested. Training for sustainable harvesting of the resources such as reed grass and skill development for market demanding goods can bring proper income generation to the local people and initiate management of the resources.

Wetlands are the most threatened among all environmental resources. A list of important wetland products is given below (Table 2).

**Table 2. Some Wetland Products**

| USES | WETLAND SPECIES |
|---|---|
| A. DIRECT USE VALUES | |
| • Human food | *Alternanthera sessilis, Eurayle ferox, Ipomoea aquatica, Nymphaea nauchalli, N. stellata, Nelumbo nucifera, Oryza nivara, Trapa bispinosa, Diplazium boryanum, Ophioglossum reticulatum* |
| • Fodder for wild animals | *Seraria paliide-fusca, Saccharum spomtaneum, Cyperus defformis, C. Marsilea tetraphylla, Pistia stratiotes, Hydrilla verticillata* |
| • Fodder for domestic animals | *Cyperus, Eichornia crassipes* |

| | |
|---|---|
| • Timber | *Shorea robusta, Adina cordifolia, Terminalia spp., Dalbergia sissoo, Acacia catechu, Anogeissus latifolius, Trewia nodiflora, etc.* |
| B. INDIRECT USE VALUES | |
| • Medicinal and Aromatic | *Acorus calamus, Centella asiatica, Vetiveria lawsonii* |
| • Fibre materials | *Arundo donax, Phragmites karka, Saccharum spontaneum, Vetiveria lawsonii, Eulaliopsis binata* |
| • Mat | *Juncus buforius , Typha angustifolia, Vetiveria lawsonii,* |
| • Paper pulp | *Eulaliopsis binata, Saccharum spontaneum,* |

*Source: Choudhary, R. P. and Ram Lal Choudhary. 1996. Flora of the Terai Region of Nepal. A report submitted to IUCN Nepal.*

## *Wetland Crops and Their Uses*

About eight wetland crops are presented in Table 3. Some plants are grown on a large scale for commercial purposes.

In Nepal, many wild plants are cultivated as crops. In the neighbouring countries, numerous crops such as water chest-nut, gorgon nut, and different types of lotus are grown in a commercial scale. The following wetland crops are recommended for cultivation.

**Table 3. Cultivation of Potential Wetland Crops and Their Uses**

| FAMILY/SCIENTIFIC NAME | LOCAL NAME | COMMON NAME | AREA | PART USED/PURPOSE |
|---|---|---|---|---|
| ARACEAE | | | | |
| **Acorus calamus* | Bojo | Sweet flag | 3 | Rhizome/Medicinal |
| CONVOLVULACEAE | | | | |
| *Ipomoea batata* | Sakharkanda | Sweet potato | 2 | Tuberous root |
| DIOSCOREACEAE | | | | |
| *Dioscorea esculenta* | Suthni | Lesser Yam | 2 | Tuber/Cereal substitute |
| NYMPHAEACEAE | | | | |
| **Nymphaea stellata* | Seto kamal | White lotus | 3 | Seed edible |
| **Nymphaea nouchali* | Neel Kamal | Blue lotus | 3 | Seed edible |
| **Nelumbo nucifera* | Rato kamal | Indian lotus | 3 | Seed edible |
| **Euryale ferox* | Makhan | Gorgon nut | 3 | Seed used as Cereal substitute & medicinal |
| ONAGRACEAE | | | | |
| **Trapa bispinosa* | Singara | Water chest-nut | 3 | Seed/Cereal substitute |

Note: 1= Marsh; 2 = Floodplain; 3= Shallow lake /ponds; 4 = River bank. * wild grown

*Source: Choudhary, R. P. and Ram Lal Choudhary. 1996. Flora of the Terai Region of Nepal. A report submitted to IUCN Nepal.*

## *Wetland Vegetables*

Wetland sites are good for vegetable cultivation and support a wide variety of vegetables. For example, the floodplains of Lanka in Koshi Tappu is widely used to grow vegetables, such as pointed gourd (See Table 4 for details).

**Table 4. Vegetables Suitable for Wetland Sites**

| FAMILY/SCIENTIFIC NAME | LOCAL NAME | COMMON NAME | AREA | EDIBLE PART |
|---|---|---|---|---|
| *PTERIDOPHYTES* | | | | |
| ASPIDIACEAE | | | | |
| *Diplazium esculentum* | Lamtusia | | 4 | Tender shoot |
| *ANGIOSPERMS* | | | | |
| AMARANTHACEAE | | | | |
| **Amaranthus viridis* | Saronchi | Amaranth | 2 | Tender shoot |
| ARACEAE | | | | |
| *Colocasia antiquorum var. esculenta* | Karkalo | Colocasia | 4 | Leaf and shoot |
| **Remusatia vivipara* | Kachu | | 4 | Tender shoot |
| CONVOLVULACEAE | | | | |
| **Ipomoea aquatica* | Karmi saag | Swamp cabbage | 3 | Tender shoot |
| CUCURBITACEAE | | | | |
| *Benincasa hispida* | Kubhindo | Ash gourd | 2 | Fruit |
| *Citrullus vulgaris var. fistulosus* | Tinda | Round gourd | 2 | Fruit |
| *Citrullus vulgaris* | Tarbooza | Water melon | 2 | Fruit |
| *Coccinea grandis* | Tilkor | | 2 | Fruit |
| *Coccinia cordifolia* | Ban kiri | Ivy gourd | 2 | Fruit |
| *Citrullus lanatus* | Ghurmi | Vine peach | 2 | Fruit |
| *Cucumis melo var. flexuosus* | Kakadi | Serpent cucumber | 2 | Fruit |
| *Cucumis melo var. momordica* | Phoont | Snap melon | 2 | Fruit |
| *Cucumis sativus* | Ashare kankro | Field cucumber | 2 | Fruit |
| *Cucurbita pepo var. medullosa* | Pharsi | Vegetable gourd | 2 | Fruit, leaf |
| *Lagenaria siceraria* | Lauka | Bottle gourd | 2 | Fruit |
| *Luffa acutangula* | Pate ghiraula | Ribbed gourd | 2 | Fruit |
| *Luffa cylindrica* | Ghiraula | Sponge gourd | 2 | Fruit |
| *Momordica charantia* | Karela | Bitter gourd | 2 | Fruit |
| *Momordica cochinchinensis* | Chatel | - | 2 | Fruit |
| *Trichosanthes anguina* | Chichindo | Snake gourd | 2 | Fruit |
| *Trichosanthes dioica* | Parwar | Pointed gourd | 2 | Fruit |
| FABACEAE (LEGUMINOSAE) | | | | |
| *Pithecellobium dulce* | Jalebi | Manilla Tamarind | 2 | Fruit |
| MALVACEAE | | | | |
| *Abelmoschus esculentus* | Ramtoriya | Okra | 2 | Fruit |
| MORACEAE | | | | |
| **Ficus racemosus* | Gular | Cluster fig | 4 | Fruit |

| FAMILY/SCIENTIFIC NAME | LOCAL NAME | COMMON NAME | AREA | EDIBLE PART |
|---|---|---|---|---|
| NYMPHAEACEAE | | | | |
| **Nymphaea stellata* | Neel kamal | Blue lotus | 3 | Tuber, Fruit |
| **Nymphaea nouchali* | Seto kamal | White lotus | 3 | Tuber, Fruit |
| **Nelumbo nucifera* | Rato kamal | Indian lotus | 3 | Tuber, Fruit |
| PANDANACEAE | | | | |
| **Pandanus nepalensis* | Kewara | Srew pine | 4 | Young shoot eaten occasionally |
| RHAMNACEAE | | | | |
| **Zizyphus mauritiana* | Bayar | Indian plum | 2 | Fruit |
| SOLANACEAE | | | | |
| *Solanum melongena* | Bhanta | Brinjal | 2 | Fruit |
| *Capsicum frutescens var. cerasiforme* | Jyanmara Khursani | Cherry pepper | 2 | Fruit |

Note: 1= Marsh; 2 = Floodplain; 3= Shallow lake /ponds; 4=River bank. * wild grown

*Source: Choudhary, R. P. and Ram Lal Choudhary. 1996. Flora of the Terai Region of Nepal. A report submitted to IUCN Nepal.*

## *Common Weeds of Wetlands*

Wetlands provide various ecological functions that include genetic conservation, flood control, nutrient removal, tourism, energy storage, and many others. Some of the important wetland weeds found in Terai's wetlands are given along with their ecological functions (see Table 5).

**Table 5. Major Herbaceous Weeds of Wetlands**

| SCIENTIFIC NAME | VERNACULAR NAME | COMMON NAME | FAMILY | ECOLOGICAL IMPORTANCE |
|---|---|---|---|---|
| *Acorus calamus* | Bojo | Sweer flag | Araceae | Medicinal, Flood control |
| *Aneillena nudiflora* | Kane | Water da flower | Commelinaceae | Flood control |
| *Cyperus erithrorhizos* | Mothe | Sedge | Cyperaceae | Water treatment |
| *Eichhornia crasipes* | Jalkumbhi | Water hyacinth | Pontederiaceae | Flood control, drainage choking, Fish and food plants affected, Nutrient removal |
| *Elaeocharis congesta* | Mothe | Sike rush | Cypereceae | flood control, fish food |
| *Eriocaulon sieboldianan* | Mothe | Club rush | Cyperaceae | Flood control, fish food |
| *Hydrocharis morus-ranae* | Fulke kamal | Frogs bit | Hydrocharitaceae | Ornament, in aquaria |
| *Hydrolea zeylanica* | Simnile | Ñ | Hydrophyllaceae | Medicinal |
| *Hydrilla verticillata* | Pani unyu | Water fern | Hydrocharitaceae | Pest in tanks, ponds, good oxygenetor, fish food, used as manure. |
| *Hygrorhiza aristata* | Pani ghans | Ñ | Poaceae | Grains eaten by poor in Bengal, Wild relative of rice, Genetic conservation |
| *Ipomoea aquatica* | Karmaiya | Swamp-cabbage | Convolvulaceae | Vegetables., flood control, nutrient removal |
| *Juncus buforius* | Gund | Toadrush | Juncaceae | Used for making mats, baskets ans chair bottoms, pith medicinal, flood control |

| | | | | |
|---|---|---|---|---|
| *Jussiaea repens* | Ñ | Water primerose | Onagraceae | Flood control |
| *Lemna perpussila* | — | Duck weed | Lemnaceae | Nutrient removal |
| *Marsilea quadrifolia* | Jal Pyali | Water clover. | Marsileaceae | Medicinal |
| *Monochoria hastata* | | | Pontederiaceae | Leaves edible, rootstock food for cattle |
| *Monochoria vaginalis* | Jal-khubhi | Piqueral weed. | Pontederiaceae | Reduce crop productivity |
| *Nasturtiun oficinalis* | Jin rayo | Water cress | Brassicaceae | Used as salad |
| *Nymphaea stellata* | Seto Kamal | | Nymphaeaceae | Food for water fowl, ducks and shelter and shade for fishes |
| *Nelumbo nucifera* | Rato mkamal | | Nymphaeaceae | same |
| *Nymphaea nouchali* | Neel kamal | | Nymphaeaceae | same |
| *Oryza nivara* | Jangali dhan | Wild rice | Poaceae | Genetic conservation |
| *Oryza rufipogon* | Jangali dhan | Wild rice | Poaceae | Genetic conservation |
| *Ottelia alismoides* | | | Hydrocharitaceae | Fish food |
| *Pistia strateoites* | Pini bunda | Wate cabbage | Araceae | Nutrient removal, water treatment |
| *Polygonum hydropiper* | Pire | Hydroppiper | Polygonaceae | Fish poisoning and medicinal |
| *Potamogeton polygonifolius* | Phite jhar | Warter ribbon | Potamogetonaceae | Food for waterfowl, ducks, and shelter and shade for fishes |
| *Sagittaria sagittifolia* | Laph | Arrowhead | Alismaceae | Fish food |
| *Spirodella polyrhiza* | - | Duck weed | Lemnaceae | Nutrient removal |
| *Trapa quadrispinosa* | Singara | Water chest-nut | Trapaceae | Fish food |
| *Typha angustifolia* | Pater | Cat tail | Typhaceae | Flood control |
| *Vallisneria spiralis* | Bam ghans | Eel grass | Hydrocharitaceae | Medicinal, leucorrhoea |

*Source: Choudhary, R. P. and Ram Lal Choudhary. 1996. Flora of the Terai Region of Nepal. A report submitted to IUCN Nepal.*

## Wetland Fauna

### *Socio-cultural Values of Wetland Fauna*

> *Not long ago, wetlands were considered a public nuisance... wastelands that we drained, filled, paved over and built upon. Today we know that wetlands are valuable resources, worthy of protection. We know that some of the important functions that wetlands provide are critical habitat for plants, birds and animals; they remove pollution from waters that flow through them, reduce flooding by slowing and storing flood waters; and protect shorelines from erosion. (Source: The Wetlands Conservancy, USA)*

Wetlands are invaluable resources to human beings. Human history and civilization began from our association with wetlands. The majority of the world population still live close to water and rely among them to meet their needs. Wetlands have been used in various ways in our society (e.g. agriculture production - rice). A total area of 325,000 ha is estimated to be covered by such paddyfields, an area which is exceeded only by the lotic ecosystems of Nepal (Rajbanshi & Gurung 1994). Rice is the staple diet of most Nepalese. The demand for rice is growing and it is likely that more intensive farming will be practiced. If wetlands capable of agricultural production are properly managed, they will yield innumerable benefits to the community.

Wetlands are described as having great potential for aquaculture and especially for fish production. In a poor country like Nepal, where meat is expensive for the poorer

people, fishes can supplement protein requirements. Similarly, sport fishery can attract a lot of sportsmen thereby generating income. Pond and lake fishery practice gives a steady income to the local communities.

Dugan (1990) points out how beneficial wetlands can be when used wisely. Forest resources, wildlife resources, fisheries, forage resources, agricultural resources, water supplies, and energy resources are the examples given (Dugan 1990). In context of Nepal, where they are already being used as a valuable resource, wetlands can be used in various other ways which may benefit both the wildlife and people. Large bodies of water such as lakes, reservoirs and rivers can be used for easy and cheap transport. Many recreational activities can be conducted which are of aesthetic value. The local economy can be uplifted by such opportunities and investment.

There are many wetland sites, for instance Ghodaghodi Tal in the west, which hold cultural values for local people. Such sites are worshipped with religious faith. In Hindu society all flowing waters are taken as holy Ganga. Thousands of people take holy dips in the rivers to perform religious rituals and the deceased are buried or cremated close to or at the confluence of these rivers.

## *Ecology of Wetland Fauna*

Wetlands are characterized by their diverse biological assemblages, high productivity and seasonal changes. Because of their high productivity they are highly exploited. Wetlands with shallow water are more productive than those with deep water. Many microscopic organisms form the prey items for macro-invertebrates such as water-insects. These and aquatic plants on the other hand provide food for bigger animals like fish and frogs. Reptiles feed on frogs, birds, mammals and other reptiles. There are birds which feed on snakes (serpent eagles), frogs (owls, kingfishers), insects (thrushes, wagtails, egrets, storks, waders), snails (Openbill Stork), and fishes (gulls, terns, cormorants, kingfishers, ducks, fish-eagles, egrets and herons). Birds are easily the most noticeable and diverse fauna of wetlands. They derive energy from aquatic ecosystems and flow them back into terrestrial ecosystems. Like birds, other vertebrates also take energy from aquatic ecosystems and link it to terrestrial ecosystems. Large reptiles such as the crocodiles are on the top of the aquatic food chain.

More interesting is the ecology of those Terai wetlands which is very much seasonal in nature due to high fluctuations in water levels. These wetlands are shallow and largely depend on the seasonal monsoon rain. They remain dry, or almost dry, for at minimum two months per year. On the onset of the monsoon, life cycles begins slowly. Eggs hatch, dormant spores sprout and lives enter the static water by way of run-off water. Such is the productivity of this kind of area. Within a fortnight, species representing all classes of vertebrata start appearing. Millions of macro-invertebrates and micro-organisms start proliferating. The wetland is soon teeming with life. While the wetland gains its optimum size, most of the organisms will have already completed a vital life-process: reproduction. When wetland areas start shrinking at their edge, species move to the centre, towards the deeper part to complete the last rituals of life. Instinctively, species sense the onset of drier months and have adopted appropriate survival strategies. Most species complete their life-cycle before the wetland dries completely. Next season, the process is repeated again in the same manner.

## *Mammals*

Of the 183 species of mammalian fauna recorded, many species are found associated with wetlands of Terai. The Greater One-horned Rhinoceros (*Rhinoceros unicornis)*, Swamp Deer (*Cervus duvauceli duvaucel)*, Asiatic Wild Buffalo (*Bubalus bubalis*), Ganges Dolphin (*Platanista gangetica*), Fishing Cat (*Prionaliurus viverrinus*), and Smooth-coated Otter (*Lutrogale perspicillata)* are a few of the mammals which depend on Terai wetlands. All these species have been threatened in recent years because of habitat loss, hunting and shortage of food. The National Parks and Wildlife Conservation Act-1972 has listed all above as protected animals.

Following mammals are known to occur in Terai wetlands:

**Greater One-horned Rhinoceros** (*Rhinoceros unicornis*). A healthy population of more than 450 survive in Royal Chitwan National Park. Some were translocated to Royal Bardia National Park where the species had become extinct. A lone individual was recently sighted in Royal Sukla Phanta Wildlife Reserve. Rhinos are mostly terrestrial but spend considerable time in wallowing during summer months. Their main habitat is marshy grassland and riverine forests along the river-courses of central and western Nepal (IUCN-Endangered: CITES-Appendix I.)

**Asiatic Wild Buffalo** (*Bubalus bubalis*). Koshi Tappu Wildlife Reserve is the only place where they survive in Nepal. Formerly it was also found in Chitwan Valley but was exterminated during 1960's (Gurung 1983) primarily because of loss of wetland habitat. The surviving population at the Koshi is estimated to around 100. Cross-breeding with domestic buffaloes may result in virtual extinction of the pure breed. For the last 3 years, 70% of the so called *arna* observed were hybrids (Hathan Choudhary *pers. comm.*), although this can be confirmed only with chromosome analysis (IUCN-Endangered: CITES-Appendix III).

**Swamp Deer** (*Cervus duvauceli duvauceli*) (soft-ground race). Formerly distributed all over lowland Nepal, including the Royal Chitwan National Park (Gurung 1983), the population is now fragmented. Two population groups are found in west Nepal. Sukla Phanta Wildlife Reserve alone shelters roughly 2000 of these animals. Most Swamp Deer in Sukla Phanta are dependent on Shikari Tal, Rani Tal and Bahunne Nala. Another small population survives in Royal Bardia National Park. According to a recent survey in Bardia, more than 80 individuals were found surviving (Jaya Narayan Ghimire *pers. comm.* 1996). In Bardia an increasing population trend is observed, whereas in Sukla Phanta after an initial increase in the population seems to have stabilized (IUCN-Indeterminate: CITES-Appendix-I).

**Ganges Dolphin** (*Platanista gangetica*). Previously distributed in all major rivers of lowland but now highly restricted distribution, with a total national population of 40, the largest population survives at Karnali River, and Royal Bardia National Park. Koshi and Narayani are the other rivers where they are found. Construction of barrage and dams are the biggest threats to this animal. Other threats include hunting, overfishing and disturbance (IUCN-Vulnerable: CITES-Appendix I).

**Fishing Cat** (*Prionaliurus viverrinus*). Distributed throughout the southern belt of Nepal, this cat is very elusive and rarely seen in day time. It is highly nocturnal, under-recorded and probably occurs in all protected areas of lowland Nepal. It is more frequently seen particularly in Koshi Tappu Wildlife Reserve. The major threats are loss of habitat, shortage of food items and disturbance (IUCN-Insufficiently Known).

**Smooth-coated Otter** (Otter *Lutrogale perspicillata*). This animal is found in all major rivers where there is relatively little disturbance and plenty of food. Some lakes and ponds (e.g. Lami Tal, Rani Tal, Tamar Tal) are also well-known for otters. It is declining rapidly, the main causes for decline include shortage of food, hunting, loss of habitat and disturbance (IUCN-Insufficiently Known).

**Common Otter** (*Lutra lutra*). Not many are known in the Terai wetlands. Recently found in Ghodaghodi Tal (BPP, 1995).

**Pygmy Hog** (*Sus salvinus*). It is extremely rare in Nepal. Scott (1989) has listed this as possibly occurring in wetlands of Sukla Phanta Wildlife Reserve. More recently it is described as extinct in Nepal (Shrestha 1994). Affects marshes and wet grasslands (IUCN-Endangered: CITES- Appendix I).

**Hispid Hare** (*Caprolagus hispidus*). Sukla Phanta Wildlife Reserve and Royal Bardia National Park are the major sites where this hare is found. Annual burning of grasslands was found to drive away these animals towards the tall grasslands bordering streams which had escaped fire (Bell 1986, IUCN-Endangered: CITES-Appendix I).

**Four-horned Antelope** (*Tetracerus quadricornis*). This animal is reported from Royal Chitwan National Park (including Parsa Wildlife Reserve) and Royal Bardia National Park. It frequents grassland-edged forested lakes such as Tamar Tal of Chitwan. It is extremely rare (IUCN-Vulnerable: CITES-Appendix III).

**Crab-eating Mongoose** (*Herpestes urva*). This is a larger mongoose occurring in Royal Chitwan and Royal Bardia National Park. There are also reports of this animal from eastern Nepal. The species has suffered because of habitat loss (IUCN: CITES-Appendix III).

**Wild Boar** (*Sus scrofa*). It is a wide-ranging animal found all over Nepal up to a height of 3400 m in summer months. It is a prolific breeder and not threatened. The wild boar is widely hunted and feasted with much delicacy. Due to its reproductive capacity it can easily retains its numbers. They create havoc for farmers and in many protected areas bring conflict between parkland and people.

**Avifauna**. A total of 841 species of birds has been recorded in Nepal (Inskipp & Inskipp 1991, Baral *et al.* 1996, Choudhary 1996, Giri & Choudhary 1996). Wetland avifauna is relatively well documented by various authors such as Halliday (1982), Scott (1989), Inskipp & Inskipp (1991), Suwal and Shrestha (1992), Baral (1992, 1993, 1996), and Perennou et al. (1994). As many as 193 species of birds are dependent on wetlands. The eutrophic lakes and river systems in higher Himalaya support very little of wetland-depedent species. Almost all species of birds depending on the wetlands, except the black-necked crane *Grus nigricollis* (vagrant), red-necked phalarope *Phalaropus lobatus* (vagrant), solitary snipe *Gallinago solitaria*, wood snipe *G. nemoricola*, ruddy Turnstone *Arenaria interpres* (vagrant), and white-breasted Dipper *Cinclus cinclus*, have been reported from the Terai wetlands. These three species are vagrants and are not counted as regular birds of Nepal. A total of 187 species of birds are dependent on the Terai wetlands of Nepal. Most of these are migratory (98), some resident (59), and some vagrants or rare visitors (30) to Terai wetlands. As many as 180 species of water birds are reported from Koshi Tappu and Barrage alone.

**Pink-headed Duck** (*Rhodonessa caryophyllacea*) and **Imperial Heron** (*Ardea insignis*) have become extinct in Nepal (Inskipp & Inskipp 1991, Baral *et al.* 1996). Both were last reported by Brian Hodgson in 1846. The former is thought to have gone under global extinction, the last authentic report coming from Bihar, India, in June 1935 (Ali & Ripley 1987). BirdLife has not declared the species as extinct but has listed it as critically endangered (Collar *et al.* 1994).

Of the wetland birds in Terai, as many as 39 species are identified as threatened on a national level (Baral *et al.* 1996). A total 11 species of birds occurring in Terai wetlands are described as globally threatened (Collar *et al.* 1994). Another 11 species are identified as near-threatened by BirdLife (Collar *et al.* 1994). The wetlands in and around Royal Chitwan National Park support large number of Ruddy Shelducks (*Tadorna ferruginea*) which are of international importance (Perrennou *et al.* 1994).

As stated by Shrestha (1994), none of the 9 wetland-depedent species, except Swamp Partridge (Francolin), are resident in Koshi Tappu. Marbled teal (*Anas angustirostri*) is noted by Shrestha (1994) together with pink-headed duck (*Rhodonessa caryophyllacea*). Marbled teal (*Anas angustirostris*), as globally threatened species (Collar *et al.* 1994) and have never been reported. They are not listed or described in any of the standard work done on Nepalese avifauna such as Ali & Ripley' Handbook , Ripley's Synopsis, Flemings' Birds of Nepal and Inskipps' Birds of Nepal. Nepal lies in the eastern limit of its range and it is likely that it might turn inward to Nepal, but authentication of this report is required.

## *Selected Bird Habitats Meriting Protection*

(Source: Inskipp & Inskipp 1991, Collar *et al.* 1994, Baral *et al.* 1996, BCN Newsletters)

**Oriental Darter** — is a resident breeder in Koshi Tappu and Chitwan. It favours forested lakes but is also found in slow moving rivers. It is seen alone or in pairs.

Nowhere in Nepal is the bird abundant or seen in large numbers. Its population has declined in recent years because of shortage of food and habitat loss. It is found breeding in 13 countries of the world, including Nepal. Lakes in Royal Chitwan National Park, the wetlands of Koshi area (recently these were discovered to be breeding in the heronry of Koshi Tappu-the largest heronry of Nepal), Ghodaghodi Tal, and Rani Tal have suitable habitat for these birds.

**Spot-billed Pelican** — these birds visit the Koshi Barrage and Tappu during late winter, spring and early summer months. They are usually found in small numbers, 2 to 5, but as many as 120 were recently sighted (Giri & Choudhary 1996). Protection of Koshi Tappu and Barrage may help to save this globally threatened species.

**Great Bittern** — is an extremely rare bird in Nepal and can be seen during winter months. Koshi marshes contain some of these birds as an irregular winter visitor.

**Yellow Bittern** — one of the late breeding summer visitors to Nepal, this bird is fairly common during the monsoon period in Koshi Tappu and Barrage. It is a rare breeder at Chitwan. It favours tall marshy reeds/grasses with water nearby.

**Black Bittern** — a resident and highly crepuscular species found in Koshi, Chitwan and Sukla Phanta. It frequents forested lakes as well as marshes.

**Painted Stork** — is recorded as a summer visitor to many places like Koshi, Sukla Phanta and Chitwan. Lone birds have been seen in winter in the Karnali river.

**Asian Openbill Stork** — probably the commonest of all storks found in Nepal, but the number is observed to be in decline. It is a resident in Nepal and has been found breeding in Koshi Tappu and Chitwan. Its movement is largely controlled by the availability of snails. After the flood in 1993 at Chitwan, the resident population has declined, probably because of shortage of prey.

**Black Stork** — is a winter visitor to Nepal largely confined to the protected areas. Koshi Tappu, Chitwan and Bardia shelter some of these along their rivers and lakes. There is evidence of a dramatic decline of this species in Nepal (Baral 1993).

**Black-necked Stork** — has been recorded only from the protected areas except the Koshi Barrage. It is found breeding at Koshi Tappu where two pairs have bred. A total of 10 in 1992 (Baral 1993) and 16 in 1995 (Baral 1995) were counted from the protected wetlands of Terai. A resident population of 20 adults is estimated in Nepal but the number is augmented by winter visitors. Perhaps the most threatened of all the storks species in Nepal, Koshi, Chitwan, Bardia and Sukla Phanta are the major sites for this stork.

**Greater Adjutant Stork** — a non-breeding summer visitor to eastern Terai. The arrival of the birds is greatly influenced by the availability of food items. It is a globally threatened species with highest threat category as endangered among all wetland birds of Nepal Terai.

**Lesser Adjutant Stork** — is found all over Nepal but showing an increase in numbers towards the eastern region. It breeds on tall simal trees (*Bombax ceiba)* nearby a river or wetland. Large and conspicuous, the population of this bird is declining globally. Protection of nesting and feeding habitat is necessary. Marshes near Koshi Barrage should be protected to ensure the survival of this species along with other nationally and internationally threatened species.

**Red-naped Ibis** — is an endemic bird of South Asia. There is no evidence of population decline of this species in Nepal, but elsewhere the population is declining. It is a breeding resident and the Nepalese population of this bird may be of international significance.

**Black-headed Ibis** — a resident species mainly found in the eastern Terai. Few birds seen as far west as Kapilbastu District, but mainly in the east Nepal.

**Eurasian Spoonbill** — is threatened because of habitat loss, hunting and disturbance. It is mainly a passage migrant and winter visitor to Koshi Tappu and Barrage.

**Comb Duck** — formerly commoner but now a scarce resident. Inhabits dense forested lakes and open bodies of water. Habitat loss as a result of wetland drainage from forested lakes has severely threatened the species in Nepal. It is a popular duck amongst game hunters. Protection of lakes like Ghodaghodi and Rani Tal is necessary for the conservation of this nationally threatened species.

**Baer's Pochard** — a globally threatened species, which migrates through and winters near Koshi Tappu/ Koshi Barrage in small numbers.

**Ferruginous Duck** — a globally threatened species found as passing migrant and winter visitor. Koshi area, Chitwan and Jagdishpur Reservoir are the main sites where this bird is regularly recorded. There are no apparent signs of population decline in Nepal, although elsewhere it is declining rapidly.

**Ring-tailed Fishing-eagle** — formerly commoner species (Ripley 1950) but now extremely rare. It is threatened with habitat loss and shortage of prey.

**White-tailed Eagle** — is found along large rivers of the Terai. Shortage of prey has threatened the species's survival in Nepal. Koshi, Narayani and Karnali rivers are the major sites which deserve protection for conservation of this species.

**Lesser Fishing-eagle** — is described as breeding at Chitwan (Gurung 1983) but no other report of breeding birds in country. It is found along slow moving rivers and forested lakes. It is a nationally threatened and globally near-threatened species.

**Grey-headed Fishing-eagle** — a localised breeding resident of lowland Nepal. It has bred at Beesh Hazar Tal (Chitwan), and Ghodaghodi Tal, and at Sukla Phanta close to Bahunne Nala. Suffers habitat loss and shortage of food.

**Imperial Eagle** — regularly seen along Koshi river, it is mainly a passage migrant.

**Swamp Francolin** — an endemic of South Asia found in Nepal, India and Bangaladesh. About 1,000 to 10,000 individuals are estimated to survive in the world (Conservation Management and Action Plan, CAMP for Galliformes: WPA-IUCN). A total of 206 adult birds are estimated to be surviving in Nepal (Baral 1995), which may be an internationally significant population of this species. It is found in Sukla Phanta and Koshi Tappu and Barrage. Numbers have increased in Koshi Tappu since 1986. Protection of habitat at Koshi Tappu and Barrage, Jhilmila near the Choudhar river canal and Bahunne Nala are necessary for conservation of this species.

**Water Rail** — it is skulking and very shy. Extremely rare winter visitor and passage migrant. Koshi Tappu and Barrage are suitable habitats for this bird.

**Baillon's Crake** — Koshi area and Chitwan are the regular sites for this bird. It is mainly a passage migrant but also a winter visitor in small numbers.

**Watercock** — a monsoon visitor mainly in the eastern Terai. Movement is controlled by the nature of the monsoon. In some years, it is commoner than others. Koshi Tappu and Barrage are the known sites for this species.

**Sarus Crane** — is distributed from central Terai west to Sukla Phanta. It has bred in Rupandehi, Kapilbastu and Bardia districts. Rupandehi and Kapilbastu districts are the major sites meriting protection. In April 1993, as many as 70 cranes were seen in Rupandehi district, the highest recorded number for the species in Nepal.

**Great Stone Plover** — is found along the large rivers like Koshi, Narayani and Karnali. It has suffered from the loss of habitat and disturbance. A nationally threatened species.

**Indian Courser** — is a nationally threatened species in Nepal. Recently, it was found to be breeding at Koshi Tappu and has bred at Koshi Barrage. Besides Koshi, it is recorded in Nepalgunj and Dhangadhi in the west Nepal.

**Long-billed Plover** — Rapti river near Hetauda is the only place where it is regularly recorded. It is a nationally threatened bird and not much is known about its status in Nepal.

**Grey-headed Lapwing** — a large lapwing which visits Nepal in winter time. In Koshi Barrage some are seen on passage and few winter. They have suffered in their regular wintering place at Kathmandu (mid-hills) where wetlands are shrinking day by day. Similar situations are seen in lowlands which threatens the species.

**Black-bellied Tern** — is endemic to South Asia. Found all over Nepal along the major rivers of lowland with breeding records in some places. Koshi Tappu and Barrage are the major places which merit protection.

**Indian Skimmer** — a globally threatened species, mainly recorded from Koshi area. A handful of reports from Narayani and Karnali were made of this species which is an irregular spring visitor to Nepal.

**Dusky Eagle Owl** — a very large owl which is nationally threatened. Reported only from Koshi and Chitwan where a very small population is resident.

**Brown Fish Owl** — another large owl which mainly feeds on fishes and frogs. It is believed that the number is going down but still fairly common in all the lowland protected areas.

**Tawny Fish Owl** — extremely rare owl and very little information is available on its status in Nepal. It was last reported in central Nepal.

**Ruddy Kingfisher** — a rare resident which is mainly seen in the Sal forested streams of Churia hills.

**Blyth's Kingfisher** — only one record from the Sabhaya Khola near Tumlingtar. A globally threatened species.

**Blue-eared Kingfisher** — a nationally threatened species. Found in shady streams and pools. It is regularly reported from Chitwan, where it is fairly common. Habitat loss, disturbance and shortage of prey are the main threats for this species.

**Smoky Warbler** — found in all protected areas of lowland Nepal, it winters along the edges of marshy rivers and lakes in small numbers. (see Annex 7 for avifauna of Terai).

### *Herpetofauna*

A great variety of herpetofauna has been reported from Terai wetlands. A total of 80 different species of reptiles and 36 different species of amphibians have been found in Nepal. Of these, 90% are found in the Terai belt. Of the amphibians, all species depend on wetlands to complete their life-cycle.

A list of 6 species of turtles is given by Inskipp (1988) which are all known to occur in lowland wetlands. Many of them have become rare because of habitat loss and their collection for meat and other medicinal purposes.

- *Kachuga dhongoka*
- *Kachuga kachuga*
- *Kachuga tecta*
- *Kachuga smithi* (BPP 1995)

- *Testudo elongata* (Shrestha 1994)
- *Indotestudo elongata* (Shrestha 1994)
- *Geochelone elongata* ?
- *Chitra indica*
- *Trionyx gangeticus*
- *Morenia petersi* (BPP 1995)

As many as 19 species of snakes are said to be associated with the wetlands in Royal Chitwan National Park (Scott 1989). Indian python, water snake, and checkered keelback are the commoner species that inhabit the Terai wetlands. Some species are listed below:

- Indian python (*Python molurus*)
- Indian egg-eating snake (*Elachistodon westermanni*)
- Water snake (*Natrix platyceps*)
- Checkered keelback (*Xenochrophis piscator*)
- Indian monitor lizard (*Varanus bengalensis*)
- Golden monitor lizard (*Varanus flavescens*)
- Gharial (*Gavialis gangeticus*)
- Marsh muggar (*Crocodylus palustris*)

The endangered gharial and marsh muggar are found in rivers which lie in protected areas. The latter species is also found in lakes. Both species are the largest reptiles of Nepal. Indian rock python, the longest of the Nepalese reptiles, is also dependent on wetlands. More recent reports of these snakes from Kathmandu Valley may be escapes or unknowingly transported by trucks from their native home in Terai when young. All three reptiles are listed as protected by His Majesty's Government of Nepal. Monitor lizards (*Varanus spp.*) are also becoming rare because of a lack of well-defined wildlife rules and an inefficient implementation body.

A list of 36 species of amphibians in Nepal is listed by Inskipp (1988). All except two species are frogs and toads. The other two, *Tylototriton verrucosus* and *Ichthyophis sikkimensis*, are found in mid-hill wetlands of east Nepal only. A high proportion of amphibians are resident of lowland wetlands. Many have become rarer in recent years because of wetland drainage and loss. *Rana tigrina* has been listed in Appendix II of CITES.

### *Fishes*

A total of 179 species of fishes are found in wetlands of Nepal. From Royal Chitwan National Park only as many as 113 species of fishes belonging to 10 orders and 23 families have been reported, the most common being cyprinoids (61 species) and siluroids (32 species) fishes (Edds 1986).

Edds (1986) further notes that many of the species of fishes are prized for humans at Chitwan such as rohu (*Labeo rohita*), sahar (*Tor puttitora*), Jalkapoor (*Clupisoma garua*) and raja bam (*Anguilla bengalensis*). Fishes are integral part of aquatic ecosystem and form an important link to terrestrial ecosystems. Many of the vertebrates living in terrestrial environment (birds, reptiles and mammals) derive their energy from aquatic ecosystems as their main food consists of fish.

Following are some fish species occurring in the Terai wetlands (Scott 1989, Shrestha 1994). More examples of fishes found in Terai are given by Edds (1986).

*Amblyphoryngodon mola, Amphipnous cuchia, Anabas testudineus, Anguilla bengalensis, Barbus spp., Barilius spp., Chaca chaca, Chagunius chagunio, Chela laubuca, Clarius betrachus, Clupisoma garua, Colisa fasciatus, Danio spp., Esomus danricus, Gadusia*

*chapra, Ghanna spp., Glossogobius giuris, Heteropneustes fossilis, Labeo rohita, Macrognathus asculcatus, Mystus spp., Nandus nandus, Ompac bimaculatus, Ompok bimaculatus, Osteobrama cotico, Oxygaster spp., Puntius spp., Rasbora spp., Tetradon cutcutia, Tor puttitora,* and *Tor tor.*

Damming, pollution, over-fishing, poisoning, dynamiting, and introduction of exotic fishes are outlined as possible threats to the native species (Edds 1986). Such practices should be controlled or banned where possible.

### *Invertebrata*

Many varieties of molluscs, for example snails, leeches, flatworms, and earthworms, inhabit wetlands. A diverse world of arthropods is found in the Terai. Crustaceans and beetles are common in wetlands and form a major diet of vertebrates. Their number increases during spring and summer months. A distinct macro and micro-invertebrates community occur in lotic and lentic ecosystems. Many interesting adaptational features can be seen in invertebrates found in lotic ecosystems. Many varieties of protozoans, mainly microscopic, are also abundant in water. Animals are mainly concentrated on upper surface of water and zoobenthos are sparse. Anaerobic organisms inhabit the bottom of deeper lakes. Since these invertebrates are the chief diet of higher vertebrates they are an important link in any aquatic ecosystem (Insects recorded from Beesh Hazar Tal are presented in Annex 8).

## Limnology*

Lakes in Nepal showed strong regional patterns in ion and nutrient chemistry which depended to varying degrees on geology, morphometry, and climate. Geology was the principal factor responsible for the continuum of ion concentrations from Terai lakes (mean = 2.188 $meq \cdot L^{-1}$), to intermediate concentrations in Midhill lakes (1.071 $meq \cdot L^{-1}$), and low concentrations in Himal lakes (0.489 $meq \cdot L^{-1}$). The observed 4-fold geometric decrease in mean concentrations was a product of easily weathered alluvium in the Terai delivering more ions to solution compared to weathering resistant igneous and metamorphic rock in the Midhills and Himal. This pattern is consistent with regional surveys linking patterns in ion concentrations to geology (Nauman 1929, Deevey 1940, Sutcliff & Carrick 1983, Duarte & Kalff 1989). Results were consistent with previous studies from Nepal (Lohman *et al.* 1988, Jones *et al.* 1989) and India (Hutchinson 1937, Kaul 1977, Kaul *et al.* 1980, Handa *et al.* 1982) for lakes with low human disturbance.

Regional patterns in nutrient concentration were similar to patterns in ionic salinity with mean phosphorus concentrations showing exponential decrease from Terai lakes by 3-fold to Midhill lakes and 3-fold again to Himal lakes. Nitrogen concentrations were similar among Terai and Midhill lakes but decreased 3-fold in Himal lakes. Geology and landcover which regulate external load are of paramount importance in determining lake nutrient status in lakes without point-source pollution (Vollenweider 1968, 1975). The regional pattern in lake nutrients is consistent with findings of greater nutrient export from unconsolidated sedimentary or alluvial geology compared to igneous and metamorphic geology (Dillon & Kirchner 1975, Duarte & Kalff 1989).

Terai lakes were located in fertile catchments on reed dominated floodplains or in tropical managed agroforestry, Midhill lakes were in catchments containing intensive agriculture, and Himal lakes were located in barren, seasonally grazed, alpine pasture

---

* Sources cited in this section are not included in the Reference Section of this report. For full citation, readers are refered to an article *Description of Water Chemistry, Algal Biomass, and Nuimitation Limitation of lakes in Nepal and Their Seasonal Patterns in a Monsoon Climate* which is being prepared by Preston McEachern and J.R. Jones, Fishes and Wildlife, School of Natural Resources, University of Missouri, Colombia, USA.

or exposed rock catchments (Gurung 1971). The gradient in landcover with increasing elevation likely contributed to the patterns in nutrient concentrations because watersheds are typically less productive with elevation or its correlate, latitude (Brylinsky & Mann 1973, Schindler 1978) and therefore export less nutrients. Nutrient export has been linked to vegetation cover with higher export from pasture and agriculture compared to forest (Dillon & Kirchner 1975, Duarte & Kalff 1989), however, terraced paddy agriculture is likely more similar to wetlands, exporting less nutrients than forested Terai watersheds.

Terai lakes were productive, being typically eutrophic by nutrient and CHL criteria (Forsberg & Ryding 1980). Terai lakes were characterized by nitrogen deficient conditions (N:P = 2 to 15), common to lakes throughout southern Asia (Fernando 1984). Some lakes were mesotrophic and even oligotrophic by nitrogen criteria due to very low pelagic concentrations of this nutrient. Lakes with lowest nitrogen had known groundwater sources (Koshi Tappu seepage, Devi Tal, and Jagadishpur Reservoir). Some Terai lakes were oligotrophic using chlorophyll criteria. These had low nitrogen concentrations (Jagadishpur Reservoir) or were dominated by macrophytes (Ghodaghodi Tal). Nitrogen deficient conditions were a result of loading from rivers or groundwater with low N:P (N:P of all Terai river sample means = 7, n = 30, and N:P = 4 for monsoon samples, n = 10). Terai rivers contained low concentrations of nitrogen in all seasons (mean = 315 $\mu g \bullet L^{-1}$) indicating drainage from a landscape deficient in nitrogen typical of tropical forests (Bruijnzeel 1991). Although groundwater was not measured directly, data from the Koshi Tappu seepage likely represents the low nitrogen (N:P = 2, [N] = 140 $\mu g \bullet L^{-1}$) groundwater influencing Terai lakes on river floodplains.

Internal loading may have been the dominant feature of some lakes, particularly shallow Terai lakes, all of which experienced tropic-like conditions (Kilham & Kilham 1990). Morphometry was important in determining the nutrient status of Terai lakes by controlling stratification, surface area of lake sediments interfacing with the mixed layer (Osgood 1988), and frequency of epilimnetic exchange with the hypolimnion and bottom sediments (Jones & Welch 1990, Welch & Cooke 1995). Evidence for resuspension of nutrient-rich sediment was apparent among shallow Terai lakes lacking macrophytes (Halkoria Daha, Devi Tal) especially in premonsoon months when water depth was low. Resuspension could have been a result of wind induced turbulence (Carper & Bachmann 1984, Osgood 1988) or from wallowing livestock whose use of the sampled lakes in protected areas became more frequent during dry months.

Monsoon had a profound impact on hydrology in Terai lakes reducing retention times and connecting some oxbows to adjacent rivers. Water initially received from rain, sheetflow, and rivers caused ionic dilution and a shift to monovalent cations. After soil became saturated and groundwater began to flow, ion concentrations increased rapidly and shifted to divalent cations, similar to observations in rivers after large rainfall (Kennedy & Malcolm 1977). Nutrient concentrations increased both from particulate matter carried in the high monsoon discharge and dissolved nutrients acquired as precipitation infiltrated through soil detritus. Johnson *et al.* (1976) reported that 75% of phosphorus loss from agricultural watersheds in New York occurred during high stream flow and the nutrient increase in streams was in both particulate and dissolved forms. The importance of leachate, in Nepal's lakes, was indicated by the marked increase in DOC during monsoon. Land management practice in Nepal includes the burning of most grassland areas just prior to monsoon which, along with a general loss of foliage in tropical trees (*Sorea robusta, Bombax* sp.) occurring during the same months (March-April), are possible sources of nutrient rich detritus flushed into lakes during monsoon. Although nutrient concentrations increased during monsoon, N:P ratios decreased due primarily to the high P loading occurring from monsoon inflows.

Midhill lakes were diverse in morphometry, nutrient concentration, and trophic state. Rara Tal is Nepal's deepest lake, it has a small watershed : lake area ratio (Okino & Satoh 1986), and resides in one of the most arid regions of Nepal, giving it a long retention time and low external loading. Rara Tal was oligotrophic. At the other extreme was Tau Daha and Rupa Tal, both shallow, polymictic lakes. Tau Daha had

heavy human use and Rupa Tal had extensive macrophyte communities. These lakes were more similar to Terai lakes with eutrophic chlorophyll concentrations, N:P ratios of 11 and 15 and, in Tau Daha, evidence of high sediment resuspension. The remaining Midhill lakes, Phewa Tal, Begnas Tal, and Indra Sarobar (Kulakhani Reservoir) were moderately deep lakes, warm monomictic, nitrogen and phosphorus deficient (3<N:P<50) and were mesotrophic. Nutrient ratios changed when stratification was disrupted demonstrating the importance of internal processes in these lakes.

Phewa and Begnas Tals were sampled frequently enough to link the breakdown of stratification in November to subsequent increase in N:P ratios. Phosphorus released from the hypolimnion must have been quickly incorporated into biomass or precipitated out so that P was increasingly deficient through dry months to March. Nakanishi *et al.* (1988) inferred phosphorus limitation in Phewa and Begnas Tals during these months from N:P ratios they recorded. Ephemeral stratification resulted in decreased N:P from March through monsoon likely because of periodic release of phosphorus and loss of $N_2$ from hypolimnetic water. Nutrient ratios observed during premonsoon months by Jones *et al.* (1989) were lower than in this study, TP was almost double (24 $\mu g \bullet L^{-1}$) and TN was slightly reduced and more similar to monsoon concentrations in this study (140 $\mu g \bullet L^{-1}$). This may indicate greater occurrence of ephemeral stratification, internal loading of P, and loss of nitrogen in denitrification in 1985.

Inflows to Phewa Tal maintained low N:P particularly during monsoon (mean N:P for Phewa Tal inflows during monsoon = 5.5). Nitrogen concentrations during monsoon in Harpon Khola, the main tributary to Phewa Tal, were < 230 $\mu g.L^{-1}$ and less than 50 µg.L-1 on one occasion resulting in an N:P ratio < 1. Intensive agriculture in Midhill valleys filters most tributaries through successive terraced rice paddy which likely results in the low N:P of inflowing rivers. Interflow was observed in Phewa Tal and is likely a factor in Begnas Tal so that inflows supplying nutrients do not cause the increase in nutrient concentrations observed in Terai lakes. Nutrient concentrations from this study closely matched previous work from the Pokhara lakes (Lohman *et al.* 1988, Nakanishi *et al.* 1988, Jones *et al.* 1989) and for Tau Daha (Hickel 1973b) and Rara Tal (Okino & Satoh 1986).

The sampled Himal lakes were oligotrophic by nutrient and CHL criteria (Forsberg & Ryding 1980), were dimictic with one lake possibly cold polymictic (Chola Tso), and demonstrated P deficiency (N:P > 26). The first description of three Himal lakes added Phoksumdo Tal, Gosain Kunda, and Bhairav Kunda to the limited data on Himalayan lakes. Phoksumdo Tal is significant because it is Nepal's largest lake in volume; Gosain and Bhairav Kundas are culturally significant to Hindu and Buddhist faiths. Results were similar to those from the Annapurna Region (Aizaki 1986, Aizaki *et al.* 1987) and Everest region (Löffler 1969) demonstrating P concentrations generally below 6 $\mu g \cdot L^{-1}$. Nitrogen data was previously unreported and shown to be in concentrations similar to seasonal low values approached by many Midhill and even some Terai lakes (around 200 $\mu g \cdot L^{-1}$). Ion and nutrient concentrations were consistent with geologic sources and were similar or lower than lakes on igneous geology worldwide (Wetzel 1983).

Chlorophyll concentrations were primarily dependent on nutrient concentrations in the sampled lakes. Both nitrogen and phosphorus explained variance in CHL ($r^2$ = 0.65 & 0.52 respectively). The CHL relationship to nitrogen was not significantly different from a relationship reported for sub-tropical lakes of Florida (Canfield 1983). The applicability of the Canfield regression to Nepal suggests that N-deficiency elicits similar responses in algal growth irrespective of local conditions, even across the broad range in climate encountered in Nepal. The CHL relationship to phosphorus was quadratic, similar to findings for turbid lakes (*e.g.* Knowlton & Jones 1993) and lakes where low N:P occurs at higher nutrient concentration (Downing & McCauley 1992). Both turbidity and low N:P were factors in the asymptotic curvature of the CHL-TP regression, NVSS was significantly higher and N:P was significantly lower in lakes where the CHL-TP slope diminished. The effects of increased solids resulting in decreased CHL yield per unit TP is likely due to decreased phosphorus availability

(Hoyer & Jones 1983, Burkholder 1992) and decreased light availability for algal growth (Jones & Knowlton 1993).

Nitrogen deficiency was a feature of Nepal's lakes indicated by the underestimation of trophic status by nitrogen parameters (Forsberg & Ryding 1980), the need to adjust trophic criteria (Table 7), generally low N:P ratios among Terai lakes, and low nitrogen in particulate organic matter (PON/POC = 112). Reciprocal limitation was the most common response among NSEs (Nutrient Simulation Experiment) indicating that neither N nor P were present in excess. Simultaneous limitation of the algal assemblage by both N and P may have occurred (Dodds *et al.* 1989) where N limited most of the assemblage but P limited some species. The close association between nitrogen and phosphorus concentrations may be a result of nitrogen fixation which can access a limitless atmospheric pool (Barica 1990, Levine & Schindler 1992) to balance nitrogen with phosphorus concentrations. However, nitrogen deficiency was not alleviated in Nepal's lakes, either because fixation could not balance loss from denitrification and nitrogen deficient inflows or other factors were inhibiting the dominance of nitrogen fixing algae.

Cyanophytes responsible for N-fixation are large, colonial species that are found in netplankton fractions (>11 μm cell diameter) and their presence would have resulted in low %uCHL. Percent uCHL was typically above 48% and was not correlated with N:P ($r = -0.1$, $p > 0.05$) as would be expected if lower N:P resulted in more cyanophytes and less small algal species.

## *Management Implications*

This study expanded on the regional reconnaissance of Nepal (Jones *et al.* 1989) adding a number of small Terai lakes and three important Himalayan lakes never previously investigated. The study also expanded the seasonal characterization of Nepal's lakes (Lohman *et al.* 1988) through the annual monsoon cycle. Regional characteristics of geology, morphology, and climate that explained variation in Jones *et al.* (1989) were applicable to the expanded regional characterization including lakes of the Himal and through seasons despite the profound influence of monsoon. Ions were more easily weathered from alluvium in the Terai with possible additional influence from higher temperatures and longer weathering periods in Terai locations (Steinitz-Kannan *et al.* 1983).

Nutrient concentrations increased during monsoon. The monsoon increase was not observed by Lohman *et al.* because nutrients were rapidly removed from the water column after monsoon presumably by uptake and sedimentation. Nitrogen concentrations increased or remained at stable concentrations in lakes through dry months while phosphorus concentrations generally declined. Monsoon brought external loading of both nutrients with greater increases in phosphorus than nitrogen causing a decrease in N:P ratios and a proclivity for N-limitation. Nitrogen was the predominant limiting nutrient among Terai lakes as had been predicted by Jones *et al.* based on their nutrient ratios. Nutrient limitation was shown to change seasonally in some lakes from phosphorus during dry months to nitrogen during premonsoon and monsoon months based on stratification patterns in premonsoon and the low N:P of external loads during monsoon.

Lake mean data in this study corresponded to seasonal values during early premonsoon for ions and late premonsoon for nutrients. Average ion conditions for lakes occurred in February and early March while nutrients required the increase that followed initial rains in April. The Jones *et al.* data, from March and April, were therefore an accurate representation if the onset of monsoon approximately corresponded in their study and this one. Sampling during premonsoon months, bracketing initial rains, may be advisable for future surveys because it would limit seasonal variability for among lake comparisons and still result in a reasonable annual mean representation with reduced sampling intensity.*

* Continued to page 308

# *Chapter Six*
# *Social Aspects*

## Socio-demographic Realities

Population distribution of Nepal for the period 1952/54 to 1991 is presented in Table 1. The Table shows that the population in the Terai, as a ratio of national population, has increased from 35.2% in 1952/54 to 46.7% in 1991.

**Table 1. Population Distribution by Ecological Zone (1952/54–1991)**

| YEAR | MOUNTAINS AND HILL | TERAI | TOTAL | POPULATION |
|---|---|---|---|---|
| 1952/54 | 64.8 | 35.2 | 100 | 8,256,625 |
| 1961 | 63.8 | 36.4 | 100 | 9,412,996 |
| 1971 | 62.4 | 37.6 | 100 | 11,555,983 |
| 1981 | 56.4 | 43.6 | 100 | 15,022,839 |
| 1991 | 53.3 | 46.7 | 100 | 18,491,097 |

*Source: CBS. 1995. Population Monograph of Nepal.*

The Terai region covers approximately 23% of Nepal's total area (181,147 sq. km), and is inhabited by 46.7% of the total population (Table 2). The average population density of Terai is 253 persons per sq. km, higher than those of mountains and hills. The mountain and hill zones have population densities of 27.9 and 137.3 persons/sq. km respectively. The population density of the Terai is just double the national average of 125.6. The data on annual population growth rate (1981-91) indicates that the growth rate of the Terai region is the highest nationally at 2.75%, whereas the national average is 2.08%. Table 2 also shows population pressure on cultivated area. The percentage of cultivated area in Terai (38.6%) is almost three times higher than that of hill region (14.3%). Of the total cultivated land of 2.36 million hectares, almost 56% is in the Terai region and pressure on cultivated land is 6.6% per hectare. The other social indicators of literacy and sex ratio show that sex ratio is higher than the national average but the literacy rate is lower than the national average of 36.5%.

Data in Table 3 shows that over the period of 40 years, the population of the Terai region increased from 35.2% in 1952/54 to 46.7% in 1991, whereas in hills and mountains, there is decreasing trend. As of 1991, 77% of land holds 53% of the total population whereas 23% has 47% population. During the period between 1952/54 to 1991, the population pressure on cultivated land and annual growth rates increased. The population density has increased in 1991, three times higher than in 1952/54. The population pressure on cultivated land is also increasing threefold. The annual growth rate is higher than the national average of 2.08% in 1991.

Table 3 shows the total population of Nepal is 18,491,097, which is double the figure contained in the 1961 Census. During the last forty years, the population of the Terai region has increased from 35.2% to 46.7% of total national population. In contrast, the population of the mountain and hill areas has been decreasing. On the basis of this data, it is evident that population pressure is growing in the Terai region.

**Table 2. Population, Land, Arable Land & Population Density by Ecological Zone**

| CHARACTERISTICS | MOUNTAIN | HILL | TERAI | TOTAL | NEPAL |
|---|---|---|---|---|---|
| Area | 27.00% | 50.00% | 23.00% | 100% | 181,147 Sq. km |
| Population | 7.80% | 45.50% | 46.70% | 100% | 18,491,097 |
| Density/sq. km | 27.9 | 137.3 | 253.6 | — | 125.6 |
| Annual Population Growth Rate (1981-91) | 1.02% | 1.61% | 2.75% | — | 2.08% |
| Percent of Total Land Under Cultivation | 3.1 | 14.3 | 38.6 | — | 16.0 |
| Cultivated Land (in ha) | 6.90% | 37.40% | 55.70% | 100% | 2.36 million ha |
| Population per ha of cultivated Land | 9.9 | 9.6 | 6.6 | — | 7.8 |
| Literacy | 33.20% | 43.90% | 36.50% | — | 39.6 |
| Sex Ratio | 98.4 | 95.3 | 103.9 | — | 99.5 |

*Source: CBS. 1995. Population Monograph of Nepal*

**Table 3. Population Distribution by Ecological Zone (1952/54-1991)**

| YEAR | MOUNTAINS AND HILL | TERAI | TOTAL | DENSITY/ SQ. KM | POPULATION/HA OF CULTIVATED LAND | ANNUAL POPULATION GROWTH RATE | POPULATION |
|---|---|---|---|---|---|---|---|
| 1952/54 | 64.8 | 35.2 | 100 | 85 | 2.1 | - | 8,256,625 |
| 1961 | 63.8 | 36.4 | 100 | 101 | 2.4 | - | 9,412,996 |
| 1971 | 62.4 | 37.6 | 100 | 128 | 3.1 | 2.39 | 11,555,983 |
| 1981 | 56.4 | 43.6 | 100 | 193 | 4.7 | 2.62 | 15,022,839 |
| 1991 | 53.3 | 46.7 | 100 | 254 | 6.6 | 2.75 | 18,491,097 |

*Source: CBS. 1995. Population Monograph of Nepal.*

The population distribution of Terai according to development regions indicates that Central Terai Region has the highest percentage (16.4%), followed by Eastern Terai Region (14.37%). The lowest population is found in the Far Western Development Region.

According to the Table 4, annual population growth rate of all the Terai regions is higher than the national average of 2.08%. The Far-Western Development Region has the highest average annual growth rate (4.59%), which is two times the national average. The second highest rate is found in Western Development Region.

**Table 4. Population Growth Rates of Terai by Development Region, 1991**

| DEVELOPMENT REGION | POPULATION | PERCENTAGE OF TOTAL POPULATION | AVERAGE ANNUAL GROWTH RATE (%) |
|---|---|---|---|
| Eastern Terai | 2,658,455 | 14.37 | 2.29 |
| Central Terai | 3,033,351 | 16.40 | 2.39 |
| Western Terai | 1,330,145 | 7.19 | 3.28 |
| Mid-Western Terai | 930,330 | 5.03 | 3.27 |
| Far Western Terai | 675,797 | 3.65 | 4.59 |
| **Total Terai** | **8,628,078** | **46.66** | **2.75** |

*Source: CBS. 1995. Population Monograph of Nepal.*

Population distribution within the Terai Districts and their average annual growth rates (1981-91) are presented in Table 5. According to the Table, Morang District has the highest population record of 674,823 and Kanchanpur District has the lowest population (285,604). Jhapa District has the second highest population, whereas Banke District has the second lowest population. Three districts - Saptari, Siraha and Mahottari - have average annual population growth rates lower than the national average of 2.08%. The remaining districts have higher population growth rates than the national average.

Kailali and Kanchanpur districts of Far-Western Development Region have average annual population growth rates of 4.83% and 4.23% respectively. These are the districts which house a highest number of wetlands both in numbers and areas.

**Table 5. Population and Growth Rate of Terai Districts**

| DISTRICT | 1981 | AVERAGE ANNUAL GROWTH RATE PERCENTAGE (1981-91) |
|---|---|---|
| **Eastern Terai** | | |
| Jhapa | 593,737 | 2.13 |
| Morang | 674,823 | 2.33 |
| Sunsari | 463,481 | 2.96 |
| Saptari | 465,668 | 2.06 |
| Siraha | 460,746 | 2.05 |
| **Central Terai** | | |
| Chitwan | 354,488 | 3.11 |
| Mahottari | 440,146 | 1.98 |
| Sarlahi | 492,798 | 2.12 |
| Rautahat | 414,005 | 2.19 |
| Bara | 415,718 | 2.64 |
| Parsa | 372,524 | 2.70 |
| Dhanusha | 543,672 | 2.28 |
| **Western Terai** | | |
| Nawalparasi | 436,217 | 3.45 |
| Rupandehi | 522,150 | 3.20 |
| Kapilbastu | 371,778 | 3.20 |
| **Mid-Western Terai** | | |
| Dang | 354,413 | 2.83 |
| Bardia | 290,313 | 3.77 |
| Banke | 285,604 | 3.30 |
| **Far Western Terai** | | |
| Kailali | 417,891 | 4.83 |
| Kanchanpur | 257,906 | 4.23 |
| **National Average** | 8,630,059 | 2.08 |

*Source: CBS. 1995. Population Monograph of Nepal.*

The average population density of the Terai region is 253.6 persons/sq. km, which is two times the national average population density of 126 persons/sq. km. Eastern Terai region has the highest population density (365.7p/sq.km), while the lowest is in Mid-Western Terai (127.2p/sq. km). The Mid-Western Terai Region has got slightly higher population density than the national average (see Table 6).

**Table 6. Population Density of Terai by Development Region**

| REGION | POPULATION DENSITY |
|---|---|
| Eastern Terai | 365.7 |
| Central Terai | 325.2 |
| Western Terai | 252.9 |
| Mid-Western Terai | 127.2 |
| Far Western Terai | 139.5 |
| **Total Terai** | **253.6** |

*Source: CBS. 1995. Population Monograph of Nepal.*

Population density of Terai districts are given in Table 6. The highest population density is found in Dhanusha District (460.73) followed by Mahottari (439.27) and Siraha (387.83) in Central Development Region. The lowest density is found in Dang District (192) and Banke District (122) in Mid-Western Development Region. Kailali and Kanchanpur District, which house the highest number of wetlands in the country, have a population density of 130 and 161 respectively (see Table 7 for detail).

**Table 7. Population Density in Terai by District**

| DISTRICT | DENSITY/SQ. KM |
|---|---|
| **Eastern Terai** | |
| Jhapa | 369.70 |
| Morang | 363.79 |
| Sunsari | 368.72 |
| Saptari | 341.64 |
| Siraha | 387.83 |
| **Central Terai** | |
| Chitwan | 159.82 |
| Mahottari | 439.27 |
| Sarlahi | 291.42 |
| Rautahat | 367.67 |
| Bara | 349.34 |
| Parsa | 275.33 |
| Dhanusha | 460.73 |
| **Western Terai** | |
| Nawalparasi | 281.76 |
| Rupandehi | 283.93 |
| Kapilbastu | 213.91 |

| | |
|---|---|
| **Mid-Western Terai** | |
| Dang | 119.93 |
| Bardia | 143.36 |
| Banke | 122.21 |
| **Far Western Terai** | |
| Kailali | 129.18 |
| Kanchanpur | 160.19 |
| **National Average** | **126.00** |

*Source: CBS. 1995. Population Monograph of Nepal.*

Data on urbanization in Table 8 indicate that the percentage of urban population is increasing both in Hill as well as in the Terai region, including valleys. The data of 1981-91 indicates that urban population is increasing in all regions, but the average annual growth rate of urban population is highest (6%) in the Terai region. From this fact, it can be concluded that the rate at which urbanization is taking place is higher in Terai than in other regions.

**Table 8. Urbanization by Ecological Zone (1981-1991)**

| ECOLOGICAL REGION | 1981 | | 1991 | | AVERAGE ANNUAL GROWTH RATE OF POPULATION | |
|---|---|---|---|---|---|---|
| | TOTAL POPULATION ('000) | PERCENT URBAN | TOTAL POPULATION ('000) | PERCENT URBAN | TOTAL POPULATION ('000) | PERCENT URBAN |
| Mountain | 1,302.9 | — | 1,443.1 | — | 1.0 | — |
| Hill | 7,163.1 | 6.9 | 8,419.9 | 10.3 | 1.6 | 5.8 |
| Terai | 6,556.8 | 7.0 | 8,628.1 | 9.6 | 2.8 | 6.0 |
| Valley | 766.3 | 47.4 | 1,105.4 | 54.1 | 3.7 | 5.1 |
| **Total** | **15,022.8** | **6.4** | **18.491** | **9.2** | **2.1** | **5.9** |

*Source: CBS. 1995. Population Monograph of Nepal.*

Over and above urban population, the number of urban areas are also growing in the Terai region. The recent data show that 20 out of 33 urban areas are in the Terai regions.

The census of 1991 shows that a total of 1,418,206 people were recorded as migrants during the period 1981-91, of which 78% settled in the Terai region. Amongst the remaining, 19% settled in hills and only 3% in the mountains. The factors for migration include the rich resources of the Terai, better lands and employment opportunities. The emigration factors were land shortage at the place of origin, hardships and low agricultural productivity.

According to Table 9, about 1,111,393 people moved to the Terai and only 195,761 individuals emigrated outside the region. The net-migration to the Terai region is 64.56% of the total migration figures in Nepal. The percentage of net migration in the mountain and hills are -53.16 and -11.40. The highest net-migration is found in Eastern Development Region (20.30%).The Western and Far Western Development Regions have the second (12.89%) and third (12.78) highest net-migration respectively.

Some 78.4% of total migrants migrated to the Terai. Terai is receiving an influx of migration both from hills as well as from neighbouring countries. Uncontrolled migration will lead to over exploitation of resources in the Terai.

**Table 9. Migration Status of Terai (In-migration and out-migration)**

| DEVELOPMENT REGION | IN-MIGRATION | | OUT-MIGRATION | | NET-MIGRATION PERCENTAGE OF TOTAL VOLUME OF MIGRATION |
|---|---|---|---|---|---|
| | NO. | PERCENT | NO. | PERCENT | |
| Eastern Terai | 362,486 | 25.56 | 74,639 | 5.26 | 20.30 |
| Central Terai | 235,313 | 16.59 | 71,636 | 5.06 | 11.54 |
| Western Terai | 197,915 | 13.96 | 15,210 | 1.07 | 12.89 |
| Mid-Western Terai | 128.232 | 9.04 | 28,151 | 1.98 | 7.06 |
| Far-Western Terai | 187,393 | 13.21 | 6,125 | 0.43 | 12.78 |
| *Total Terai* | *1,111,393* | *78.36* | *195,761* | *13.80* | *64.56* |
| Hills | 267,116 | 18.83 | 1,021,039 | 71.99 | -53.16 |
| Mountain | 39,751 | 2.81 | 201,406 | 14.21 | -11.40 |

*Source: CBS. 1995. Population Monograph of Nepal.*

## Human Use

Resources - aquatic and terrestrial - found in wetlands are directly used by humans for both consumptive as well as non-consumptive purposes. People use these resources to meet their needs and requirements. Various uses of wetlands and wetland resources are summarized below (Bhandari, 1996; Davies, 1993)

- Eco-tourism or nature tourism (Phewa Tal, Rupa Tal, Begnas Tal, Rara Tall)
- Recreation (swimming, boating, rafting, picnicking and wading in lakes)
- Aquacultural activities (penning and fish enclosures in Phewa Tal, Rupa Tal, and Begnas Tal)
- Fisheries (Badhaiya Tal)
- Animal fodder (all over the country)
- Fuelwood collection (all over the country)
- Plant harvest (water chestnut, lotus, Karmi Sag, and *Nymphaea alba*)
- Domestic livestock grazing
- Wild rice (Tinny, Tinna and Tumina species in Ajigara Tal and Buddhi Tal of Kapilbastu District and Gaidahawa Tal Rupandehi District)
- Reptile and amphibian conservation (Chitwan and Bardia)
- Motes collected for gold panning in the Karnali River
- Driftwood collection (many rivers and streams)
- Irrigation (in Mahakali, Narayani, Trijuga, Bagmati, and Koshi rivers, Khageri Khola, and Nakhrodi Tal of Bardia)
- Extraction of water in lakes and ponds (Ghor Tal of Bardia District)
- Supply of drinking water (in Gupha Tal and Lamtal of Terhathum District)
- Water transportation (Begnas and Phewa tals)
- Vegetable growing (Karbalah Tal in Rupandehi District and Lanka islet in Koshi Tappu)
- Rice fields and deepwater rice paddies (Rice-cum-fish farming in Terai)
- Production of hydropower (Marsyangdi and Indra Sarobar)
- Domestic use (washing clothes, utensils, and bathing in many wetlands of the Terai region)

- Waterholes for domestic animals in the dry season (Halkhoria Daha in Bara District)
- Wallowing for water buffaloes (many ponds in the Terai region)
- Integrated farming (fish, duck, and pig farming in Chitwan)
- Snail (*Macrochlamys tugurium*) collection by Tharus in the Terai region.
- Scientific use (flora, fauna, limnology, hydrology and so forth)
- Educational use
- Religio-cultural use (Phewa Tal, Bedkot Tal, Ghodaghodi Tal, Tribeni and Devaghat)
- Collection of sand, boulders, pebbles, and clay
- Seasonal settlements (Kothia Ghat)
- Thatch grasses (Siru and Kans)
- Timbers and logs (Sisso, Sal, Asna)
- Special mulching materials for potatoes (water hyacinth in Koshi Tappu)
- Temporary construction materials
- Wheat and mustard cultivation in shore areas (Puraina Tal, and Bani Tal of Kanchanpur District and Ajigara Tal of Kapilbastu District)
- Raw materials for craft works (Pater, reeds, vines)

The data in Table 10 indicates that fishing is the number one resource use in wetlands and is found in 94% of wetlands. The second highest use is animal grazing, which is done in 70% of wetland sites. Irrigation occupies only third position with 69% of total resource use (see Table 10 for details). These wetland sites were found to be the habitats for wild relatives of cultivated crops, endangered and threatened flora and fauna, and migratory and rare birds.

**Table 10. Uses of Wetlands in the Terai Region**

| USES | FREQUENCY | PERCENTAGE |
|---|---|---|
| Fishing | 153 | 94 |
| Grazing | 113 | 70 |
| Irrigation | 112 | 69 |
| Plant Harvest* | 96 | 59 |
| Domestic Use | 52 | 32 |
| Fuelwood | 32 | 20 |
| Wildlife Use | 20 | 13 |
| Religious Use | 18 | 11 |
| Others** | 23 | 14 |

N. B. * Includes thatch grasses, timber, aquatic crops, and fodder.
** Others include recreational use (13), transport (7), power (2) and waste disposal (1).

*Source: National Wetland Database, IUCN Nepal, 1996.*

The data on conservation status of wetlands indicate that only 6 % of the wetlands are in excellent condition implying no need of conservation, whereas 29 % are in the category of high status meaning they may need conservation. About 35% are in fair condition meaning they need immediate conservation measures. See Table 11 for detailed information.

**Table 11. Ranking of Wetland Sites in Terai (N = 163)**

| RANKING | FREQUENCY | PERCENTAGE |
|---|---|---|
| Excellent | 9 | 5.6 |
| High | 47 | 28.8 |
| Average | 32 | 19.7 |
| Fair | 57 | 34.9 |
| Poor | 18 | 11.0 |
| Total | 163 | 100.0 |

*Source: National Wetland Database, IUCN Nepal, 1996.*

## Land Tenure and Land-use

Nepal is an agrarian country which places heavy emphasis on the use of land. It is considered a valuable source of social prestige, political power and economic enjoyment. It is said that land is owned by the government. In this connection, Regmi (1978:17) states:

> *State ownership has been the traditional form of land tenure in Nepal. However, the extensive use of the land by individuals acting in their private capacity and the emergence of intermediaries between the state and the cultivator have been tended to obscure the character of this basic relationship in recent years.*

Nevertheless, the lands are held and owned by private individuals, institutions, and the government. In Nepal fee simple ownership is a common practice for private individuals. Persons may sell or purchase or lease out lands under their jurisdiction. The usufruct does not lie in the legal land owners.

Most of the wetlands discussed in this inventory are in natural conditions and are generally owned by His Majesty's Government. However, an analysis indicates that the ownership of these lands is held by different government agencies for specific purposes. In some cases the lands are owned by the government but usufructs belong to the intermediaries or the tenants. For example, the Gaura Daha of Jhapa District is legally owned by the government of Nepal but the usufructory rights belong to the Gaura Daha Village Development Committee (VDC). This VDC has leased out the lands to a contractor who pays rent to the VDC every year. The VDC terminates the contract as and when desirable. In some cases the wetlands are given on long-term contract of 5 years, 10 years, or 15 years. The ownership of wetlands are neither transferable nor divisible, but inheritable. Likewise the use of other wetlands such as Halkhoria Daha of Bara District and Bhadaiya Tal of Bardia District are under the jurisdiction of the District Development Committee and are given on a long-term lease to a contractor who pays annual royalty to the District Development Committee. There are many wetlands where the local VDC's and the District Development Committees are exercising the usufructs over their resources.

### *Wetland Ownership*

On the basis of the collected information wetland ownership can be categorized into the following groups:

**State ownership** — according to the prevailing law of the country, the land not registered in any name belongs to the state. The wetlands lying within this area are owned by the state and comes under the jurisdiction of the Ministry of Forests and Soil Conservation.

**Gazetted land ownership** — wetlands inside the protected areas and parks fall under this category. The ownership of these sites are legally held by DNPWC (Department of National Parks and Wildlife Conservation). The wetlands such as Tara Tal in RSPWR (Royal Sukla Phanta Wildlife Reserve) and Devital and Tamar Tal in RCNP (Royal Chitwan National Parks) fall under this type of ownership.

**Trust ownership** — some of the ponds that are of religious significance legally belong to the Guthi Sasthan. The Guthi Sasthan is the caretaker of these types of wetlands.

**Corporate ownership** — the ownership of Jagadishpur Reservoir is owned by the Nepal Electricity Authority, Rampur Ghol is owned by the Institute of Agriculture and Animal Science and Harahawa River floodplain by Lumbini Development Trust.

**Private ownership** — small ponds built for aquaculture and fisheries and deepwater rice fields are owned by individuals upon payment of a land fee to the government. This is also called fee simple ownership. The cultivated and settled lands in the vicinity and catchment areas fall under this category. Such ownership is inheritable and transferable.

### *Tenancy System*

Tenancy is the use and occupation of land or dwelling of another on a rental basis. Land tenancy is the system under which land is cultivated by tenants and the product is divided between landowner and tenant.

Land tenure is a bit different in wetland sites as the wetlands discussed herein are legally owned by His Majesty's Government. Their usufructs are given to local institutions such as VDC's, governmental agencies and district development committees of different districts because wetlands are considered wastelands and as such are freely accessible and in some cases under communal ownership. A cursory review of wetland tenancies in the Terai region of Nepal shows prevalence for the following land tenancy practices:

**Cash tenancy** — in the rivers of the Terai region, the fishing rights are given to the wetland-depedent people to catch fish in the rivers. They pay the fee to the government for a fixed period of time with catch limit. This practice is common in the Karnali and Narayani rivers.

**Contract tenancy** — under this agreement, management and harvest of the wetlands and their resources are officially given to a bidder by the VDC or the District Development Committee. The duration of contract depends on the type of wetlands, the kind and amount of resources available.

**Community tenancy** — the wetlands are occupied by the community which harvests the resources within a fixed period of time, after which any one from the community can harvest the resources. The communities themselves supervise wetlands and their resources.

**Seasonal tenancy** — owners cultivate the land in the main season and lease out to the tenants for special purposes such as growing vegetables, setting up a temporary markets, and other purposes. The form of payment is generally cash.

**Ailani tenancy** — generally, ailani is the land owned by the government which is illegally occupied by people who use it for cultivation and settlement. In most cases, the tenants do not pay any taxes to the government and are sometimes forcefully removed from the lands. In city areas, the ownerships of ailani lands have been transferred to private individuals.

**Batai tenancy** — tenants rent lands from the landlord and any agricultural produce is divided on a fifty-fifty basis.

**Kamaia tenancy** — the tenants rent lands and provides labour input, while the landlord provides all other inputs (e.g. oxen, seed, manure and fertilizers). Agricultural produce is divided equally.

### *Forms of Payment*

Land tenure arrangements around the wetland sites are of various forms and differ from place to place. The common forms of payment on the cultivated lands are:

- **Cash payment** — the tenant pays a fixed cash amount before the season, regardless of harvest outputs. This practice is common in areas with absentee landlords.
- **Commodity payment** — instead of cash, the landlord is paid in the form of predetermined commodities. The tenant determines crop selection and use.
- **Sharecropping (Shared tenancy)** — this type of tenurial arrangement is common throughout Nepal where it is termed *Adhiya Kamaune*. Harvests are equally shared between the owners and tenants according to pre-determined and mutually-agreed criteria.

### *Water Rights*

Although water rights are vested in the government, waters from wetland sites are freely used by local communities without restriction. Besides domestic usage, waters from wetlands are used for irrigation purposes. The irrigation canal that comes from Nakharodi Tal of Kailali District is an example of free use by local communities of water from wetland sites. There is no water rights law in Nepal nor have studies taken place on water use rights other than for irrigation. In some cases local communities have been draining water for harvesting fishes such as in Padereni and Tarbaria Tal of Kanchanpur District. Although waters from wetland sites are being freely used, there is no legal arrangement for water use convenants vis-a-vis wetland sites.

### *Land-use in the Surrounding Areas of Wetlands*

The land-use status of Terai is given in Table 12. According to the Table, 75 percent of total Terai's land is covered by agriculture and only 19 percent by forest. The further breakdown of land-use data indicates that western Nepal has the highest percentage of land under forest (29 percent), followed by central Nepal (22 percent). The eastern Terai has only 13 percent forest land. Land-use data on agriculture indicate that in eastern Terai, 83 percent of land is under agriculture, and this percentage decreases towards the western Terai. The data on land-use indicate that land covered by shrubs/grass in Terai is 6 percent and regionwise, it ranges from 4 to 9 per cent (See Table 12).

**Table 12. Land-use Status of Terai**

| PLACE OF LAND-USE | FOREST | AGRICULTURE | SHRUB/GRASS | TOTAL |
|---|---|---|---|---|
| Total in Terai | 19% | 75% | 6% | 100% |
| Western | 29 | 62 | 9 | 100 |
| Central | 22 | 72 | 6 | 100 |
| Eastern | 13 | 83 | 4 | 100 |

*Source: Nelson et al., 1980.*

Land-use patterns in the surrounding area of the wetlands have been identified as follows:

**Cultivated land** — the majority of lands around the sites are cultivated by people to raise crops, mainly rice, maize, wheat, tobacco, sugarcane, mustards, sunflower, and vegetables. These lands are intensively cultivated with two to three crops harvested in a year. The productivity and number of crops depend upon irrigation facilities. In western Nepal, only two crops are taken in a year whereas in eastern Nepal three crops are taken. On these lands farmers apply farm-yard manures, composts and fertilizers. The run-off from the site euthrophies and pollutes water. Cultivation is being conducted on both registered as well as unregistered lands. The registered land is called Numbari land in Terai. For example, the lands around Bhokari Daha in Saptari District and many wetlands in Rupandehi District are surrounded by rice fields and private fish ponds, whereas Badhaiya Tal in Bardia District is surrounded by rice fields.

**Pasture** — pasture areas are common around the wetland sites in the western region of Nepal. The lands are intensively used by local communities which sow winter crops. The pastures are the source of pollution and eutrophification in the lakes and ponds. Padereni Tal of Kanchanpur District is a good example of the many tals surrounded by overused pasture lands.

**Commercial establishment** — industrial zones are a common scene in the Terai region, particularly along the river floodplain. Hetauda Industrial District and Bhrikuti Paper and Pulp Industry in Gaidakot of Nawalparasi District are two examples of industrial settlements along the floodplains of the Rapti and the Narayani rivers respectively. Likewise the Gorkha Brewery in Nawalparasi District is located near the Narayani River. The Sugar Factory near the Narsahi Ghol in Nawalparasi District is another example.

**Open forest** — Due to public access and proximity to settlements, the surrounding forests have been heavily used by people for domestic purposes as well as for their livestock use. In consequence, the land around wetland sites has been open and no vegetation is seen under the crown. The burning examples are in Tara, Bantaria and Tarbaria tals of Kanchanpur District. There are many lakes and ponds that have become surrounded by open forests.

**Grassland** — the wetlands situated inside the protected areas are surrounded by grasslands. These wetlands are found in Royal Chitwan National Park, Koshi Tappu Wildlife Reserve (KTWR) and Lumbini Development Project area in Lumbini.

**Settlement** — wetland sites are surrounded by settlements such as villages, local markets, and recently grown temporary settlements. The settlements are the source of pollution and eutrophication to the lakes and ponds. The examples are in Kachan Kabal and Gaura Daha of Jhapa District, and Narsahi Ghol of Nawalparasi District and Rani Pokhari, and Kerunga Ghol of Chitwan District. The Bharatpur Municipality of Chitwan District and Bhadrapur Municipality of Jhapa District and Gaur Municipality are some of examples of settlements that pose direct threats and thereby cause vulnerability to wetlands and their resources.

**Barren land** — barren lands, called *Parti Jagga* in Nepali, also surround wetlands. These lands are registered but have not been, or are no longer, cultivated owing mainly to overgrazing.

**Dense forest** — is generally found in wetlands that are far away from roads or settlements, or are located inside protected areas. Dense forests are found in Kharse Tal of Banke District, Bedkot Tal of Kanchanpur District, Devi Tal, Lami Tal and others in Royal Chitwan National Park in Chitwan District.

## Religio-cultural Values

Wetlands involving rivers, lakes and ponds have a tremendous significance in terms of religion, culture, norms and values in Nepal. In some places, they are regarded as the form of gods and goddesses, whereas in other places they are worshipped and considered as places of religious importance. Bathing in wetlands containing hot

springs is regarded by the Nepalese as having medicinal value, particularly to cure skin diseases. The Karnali River, Kali Gandaki and the Sun Chhahara of Mustang District are the treasured motes for panning gold. Over and above aquatic and terrestrial resources , these motes provide means for the livelihood for local people. In many places the water from lakes such as in Jajura Daha is used to run the water-powered mills. In Phewa Tal electricity has been generated. Significance of wetlands in term of religio-cultural values range from social and economic to heritage and pilgrimage significance.

According to Hindu legends, rivers are regarded as mother Ganges and given a high status in the society. The river confluence in many parts of the country are considered holy and sacred places to purify sins and earn merits for blissful eternal life. These places are famous pilgrimage sites. People on certain occasions visit the area and take a holy bath and other religious rites and rituals. These sacred places include Devaghat, Ridi, Barah Kshetra, Dhanusha Sagar, Ganga Sagar and others. In the shore areas of lakes and ponds, temples of various deities such as Shivaji, Jaldevi and Baraha have been built. Such places include Ghodaghodi Tal, Halkhoria Daha, Devaghat, and Barah Kshetra.

Religious baths are taken in some of the ponds such as in Barun Sagar and Ganga Sagar in the Terai region. On the shores of many lakes, festivals are observed on the day of Rishi Tarpani. In Palpa District, the Satyawati Tal itself is considered as the form of goddess and worshipped by the people in the months of Kartik. Festivals are observed in this Tal on Kartik Purnima and devotees remain awake throughout the night singing and dancing. The Magars of northern Baglung District regard the Jalpa Khagar Tal as Barah Deity and appease the deity by worshipping and sacrificing sheep and goats. Similarly, the people of Mustang District, particularly cowherds and shepherds worship the Kali Baraha Tal and sheep are sacrificed in Janai Purnima. Colorful flags are also offered to the deity.

In the centre of many artificially constructed ponds in the Terai region people have established an altar (*Maulo* in Nepali) to symbolize Nag Deity. In other places Barun Deity, which are the symbol of water in Hindu religion, is worshipped. Even in Buddhism, lakes are considered sacred places. For example, monasteries have been built in Shey-Phoksundo lake in Dolpa and Dhumba Gomba in Mustang District. The believers of Shaiba Margi pay their homage to Shey-Phoksundo Tal. In Dhumba Gomba devotees are not allowed to take with them liquors, beverages, garlic or meat. Bhume (deity of land) is worshipped in Rupchhe Chhahara at Dana Village Development Committee area of Mustang District. Many wetlands are of tremendous significance and big religious rites (*yangyas*) are held regularly in places like Dhanusha Sagar, Barun Sagar, Ghodaghodi Tal and Devaghat.

Sapsu Dhap of Khotang District is considered a religious place for Rai people and worshipped by offering Panchabali (sacrificing five different types of animals). Jatras and festivals are the main activities in and around the wetlands. During the time of these Jatras and festivals, people buy and sell agricultural commodities (e.g. cattle, goats, and sheep). In Tribeni of Udaipur District, people buy and sell horses and dogs on one side and other commodities on the other side. Tatopani area is generally used for picnic purposes. Wading, rafting, and boating are common activities in the Trisuli River, the Kali Gandaki, Phewa Tal, and Begnas Tal.

In many lakes and ponds some superstitious beliefs are still found. For example, people around the Dhaulagiri Himal believe that worshipping Bhutarchho Tal helps prevent drought in the region, thereby preventing famine. The ritual includes worshipping and sacrificing goats. In the event of long-term drought, the people of Manang District come to worship the Dauti Pokhari, which is regarded as the symbol of rain. In Gosainkund, which is near the Kathmandu Valley, the pilgrims take a religious bath and remain awake during the evening to appease Shivaji. Saman learning is rendered there on the night of Rishi Purnima. It is believed that paying pilgrimage to this Gosaikund and ponds will earn merits equal to that earned from visiting four religious places: Badri, Kedar, Dwarik, and Hardwar in India. In Jatapokhari of Dolkha and Ramechhap districts, childless parents come to worship the lake goddess to get

the blessing of children. This is also common in Kubhinde Dah of Salyan District. Parents without sons go and bath in Rinmokshya Daha of Mugu District in far-western Nepal to have the blessing of a male child. Similarly it is believed that worshipping after bathing in Annapurneswor Daha prevents crop damage. In Papkunda, all sins are washed away and in Dharma Kunda all spiritual debts are forgiven. Dhamis come to the Rinmokshya Tal and mumble invocations to revive the goddess' power in humans.

It is believed that bathing in Ganga Sagar in Dhanusha cleanses sin and demerits. There are many legends and folk tales linked with lakes and ponds. Shiddha Baba Tal of Mustang is considered symbolic for birth, death and illness. The Magars of Palpa District worship the goddess of Rambha Pani. Appeasing her through the sacrifice of goats and sheep is important to prevent drought and famine in the area. It is believed that Bhabishya Bakta Pokhari of Bhojpur changes its colour to red if unfavourable events are to take place in the area.

Some of the wetland sites have been the centre of material Hindu culture. Festivals, jatras, and festivities are the testimonies of their rich cultural and material heritage. These places are Devaghat, Ridi, Galeswor, and Bedkot. Devaghat and Galeswor are famous for their religious significance and sanctity. These places house antiques, ancient idols, images, stone carvings, ancient temples, hospices and other crafts.

Wetland sites are used as cremation grounds and graveyards for Hindus. The specific spots along the river is considered as the ghat (ritual place for cremation). In rivers such as Kali Gandaki, the Astu (a portion of burnt body left over from cremation) is offered in the belief that the dead can go straight to the heaven and earn merits.

## Wetland-dependent People

Nepal is an agricultural country and the majority of its population depends on farming and livestock raising. Some people are engaged in business while others are in government jobs. As evidenced in this report, there are also many which are directly linked to wetlands. This group is scattered mostly in the Terai region. Owing to heavy pressure on resources these people are gradually leaving wetland activities as their major occupation and are in the state of transition. This forced shift is an indication that these growing populations can not survive on dwindling wetland resources.

The major ethnic groups dependent on wetlands in the kingdom are small fractions of the population and are scattered over the region. Many dependents have their own language, culture, physical features and way of life. They live along the river basins and wetland sites (Bista, 1986). Different scholars have included them in different fold but they hold their own identity and position among innumerable socio-cultural groups living in the kingdom. They are an independent socio-cultural group like many others in the country (Subba, 1992). People dependent on wetland resources own very little. One will find only a few earthen pots and hand-woven baskets made of bamboo, wild grasses and cattail. They are shy and provincial in nature. They have remained unchanged in their traditional culture despite the changes taking place around them. They worship Ban Devi (goddess of forest), and Kulkulayan (the family deity).

In the course of our survey, we found that the majority of these groups are officially landless or do not enjoy secure land ownership. An overview of major wetland-depedent people is presented here:

**Sunaha.** The Sunahas, also called Sundhuwas, are found in the Karnali basin of the Far Western Development region. The Sunahas generally settle along the river banks catching fish and providing ferry services to passers-by. In the rainy season, when the river is flooded, they engage in farming their marginal lands. Previously treated as untouchable by the Tharus, they are of three types: Sunaha, Khuna, and Raji. The Raji groups are found in the hill region, whereas Sunaha and Khuna are found in the Terai region.

In Tharu language, the professional people doing gold panning in the river are called Khanwa. The Khanwas are found in the Babai River. Their dress and way of life are similar to Tharu. In the Babai River, the Deshauri Tharus are also found engaged in gold panning and collecting motes.

**Mallah.** The Mallah people are clustered in the area near the Gandak Barrage in the southernmost part of Nawalparasi district of western development region of Nepal. Their settlement is locally known as Machhahari Tole (machhahari meaning fish eater and Tole meaning settlement). The Mallah of Nawalparasi District worship the deity Gangaji (river) , Komalbir and Keolji for the general welfare and protection of the Mallah communities. The worship of Gangaji is conducted during the months of Magh and Baisak. The Goddess Gangaji is worshipped followed by the offering of a female goat.

**Bote.** Bote people are found in the districts of Nawalparasi and Chitwan. They are of two types: Pani Bote and Pakhe Bote. They depend on river for fishing, rendering ferry service to the people and gold panning (for details, see Subba, 1992). As part of food gathering, they look for possible burrows in the ricefields to collect rice stored by rats in their holes. Botes of Nawalparasi collectively conduct the worship of the deity, Phulan Devi to protect themselves from accidents in the river. The worship is conducted by the Gurwo at a common place, preferably at the house of an elderly. And pigeons and chickens are sacrificed at the altar.

**Mushahar.** Mushahars, like Botes, live around the Narayani river and are concentrated in the district of Nawalparasi. They differ with Botes in appearance and physical characteristics. For examples, the Mushahar people are black in appearance and have a pointed nose, whereas botes are light black in appearance and have a flat nose.

**Bantar.** Bantar, an indigenous people to Terai, are also called Sardar and are distributed in parts of Sunsari and Saptari districts. They are of two types; Sardar and Raj Bantar. Majority of Sardars depend on cattails, from which they weave and make a variety of mattresses. Both male and female are heavily engaged in cattail technology. They generally collect cattails from the Reserve, the barrage area and along the boundary of the Reserve. Bantars claim that the mat industry has suffered due to two serious problems; a shortage of raw material to braid rope and restriction of harvest from inside the Reserve area.

**Gongi.** Gongis, also called Mallahs, are the people who are found around Koshi Tappu Wildlife Reserve, the only Ramsar site of Nepal. They are mostly landless and are primarily engaged in fishing in the Koshi River. The bank areas of the Koshi River are inhabited by these people who report that the Koshi is shifting its course to the west. Because of rules and regulations, Gongi people are not allowed to fish inside the Reserve but do fish around the barrage and burrows along the park boundary.

**Mukhia.** Mukhia people are also called Bihin in Rautahat District of central Terai region of the country. Their primary occupation is fishing by small nets. At the time when fish harvest is poor, they work in the fields of landlords as daily wage earners. Given the choice, these people prefer to go for fishing for a long time without any rest. The Mukhia, due to diminishing wetlands in the Terai region, are gradually withdrawing from this occupation and becoming landless laborers. In our field visit it was observed that they are the most concerned about the prospects and opportunities for their gainful employment in future.

**Dushad.** Dushads are lower caste people doing menial jobs and are found in Parsa District. They are engaged in fisheries, fish catching and fish trading.

**Sahani.** Sahanis are fishermen mainly found in Rautahat, Parsa, and Bara. They are both fish catchers as well as fish traders, and are also trained to raise fish in private as well as community ponds.

**Kewat.** Kewats are special type of people engaged in fishing and fisheries and are found in Rampurwa, Tribenisusta, Baidauli, Harpur and Bhujhawa VDC areas of

Nawalparasi District in central Nepal. They are different from Mallah and Bote people found elsewhere in the district.

**Danuwars.** They are the largest group of people found in Chitwan, who live in the inner Terai area as well as in Siraha and Sindhuli districts in the eastern part of the country. They are immune to malaria. Fishing and ferry services are their main occupation. Some people call them aquatic people (Jaljibi meaning dependent on water only). Dependent on farming and fishing, the Danuwars are of three distinct types: Kacchare (living along the upper river valleys), Rajhan in the Terai , and Bahaduriya (also called Bista) in other parts.

**Majhis.** They are indigenous people of Nepal mostly inhabiting the inner Terai and river basins for at least a few hundred of years, with their primary occupation being ferry service and fishing. Those living along the river valley and banks construct their homes with rounded river stones and thatch the roofs with rice straw. Those who live in the inner Terai have low thatched huts with wattled walls. Their huts stand quite apart from one another. Majhis are almost entirely fishermen or ferrymen on the rivers, where they use small dugout canoes for transport.

**Darai.** Darai people are found along the bank of the rivers in districts of Chitwan and Nawalparasi and at the foothill of the Mahabharat range near the Terai region. They also depend on fishing and farming.

**Kumal.** Kumals are distributed in Chitwan and along the banks of the rivers and streams and small valleys in the gorges of the Mahabharat range doing pottery and farming. They also depend on fish and aquatic resources.

**Barhamus.** Barhamus are also an ethnic group of the people who live close to Darai along the river valleys and are dependent on fishes and aquatic resources. They live primarily in the district of Gorkha.

**Kushar.** Kushars like Majhi, depend on fishing and aquatic resources.

**Kachhare.** Kachhare is the name given to the fishermen living in the valley along the upstream. These Kachhares can be Bote, mainly pakhe, Darais and Majhi.

**Dhangar.** Dhangars are found in the river banks of Morang, Sunsari and Sarlahi districts of eastern Nepal and are dependent on fishing. They are also found in the area, called *Nau Saya Bigha* near Janakpur in Dhanusha. Crafts made from bamboo, straw, wheat straw and others materials are their main source of income.

**Tharus.** Tharus are distributed all over the Terai region. Although their main occupation is farming and livestock raising, they also fish. Groups of Tharu women fishing in small ditches and burrows along the highways and roads are the common scene. Besides catching fishes, they also collect snails, highly nutritious food from ponds, canals and ghol. They also weave and manufacture crafts and goods out of aquatic resources.

**Pode.** Podes, besides doing menial job of cleaning, do fishing for their livelihood. They are found in Phewa Tal area of Pokhara and in Panauti of Kavre District.

## People's Perspectives on Wetland Conservation

In connection with administering the data sheet, the team members asked the local communities about general status of wetlands and wetland resources in their communities. The following themes were framed to determine their perspectives on the conservation and management of wetlands. Their responses have been summarized as follows:

### *Historical Accounts of Resource Use in the Area*

Majority of the respondents told us that the resources in and around the wetland sites were abundant ten years ago. Some said that resources were so plentiful that they never thought the wetlands would be environmentally deteriorated to the extent they have been. Some reminiscenced of their encounter with tigers and how they managed to run away. They sometimes talked of their association with a hunting party of the Rana Prime Minister and other dignitaries. An old Tharu informant told us that he was hired by three prime ministers to assist in tiger hunting around and about Halkhoria Daha. The man, in his mid 90s, told us that the resource situation in the Halkhoria area has been changing in an alarming way and added if this trend continues the Halkhoria Daha would go into subsidence in a couple of years. The water level and area under water was significant and no one was allowed to fish there unless permission was granted from the village headman. When community fishing took place, the scene would be spectacular, resembling festivals. Wildlife were very common sightings.

### *Why Are Wetlands Being Deteriorated and Degraded?*

Based on discussions with local people, the conclusion was made that the deterioration and degradation are attributed mainly to easy accessibility to wetlands and shortage of alternative lands around local communities. Local people also consider wetlands as free goods. If not used by them, it is believed that others will come and use the resources. Further probing revealed that there are no structures in place to protect wetlands. Some communities believe that wetlands and their shorelines belong to them but contractors come and harvest them freely, presenting a competitive situation where legal rights are ill defined. Furthermore, overgrazing by domestic animals has degraded wetland sites.

### *Local Solutions for Conservation?*

On the question of conserving wetlands and their resources, people say that it is possible to conserve them if the people are given the legal rights to manage and use them according to their needs. This is the first and foremost prerequisite to conserve and protect these resources. This could be attained by handing over the resource management to local institutions such as VDC or user's group, who would not only be responsible for their management but also for the equitable distribution of their resources. They feel that any conservation programme that attempts to involve locals in planning and execution are likely to be successful and be sustainable in the long run. Regular consultation with them about future use and incorporating their norms and culture in the planning will help gain people's support and trust. Direct benefits to people and control of the people over the use of the resources have direct impacts on the conservation and judicious management of wetland resources.

### *People's Viewpoints on External Assistance*

People seem to be quite receptive to external assistance, particularly for the purpose of conservation projects. External assistance would be helpful if respective roles and responsibilities are discussed and clearly delineated at the outset. People feel strongly that external agents with experience in wetland management should start a confidence building programme to win people's trust, support and participation. Only then would community participation be meaningful and productive. Otherwise, instead of people's participation and involvement, marginalization would prevent productive advancements in wetland conservation.

### *How Can Outsiders Be Helpful in the Wise Use of Wetland Resources?*

The outsiders would be useful if they provide technical assistance (education, finance, skills, awareness, material contribution, advisory role, experts, transportation, seed money, and so forth). Periodic visits and advice for programme planning would equally be useful. Some argue that no such things exist in the world that would lead the outsiders to be helpful in the sustainable utilization of wetland resources other than thoroughly understanding the community dynamics and social processes in the community. Vesting responsibility in the local communities, however, is the favoured approach.

# Chapter Seven
# Problems and Threats

## Wetland Habitat Loss

Wetland habitat loss is a common phenomenon in Terai. Many factors are associated with its destruction. The process of habitat loss is schematically explained below in Figure 5.

### *Reasons*

The reasons attributed for their loss are: 1) lack of awareness among people, planners and policy-makers, 2) lack of an effective wetland policy and action, 3) lack of responsible institutions, and 4) multiple ownership of wetlands. All these reasons have been further compounded by the growing population of the country as a whole and the migration of hill people to the Terai.

### *Encroachments*

A large number of encroachments are occurring around wetlands, including the catchment areas. The major encroachments are: 1) drainage of wetlands for irrigation, reclamation and fishing, 2) filling in for solid waste disposal, road construction and commercial, residential and industrial development, 3) conversion of the site for aquacultural purposes, 4) construction of dams, barrages, and other barriers for controlling water, 5) groundwater extraction using high-powered pumps and digging ditches in sites where there is no inflow of water, 6) discharge of sediments and pollutants from nearby areas, 7) animal grazing, 8) overexploitation of aquatic resources, and 9) soil extraction.

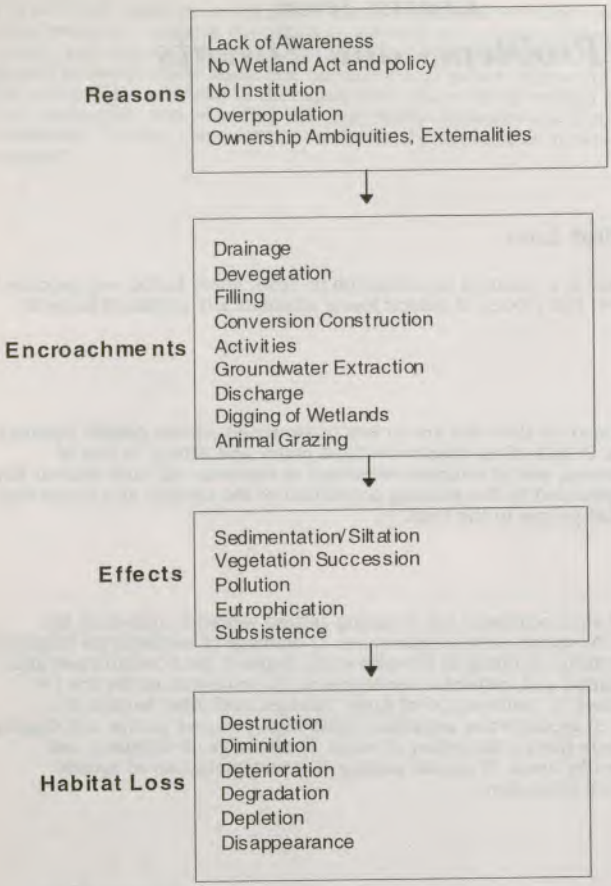
### *Effects*

Consequently, these factors singly or jointly have led to either subsidence of the wetland sites or the deposition of siltation and sedimentation inside the water body, or have eutrophied the water body through run-off and pollution. Modern irrigation systems have adversely affected the wetlands. There are also adverse impacts from externalities such as fertilizer and pesticide use, run-off from agricultural fields. Deforestation and industrial development in the catchment areas have caused siltation of wetland sites and lowered the water level.

### *Loss of Habitat*

All these factors have led to habitat destruction in wetlands. Also, deterioration and degradation of wetland sites and their catchments are constantly taking place in the Terai region of Nepal, thereby leading to their complete and irresponsible loss.

**Figure 5. The Process of Wetland Loss**




## Principal Threats and Disturbances

Empirical evidence collected from the Rapid Reconnaissance Survey of 163 wetland sites and their resources revealed that wetlands of the Terai are vulnerable to a number of threats and disturbances (see Table 1 below for details). Siltation has been a great threat to wetlands. Table 1 shows that 66% of total wetlands are exposed to siltation problems, whereas 62% show the problem of agricultural run-off. Almost two-thirds of those wetlands are under threats and disturbances such as dredging and drainage. The sources of pollution are agricultural run-off, factory effluent, washing and sewerage emissions, and domestic effluent. This has eutrophied the water thus endangering the survival of aquatic fauna. This had led to the invasion of monocultures such as water hyacinth, *Aeschenomene* sp. and many others. It accounts for 27 percent. Building construction, trash and waste and other factories are also posing major threats to wetland sites of the Terai region.

**Table 1. Major Threats to Wetland Sites (N = 163)**

| THREATS | FREQUENCY | PERCENTAGE |
|---|---|---|
| Filing* | 108 | 66 |
| Agricultural Run-off | 101 | 62 |
| Dredging/Draining | 63 | 39 |
| Pollution | 47 | 29 |
| Monospecific Domination | 44 | 27 |
| Others** | 41 | 25 |

N. B. * Filling includes siltation, sedimentation, subsidence and erosion.
** Others include road and building construction, trash and wastes and other household use.

*Source: National Wetland Database, IUCN Nepal, 1996.*

## Major Problems

This wetland data leads to the conclusion that wetlands are seriously plagued with the following problems, which if left rampant will have a long-term impacts on their ecosystems:

1. *Drainage:* drainage is the major problem in these wetland sites, where local people dig an outlet ditch or use high-powered pump sets to drain the water and to harvest fish and aquatic resources. Since the majority of sites do not have any inlets and depend on rain and run-off from the surrounding areas, these wetlands are tending towards subsidence. Once the area dries, people reclaim the areas for cultivation or other purposes. Examples of wetland sites being drained are common, and include almost all the wetlands types included in the inventory.

2. *Over-fishing*: fishing is a common way of utilizing wetland resources in Terai. Groups of people, especially fisherfolk, do the fishing using traditional fishing gear. This is common in rural Terai. At the time of the field survey, about 130 men and women were seen at Lauka Bhauka Tal of Kailali District undertaking collective fishing. These people continue fishing in groups as long as they are able to find fish and fingerlings. In the lake assigned to the contractors, they virtually sweep all fish of marketable size, leading some species to extinct.

3. *Over-grazing by livestock*: lake areas are the venue for thousands of animals for foraging and grazing. In Halkhoria Daha of Bara District, about 20-25 thousand animals are brought for grazing and watering everyday in the dry season, some from as far as 10-12 kilometers. Shoreline areas look cleaner than nicely mowed turf areas. The grazing and movement of these animals has a far reaching impact on the ecology of the lake and surrounding areas.

4. *Building materials*: many wetland-related trees are used by rural people as building materials for their houses, sheds, cattlesheds, fencing, and so forth. These trees and branches are also used for making foot bridges. These activities are common in Beesh Hazar Tal of Chitwan, Ghodaghodi Tal of Kailali and Tara Tal of Kanchanpur. Felling of trees and clearing are prime examples of deforestation at the watershed area.

5. *Fodder and fuelwood collection*: forests of Nepal meet the basic needs of Nepalese people, such as fodder, forage, and fuelwood collection. Wetlands and wetland areas are no exception in this regard. Cattle herders and local people carry loads of fuelwood and fodder on their backs, shoulders or heads every day to supplement their income as well as feed their animals, especially milking animals and stocked heads.

6. *Pollution*: many wetlands are suffering from domestic sewage, industrial effluents, pesticides and fertilizers. Sewage from the Gorkha Brewery and Bhrikuti Paper and Pulp Factory are the major source of pollution in the Narayani River, which is also further exacerbated from the sewage of towns such as Narayanghat and Mugling

Bazaar. This sort of pollution has not only lowered the quality of water in the wetlands, but also has increased the level of nutrients in the water, causing eutrophication in lakes, ponds and rivers. Industrial effluents mainly in the urban cities in the Terai are continuously adding pollution to the wetlands. Dam construction in Nepal has negatively affected wetland biodiversity as well as habitat for migratory and local waterfowls. A change in habitat affecting the wetland biodiversity has been recorded after dam construction in Karnali river at Chisapani.

7. *Vegetation succession*: many wetlands are being invaded by weeds and shrubs such as water hyacinth (*Eichornia crasspies*), Dhodia (*Aeschynomene* sp.), and Besharam (*Ipomoea* sp.). These weeds are a serious problems in Sonia, Rupia, Badka Tals of Kailali District and many lakes and ponds in Rupandehi and Chitwan Districts.

8. *Siltation:* because of devegetation around the catchment areas of the wetland sites erosion is taking place and silt and sediments are filling wetlands. Siltation and sedimentation have lowered the level of water in the wetland sites.

# *Chapter Eight*
# *Site Description*

A brief description of each wetland site is given according to the guidelines set out below. For details, the readers are advised to refer to the computerized National Wetland Database System established by IUCN Nepal.

| | |
|---|---|
| **Site Description:** | Site descriptions are based on the rapid reconnaissance survey. For detailed information, readers are advised to use the National Wetland Database established at IUCN Nepal Office. |
| **Name:** | Name of the site in the Roman alphabet, followed by Nepali script in parenthesis. |
| **Situation:** | Settlement, Ward No., Village Development Committee, nearest settlement and its distance to the site and District. The distance to reach the site from the town is given in kilometers. |
| **Development Region:** | The development region in which the wetland is located. The division of development regions is as recommended by His Majesty's Government of Nepal. (Eastern, Central, Western, Mid-Western, and Far-Western) |
| **Physiography:** | Physiographic region in which wetland site is situated. (High Himal, High Mountain, Middle Mountain, Siwalik and Terai) |
| **Overview:** | A general description of the site, including seasonally. |
| **Location:** | The geographical coordinates (latitude and longitude) of the site. |
| **Area:** | Area of the wetland site including shorelines in hectares. |
| **Wetland Type:** | Wetland classification as modeled after IUCN's wetland classification. (See Annex 2: Rapid Reconnaissance Survey) |
| **Climatic Region:** | Climatic zone, in which the site falls (Tropical, subtropical, warm temperate, cool temperate, alpine and tundra). |
| **Hydrology:** | Water sources, inlet, outlet and seasonal use of water for human purposes. |
| **Biogeographical Realm:** | A biogeographical realm according to Udvardy (1975) (Palearctic and Indo-malayan Realm). |
| **Morphometry:** | External measurement of the site. |
| **Limnology:** | Data and information on water quality of the site. |

| | |
|---|---|
| **Major Flora:** | Principal vegetation recorded in the area. |
| **Importance to Wildlife** | Major animals, avifauna, reptiles and amphibians reported or recorded in the area. |
| **Special Features:** | Features that are special to the area. |
| **Land Ownership:** | Ownership of land and tenurial practice. |
| **Land-use:** | Land-use patterns. |
| **Uses:** | Human uses of the area. |
| **Threats and Disturbances:** | Menace to the wetlands and vulnerability of resources. |
| **Conservation Plan:** | Details of conservation and management of the area. |
| **Human Population:** | Surrounding VDC areas, population and households. |
| **Research Works:** | Any work leading to generation of knowledge in the area. |
| **Others:** | Special information significant to the site. |
| **Overall Ranking:** | Rating of the site in relation to other wetlands, with reasons. |
| **References:** | Reference documents. |

Note: The description has been omitted when relevant information is not available.

Here are the summary descriptions of 163 wetland sites, surveyed in the Terai region of Nepal.

## 1. Titara Tal (तितरा ताल)

| | |
|---|---|
| *Situation:* | Bani, Ward No. 2, Krishnapur VDC, 14 km west of Attariya, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | It is a seasonal lake and retains water until November. It receives water from the surrounding areas as well as from spring that gets charged during the monsoon season. When dry, water remains for a few weeks only. |
| *Location:* | Latitude: 28°39'43.9" N Longitude: 80°25'02.4" E Altitude: 190 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 8 |
| *Climate:* | Tropical |
| *Hydrology:* | It has no inlet and outlet. Water accumulates during the rainy season only. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important tree species that surrounds the lake are Khair (*Acacia catechu*), Gutel (*Trewia nudiflora*) and Haldu (*Adina cordifolia*). The shoreline of the Tal is invaded by the successional growth of Besharam (*Ipomoea fistulosa*). |
| *Importance to Wildlife:* | The lake supports a small resident and migratory population of waterfowls. The important bird are *Egretta alba, E. intermedia, Vanellus indicus, Phalacrocorax niger, Ardeola grayii, Anas acuta, Dendrocygna javanica, Anas crecca, Nettapus coromandelianus, Alcedo atthis, Halcyon smyrnensis, Ciconia episcopus, Ephippiorhynchus asiaticus, Leptotilus javanicus, Pseudibis papillosa*. Two species of fish have been recorded from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, mainly forest. |
| *Land Use:* | Forest (80%), Pasture (20%) |
| *Uses:* | Grazing, fodder collection, domestic use, plant harvest, fishing in the rainy season only. |
| *Conversion Practices:* | Grazing and deforestation activities. |
| *Threats and Disturbances:* | Filling and siltation |
| *Conservation Plan:* | x |
| *Human Population:* | This site lies in Krishnapur VDC, which has a population of 13,892 with 2,125 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Inside the forest away from the settlement. |
| *References:* | x |

## 2. Padereni (पडरेनी)

| | |
|---|---|
| *Situation:* | Bani, Ward No. 2, Krishnapur VDC, 11 km west of Attariya, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Padereni is a meander of the Donda River. Half of the area remains marshy during the winter season. Local people have dug out a drainage outlet for fishing. The area can be viewed from the ridge near the settlement. |
| *Location:* | Latitude: 28°51'08.8" N Longitude: 80°25'32.1" E Altitude: 205 m. |
| *Area:* | 15 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by *Syzigium* forest. On the southern part of the lake some Khair trees are seen. The major tree species are Jamun (*Syzigium cumini*), Gutel (*Trewia nudiflora*), Khair (*Acaca catechu* ), Haldu (*Adina cordifolia*), Sissoo (*Dalbergia sissoo*). The aquatic vegetation of the lake includes lotus (*Nelumbo nucifera*). Due to overdraining and overgrazing the lake is gradually converted into grassland and covered by siru (*Imperata cylindrica*). |
| *Importance to Wildlife:* | The lake supports a small resident and migratory population of waterfowls. The important birds are *Egretta alba, E. intermedia, Vanellus indicus, Phalacrocorax niger, Ardeola grayii, Anas acuta, Dendrocygna javanica, Anas crecca, Nettapus coromandelianus, Alcedo atthis, Halcyon smyrnensis, Ciconia episcopus, Ephippilorhynchus asiaticus, Leptotilus javanicus, Pseudibis papillosa*. Three species of fish have been recorded from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Open Forest (60%), Pasture (20%), Grassland (20%) |
| *Uses:* | Fishing, grazing, fodder, domestic use, plant harvest, and fuel source. |
| *Conversion Practices:* | People are digging ditch to drain the water. |
| *Threats and Disturbances:* | Draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The site is in Krishnapur VDC. It has 2,125 households with a total of population of 13,892 |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Overgrazing and draining |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 3. Banda Tal (बन्दा ताल)

| | |
|---|---|
| *Situation:* | IBRB Gaon, Janakbasti, Ward No. 6, Laxmipur VDC, 3 km west of Tribhuwanbasti Bazar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal is situated in the middle of the barren land and is about half a kilometer from Sano Banda Tal. Three-fourths of the Tal still holds water and people use the water to irrigate their rice fields. |
| *Location:* | Latitude: 28°39'43.9" N Longitude: 80°25'02.4" E Altitude: 190 m. |
| *Area:* | 45 ha |
| *Wetland Type:* | 6, 10, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet but only runoff water and spring |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The following aquatic plant species; Besharam (*Ipomoea fistulosa*) and water lily (*Nymphaea* sp.) are scattered throughout the lake area. |
| *Importance to Wildlife:* | The lake is considered important for waterfowl population. The lake with marshes supports both resident & migratory bird species. Resident species includes *Egretta alba, E. intermedia, Dendrocygna javanica, Nettapus coromandelianus, Sarkidiornis melanotos*. Winter visitors include *Anser indicus, Tadorna ferruginea, Anas acuta, Anas crecca*. Two species fish have been recorded i.e. *Heteropneustes fossilis* and *Labeo rohita*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and privately owned land |
| *Land Use:* | Agriculture (50%), Settlement (30%) and Pasture (20%) |
| *Uses:* | Fishing, grazing, domestic use, plant harvest |
| *Conversion Practices:* | Shoreline being converted into rice terraces. |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The VDC of Tribhuwanbasti has a total of 1,563 households with 8,825 people. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Human encroachment. |
| *References:* | Inland Water Fisheries Programm. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries building, Balaju. |

## 4. Sano Banda Tal (सानो वन्दा ताल)

| | |
|---|---|
| *Situation:* | IBRB Gaon, Janakbasti, Ward No. 6, Tribhuwanbasti VDC, 4 km west of Tribhuwanbasti Bazar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Situated in the middle of the barren lands, the lake receives flood water from the agricultural lands and is believed to have some aquifer inside the lake. The area is invaded by *Impomea* species of aquatic plants. |
| *Location:* | Latitude: 28°39'43.9" N Longitude: 80°25'02.4" E Altitude: 188 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 6, 10, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | Natural springs and runoff water |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The following aquatic plant species i.e. Besharam (*Ipomoea fistulosa*) and water lily (*Nymphaea* sp.) are found in the lake area. |
| *Importance to Wildlife:* | This lake supports a small resident and migratory population of a number of waterfowl species. Residential species includes *Egretta alba, E. intermedia, Dendrocygna javanica, Nettapus coromandelianus, Sarkidionis melanotos*. Winter species includes *Anser indicus, Tadorna ferruginea, Anas acuta, Anas crecca*. Two species of fish have been recorded i.e. *Heteropneustes fossilis* and *Labeo rohita*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and privately owned land |
| *Land Use:* | Agriculture (50%), Settlement (30%), Pasture (20%) |
| *Uses:* | Fishing, grazing, domestic use, plant harvest |
| *Conversion Practices:* | Human encroachment |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, draining, and filling. |
| *Conservation Plan:* | x |
| *Human Population:* | This site lies in Tribhuwanbasti VDC, which has a population of 8,825 with 1,563 hoseholds. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Human encroachment. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 5. Naini Tal (नैनी ताल)

| | |
|---|---|
| *Situation:* | Ganesh Gaon, Ward No. 9, Kalika VDC, 14 km west of Tribhuwanbasti Bazar , Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | A barbed wire fencing encloses the lake and is in the middle of Ganesh Gaon. Pump set is used to extract water for agricultural field. The runoff from the village enters the lake and water level goes down in the summer season. |
| *Location:* | Latitude: 28°41'43.3" N Longitude: 80°24'30.0" E Altitude: 195 m. |
| *Area:* | 4 ha |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | No water source |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is deprived of forest trees and aquatic plant species. |
| *Importance to Wildlife:* | This pond provides foraging habitat for both resident and migratory bird species which includes *Egretta alba, E. intermedia, Dendrocygna javanica, Nettapus coromandelianus, Sarkidiornis melanotos*. Winter visitors include *Tadorna ferruginea, Anas acuta, Anas crecca, Anas platyrhynchos, Aythya ferina*. Three species of fishes have been recorded i.e. *Esomus dandricus, Heteropneustes fossilis* and *Clarias batrachus*. |
| *Special Features:* | x |
| *Land Ownership:* | Community and private ownership |
| *Land Use:* | Agriculture (80%), Settlement (20%) |
| *Uses:* | Irrigation and fishing. |
| *Conversion Practices:* | Draining of water to irrigate rice field. |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of the surrounding settlement is 8,233 with 1,406 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. No vegetation and managed for fishing only. |
| *References:* | x |

## 6. Tarbaria Tal (तरबरीया ताल)

| | |
|---|---|
| *Situation:* | Maina Gaon, Ward No. 2, Shreepur VDC, 2 km from Bellore, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | A dam and gravelled road helps retain water in the Tal. Water remains throughout the year. It has no inlet but outlet only. It is scenic and runs along the road for a few kilometers. |
| *Location:* | Latitude: 28°42'58.0" N Longitude: 80°22'0.16" E Altitude: 215 m. |
| *Area:* | 20 ha |
| *Wetland Type:* | 8, 10, 11, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | No source of water. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by the sal forest. The marshes and swamps shoreline are largely invaded by the successional growth of Besharam (*Ipomoea fistulosa*) |
| *Importance to Wildlife:* | This lake supports a small population of waterfowls. Resident species includes *Egretta alba, Phalacrocorax niger, Ardeola grayii, Anhinga melanogaster, Bubulcus ibis, Alcedo atthis, Ceryle rudis, Pelargopsis capensis, Halcyon smyrnenis, Vanellus indicus, Nettapus coromandelianus, Dendrocygna javanica, Ichithyophaga ichtyaetus.* Winter visitors are *Anas acuta, Anas crecca, Tadorna ferruginea.* Two species of fish have been recorded: *Labeo rohita, Puntius chola.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land and partly private lands. |
| *Land Use:* | Open Forest (90%), Agricultural Land (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest and fuel sources |
| *Conversion Practices:* | Pasture land |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The total population of Shreepur VDC is 14,280 with a total household of 1,877. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. In the forest area running along the road. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 7. Bantaria Tal (बन्तरिया ताल)

| | |
|---|---|
| *Situation:* | Maina Gaon, Ward No. 2, Shreepur VDC, 3 km north of Bellore, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The western side of the Tal is open forest and is used for cremation. The eastern side is agricultural fields. People use its water to irrigate rice fields. |
| *Location:* | Latitude: 28°43'12.3" N Longitude: 80°23'08.3" E Altitude: 230 m. |
| *Area:* | 6 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The eastern boundary of the lake is sparsely covered by sal (*Shorea robusta* ) trees. Rest of the area is surrounded by agricultural land. There is no growth of any aquatic plants in the lake area except some *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | This lake supports a small resident and migratory population of several species of waterfowls. Resident species includes *Dendrocygna javanica, Phalacrocorax niger, Egretta alba, Ardeola grayii, Nettapus coromandelianus, Ceryle rudis, Perargopsis capensis, Halcyon smyrnensis, Ahhinga melanogaster*. Winter visitors include *Tringa nebularia, T. totanus, Anas acuta, Anas crecca, Tadorna ferrugnea*. The lake has two species of fishes *Labeo rohita* and *Cirrhinus mrigala*. |
| *Special Features:* | Creamation is done at the margin of the lake. |
| *Land Ownership:* | Partly surrounded by government land and partly by private land. |
| *Land Use:* | Agriculture (50%), Open Forest (30%), Pasture (20%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, plant harvest, fuel sources |
| *Conversion Practices:* | People are converting the lake area into rice field. |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of the area, mainly shreepur VDC is 14,280 and households 1,877. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because lake area is converted into rice field. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 8. Piyari Tal (पियारी ताल)

| | |
|---|---|
| *Situation:* | Bijpatta, Ward No. 7, Parasan VDC, 16 km south of Tribhuwanbasti Bazar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | It is situated in the border between Nepal and India. This lake is an oxbow lake. The depth of the Tal is about 2 meters. The area is invaded by water hyacinth and local Indian contractor are contracted to catch fish. The length of the lake is about 10-12 km. |
| *Location:* | Latitude: 28°33'39.4" N Longitude: 80°30'59.4" E Altitude: 200 m. |
| *Area:* | 24 ha |
| *Wetland Type:* | 2 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Some Jamun trees (*Syzygium cumini*) were seen on the southern side of the lake. The water bodies is entirely invaded by *Eichhornia crassipes* and the edge covered by *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | This oxbow lake supports a small resident and migratory population of several species of waterfowl. Resident species include *Phalacrocorax niger, Ardeola grayii, Egretta alba, Nettapus coromandelianus, Dendrocygna javanica, Pelargopsis capensis, Alcedo atthis, Halcyon smyrnensis, Hydrophasianus chirurgus*. Winter visitors are *Anas crecca, Anas acuta, Charadrius dubius, Tringa nebularia, T. hypoleucos, T. totanus*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, owned by private land and border with India |
| *Land Use:* | Agriculture (50%), Open Forest (50%) |
| *Uses:* | Fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | This lake borders India and is situated in Parasan VDC, population of which is 9,796 and households, 1,615. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it lies in the border area. |
| *References:* | x |

## 9. Bichki Tal (बिचकी ताल)

| | |
|---|---|
| *Situation:* | Janakbasti, Ward No. 4, Tribhuwanbasti VDC, 5 km south of Tribhuwanbasti Bazar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is situated in the middle of the shrubs and open forests. The area is mostly used for animal grazing and is the main area for local people to collect fodders, grasses and fuelwood. |
| *Location:* | Latitude: 28°38'21.9" N Longitude: 80°25'59.8" E Altitude: 196 m. |
| *Area:* | 4 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No water source but retains runoff from the surrounding areas. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake area is surrounded by forest trees, Sal (*Shorea robusta*), Kusum (*Schleicheria trijuga* ) and Khair (*Acacia catechu*). *Ipomoea fistulosa* is also seen on the shoreline. |
| *Importance to Wildlife:* | The lake supports a small resident and wintering population of several species of waterfowls. Provides a staging area for many bird species during their migration. Resident species include *Egretta alba, Phalacrocorax niger, Ardeola grayii, Hydrophasianus chirurgus, Dendrocygna javanica, Ceryle rudis, Perargopsis capensis, Halcyon smyrnensis, Vanellus indicus, V. spinosus*. Winter visitors are *Anas crecca, Anas acuta, Charadrius dubius, Tringa nebularia, Tringa totanus*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Open Forest (40%), Grassland (30%), Pasture (30%) |
| *Uses:* | Fishing, grazing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | Deforestation and grazing |
| *Threats and Disturbances:* | Draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of Tribhuwanbasti VDC depend on this lake and its population is 8,825 and household 1,563. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Heavy grazing and firewood collection and encroachment from Indian side. |
| *References:* | x |

## 10. Aanp Tal (आँप ताल)

| | |
|---|---|
| *Situation:* | Janakbasti, Ward No. 5, Tribhuwanbasti VDC, 7 km of Tribhuwanbasti Bazar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This lake is about 2 kilometer west of Bichki Tal and is surrounded by *Ipomoea* sp. Heavily used by local people for fishing, water remains throughout the year. It is also used for animal grazing. In the rainy season, it is connected with small Kakari Tal. |
| *Location:* | Latitude: 28°38'17.5"N Longitude: 80°25'33.8"E Altitude: 184 m. |
| *Area:* | 7 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The forest is dominated by Kusum (*Schleicheria trijuga* ). Other important trees found here are Jamun (*Syzigium cumini*), Khair (*Acacia catechu*), and Simal (*Bombax ceiba*). *Ipomoea fistulosa* is found on the shoreline of the lake. |
| *Importance to Wildlife:* | The lake supports small resident and wintering populaiton of waterfowl species. Resident species includes *Dendrocygna javanica, Phalacrocorax niger, Ardeola grayii, Nettapus coromandelianus, Alcedo atthis, Pelargopsis capensis, Ceryle rudis, Halcyon smyrnensis, Spilornis cheela, Ichthyophaga ichthyaetus, Gyps indicus, Neophron percnopterus*. Winter visitors include *Anas crecca, Anas acuta, Tringa totaus, Tringa nebularia*. Three species of fish have been recorded e.g. *Puntius chola, Heteropneusts fossilis, Clarias batrachus*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Pasture Lands (50%) and Open Forest (50%) |
| *Uses:* | Fishing, grazing, fodder, plant harvest |
| *Conversion Practices:* | Deforestation and grazing |
| *Threats and Disturbances:* | Draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 8,825 people of Tribhuvanbasti VDC use this lake and total household in the VDC is 1,563. People from across the border also use the area for grazing animals. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Heavy grazing and firewood collection and encroachment from northern side. |
| *References:* | x |

## 11. Bedkot Tal (बेदकोट ताल)

| | |
|---|---|
| *Situation:* | Chhela Bagon, Ward No. 5, Daiji VDC, 23 km of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Situated at the hill top in the middle of dense forest, the lake is religiously important. People come here to bathe in winter. The temples at the ridge have enhanced its religious significance. It is scenic and is connected by a dirt road. |
| *Location:* | Latitude:29°01'25.8"N Longitude: 80°19'04.8"E Altitude: 407 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | A small spring provides water to the lake. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tropical sal forest surrounds the lake from all sides and is rich in floral diversity. The other important tree species found in the lake are Kusum (*Schleichera trijuga*), Khair (*Acacia catechu*), Haldu (*Adina cordifolia*), Bijaya Sal (*Pterocarpus marsupium*), Simal (*Bombax ceiba*), Saj (*Terminalia tomentosa*), Bhalayo (*Semicarpus anacardium*), Rajbrikshya (*Cassia fistula*). *Nymphaea* sp. are floating on the lake. *Typha* is found in marshy areas as well as on the shoreline. *Salix* species are also growing on the shoreline and marshy areas. |
| *Importance to Wildlife:* | The lake is important for wildlife. It supports resident and migratory waterfowls. Resident species includes *Tachybaptus ruficollis, Ardeola grayii, Gyps bengalensis, Gyps indicus, Spilornis cheela, Porphyrio porphyrio, Halcyon smyrnensis, Dendrocygna javanica, Nettapus coromandelianus*. Winter visitors are *Ciconia nigra,Gyps fulvus, Gallinula chloropus, Anas acuta, Anas crecca*. The lake serves as waterhole for *Panthera pardus, Naemorhedus goral, Axis axis* and other mammals. |
| *Special Features:* | Religious place for bathing, marriage, worship, etc. Pilgrim visit the area on the occasion of Ram Nawami. |
| *Land Ownership:* | Government land |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Religious, grazing, fodder collection |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Road construction along the bank, draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | May pilgrims come and bathe into the lake. The people of Daiji VDC use the area. Its population and household are 12,967 and 2,086 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Less encroachment. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 12. Mahakali Floodplain (महाकाली बाढ मैदान)

| | |
|---|---|
| *Situation:* | Brahmadeva, Ward No. 9, Mahendranagar Municipality, 15 km north-west of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This floodplain starts from Brahmadeva of Mahendranagar Municipality. The Tanakpur barrage has created an impoundment of about 50 ha in the Indian side. Due to dam, the eastern channel of the Mahakali river has dried and people are using this dried portion to collect sand and gravel for heavy construction. |
| *Location:* | Latitude: 29°04'02.9"N Longitude: 80°07'45.0"E Altitude: 161 m. |
| *Area:* | 8,750 ha |
| *Wetland Type:* | 2, 3, 27 |
| *Climate:* | Tropical |
| *Hydrology:* | It has a perennial water source and has inlet, outlet and a barrage. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This floodplain is very much poor in aquatic floral diversity. The important trees found on the embankment areas are Sal (*Shorea robusta*), Sissoo (*Dalbergia sissoo*), Khair (*Acacia catechu*). |
| *Importance to Wildlife:* | The Mahakali floodplain is a wintering area for sizeable number of several species of waterfowl and provides a staging area during their migration. Winter visitors and passage migrants are *Anas platyrhynchos, Anas acuta, Anas querquedula, Anas strepera, Anas clypeata, Anas crecca, Ephippiorhynchus asiaticus, Mergus merganser.* Resident species includes *Threskiornis melanocephala, Pseudibis papillosa, Pseudibis leucordia, Leptoptilos dubius, Ardeola grayii, Ardeola purpurea, Egretta alba, Egretta intermedia, Sarkidiornis melanotus.*<br><br>The floodplain shrub land and the forest support the protected repitle species i.e. *Python molurus*. Among the fish species, *Tor putitora* and *Schizothorax* sp.are the threatened ones occurring in the river.<br><br>Common mammalian fauna found in the floodplain forest area are *Axis axis, Sus scrofa,* and *Panthera pardus.* |
| *Special Features:* | |
| *Land Ownership:* | Government land, private land and foreign land (India) |
| *Land Use:* | Agriculture (30%), Open Forest (20%), Barren Land (20%), Settlement (20%), Pasture (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | Because of the construction of Tanakpur dam the eastern distributory of the river is completely dried. |
| *Threats and Disturbances:* | Sedimentation |
| *Conservation Plan:* | x |
| *Human Population:* | The riverine area of the floodplain consists of two VDC: Dodhara and Chandani and the municipality of Mahendranagar. The total household of the area is 14,344 and has a population of 87,864. The major towns are Mahendranagar and Indian city of Tanakpur in Uttar Pradesh. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Crossboundary area and administered by the Tanakpur Barrage Administration and Mahakali Irrigation Project. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 13. Chaudhar River Floodplain (चौधर नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Diaji, Ward No. 5, Daiji VDC, 8 km of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Mushe Khola and Bagori Khola make this Chaudhar river and crosses the highway near Daijii. The river meets the Bahunne Nala inside the Royal Sukla Phanta Wildlife Reserve. It is important for wildlife. |
| *Location:* | Latitude: 28°57'06.2" N Longitude: 80°15'16.4" E Altitude: 145 m. |
| *Area:* | 2,812 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Permanent inlet and outlet |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Riverine forest dominated by Simal (*Bombax ceiba* ) and Khair (*Acacia catechu*). Stands of Sal trees also occur on the floodplain areas. |
| *Importance to Wildlife:* | The river and riverine floodplain is important for breeding, and migratory birds. The following large waders are recorded *Ephippiorhynchus asiaticus, Mycteria leueocephala, Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Platalea leucordia* and *Grus antigone*. Other important bird species include *Tadorna ferruginea, Vanellus indicus, V. spinosus, Phalacrocorax carbo, P. niger, Spilornis cheela, Ardea Purpurea, Ardeola grayii, Butorides striatus, Nycticorax nycticorax, Ichthyophasa ichthyaetus, Charadrius dubius, Tringa ochropus, T. hypoleucos, T. nebularia, Tringa totatnus, Rostratula benghalensis, Glareola lactea, Sterna aurantia, Sterna cospia,Ceryle rudis, Alcedo atthis, Pelargopsis capensis, Halcyon smyrnensis.* |
| *Special Features:* | |
| *Land Ownership:* | Government land but surrounded by privately owned agricultural field. |
| *Land Use:* | Agriculture (60%), Open Forest (15%), Dense Forest (15%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, domestic use, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Building construction, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The river crosses through three VDC's and one municipalities. The population along the floodplain is 94,683 and the number of household is 15,116. The main town is Mahendranagar. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. No sedimentation but agricultural runoff. |
| *References:* | x |

## 14. Banara River Floodplain (बनरा नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Titara, Ward No. 4, Krishnapur, 16 km of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This river starts from the Churia hill and meanders to India. Crossing over 10 VDCs, this river creates fertile and flat floodplain, which serves as refuges for wildlife and aviafauna. |
| *Location:* | Latitude: 28°533'15.7" N Longitude: 80°23'48.0" E Altitude: 162 m. |
| *Area:* | 2,820 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has perennial water source with continuous outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Tropical riverine forest tree species e.g. *Bombax ceiba* and *Acacia catechu* are found at the embankment and floodplain areas. Sal trees also occur on floodplain areas. |
| *Importance to Wildlife:* | The river and its marshland supports breeding, staging and wintering migratory birds. The following large waders are recorded; *Ephippiorhynchus asiaticus, Mycteria leucocephala, Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Platalea leucorodia* and *Grus antigone*. Other bird species includes *Tadorna ferruginea, Vanellus indicus, V. spinosus, Phalacrocorax carbo, P. niger, Spilornis cheela, Ardea purpurea, Ardeola grayii, Butorides striatus, Nycticorax nycticorax, Ichthyophaga ichthyaetus, Charadrius dubis, Tringa ochropus, T. hypoluncos, T. nebularia, T. totanus, Rostratula benghalensis, Glareola lactea, Sterna aurantia, Sterna caspia, Ceryle rudis, Alcedo atthis, Pelargopis capensis, Halcyon smyrnensis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land and privately owned land. |
| *Land Use:* | Agriculture (30%), Open Forest (20%), Pasture (20%), Dense Forest (10%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest and fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction along a bank, pollution, agricultural runoff, dredging/draining and filling. |
| *Conservation Plan:* | x |
| *Human Population:* | The ten VDC's that the river crosses have a total population of 97,337 with households of 14,417. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it passes through forest area away from human settlement. |
| *References:* | x |

## 15. Donda River Floodplain(दोंदा नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bani, Ward No. 2, Krishnapur, 9 km west of Attariya, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Donda River, locally called Maccheli Khola meanders and meets the Banara river at Jain, Dekhatbhuli VDC. It has created wide floodplain good for reptiles, amphibians, birds and mammals. |
| *Location:* | Latitude: 28°51'07.1" N Longitude: 80°26'07.6" E Altitude: 158 m. |
| *Area:* | 2,500 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river goes torrential during the rainy season. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The river floodpians are dominated by riverine forest species *Bombax ceiba*, and *Acacia catcheu*. Scattered stands of Sal trees also occur in the area. |
| *Importance to Wildlife:* | The river and the marsh supports breeding and migratory birds. Floodplain serves as an ideal habitat for large waders such as *Ephippiorhynchus asiaticus, Mycteria leucocephala, Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Platalea leucordia* and *Grus antigone*. Other bird species includes *Tadorna ferruginea, Vanellus indicus, V. spinosus, Phalacrocorax carbo, P. niger, Spilornis cheela, Ardea purpurea, Ardeola grayii, Butorides striatus, Nycticorax nycticorax, Ichthyophaga ichthyaetus, Charadrius dubis, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus, Rostratula benghalensis, Glareola lactea, Sterna aurantia, S. caspia, Ceryle rudis, Alcedo atthis, Pelargopsis capensis, Halcyon smyrnensis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land and privately owned land. |
| *Land Use:* | Agriculture (30%), Open Forest (20%), Pasture (20%), Dense Forest (10%), Grassland (10%) and Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use and plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction along bank, pollution, agricultural runoff, dredging/ draining, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | The population depending on this segment of the river floodplain are from two VDCs totaling 22,196 population and numbering 3,206 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because of less human encroachment. |
| *References:* | x |

## 16. Mohana River Floodplain (मोहना नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Gulariya, Ward No. 1, 6 km west of Krishnapur, Attariya, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Mohana river borders Kanchanpur and Kailali districts. All the rivers that originate in the Churia hills of Bardia district eventually meet it in the south. It has created a big and long floodplain and makes the southern border of Kailali district. The river joins the Karnali near Dhansinghpur VDC of Kailali District. |
| *Location:* | Latitude: 28°49'26.5" N Longitude: 80°30'56.0" E Altitude: 151 m. |
| *Area:* | 13,500 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial source of water coming from Chure Hills. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Riverine forest i.e. *Acacia catechu* and *Bombax ceiba* are dominant on the floodplain. Some stands of Sal trees (*Shorea robusta*) also occur in the area. |
| *Importance to Wildlife:* | Marshes provides an ideal habitat for large waders. Large waders such as *Ephippiorhynchus asiaticus, Mycteria leucocephala, Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Platalea leucorodia* and *Grus antigone*. Other bird species includes *Tadorna ferruginea, Vanellus indicus, V. spinosus, Phalacrocorax carbo, P. niger, Spilornis cheela, Ardea purpurea, Ardeola grayii, Butorides striatus, Nycticorax nycticorax, Ichthyophaga ichthyaetus, Charadrius dubis, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus, Rostratula benghalensis, Glareola lactea, Stelna aurantia, S. caspia, Ceryle rudis, Alcedo atthis, Pelargopis capensis, Halcyon smyrnensis.<br><br>The large sand bank, floodplain with large volume of the water near the border line harbours some *Crocodile palustris*. The river ultimately joins with Karnali. It has been said that the crocodiles also come from the Karnali river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and privately owned land |
| *Land Use:* | Agriculture (30%), Open Forest (20%), Pasture (20%), Dense Forest (10%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction along the bank, pollution, agricultural runoff, dredging/draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The river borders the districts of Kanchanpur and Kailali and runs through five VDCs of Kanchanpur and nine VDCs of Kailali district. The population of these VDCs is 161,940 with a total households of 25,152. The major town are Dhangadhi and Narayanpur. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. No significant threat to the floodplain. |
| *References:* | x |

## 17. Gusta Tal (गुष्टा ताल)

| | |
|---|---|
| *Situation:* | Anadai, Ward No. 2, Rauteli Bichawa VDC, 15 km east of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Gusta Tal is a 30 meter wide ditch extending over a few kilometers. Because of its situation in the middle of agricultural fields, it has neither inlet or nor outlet. Water is stagnant and remains all the year round. People have reported the sighting of marsh crocodile.The area is full of water hyacinth and reed. |
| *Location:* | Latitude: 28°14'19.2" N Longitude: 80°14'49.2" E Altitude: 149 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The stagnant pond and marshy area is fully covered by water hyacinth (*Eichhornnia crassipes* ) and cattail (*Typha* sp). |
| *Importance to Wildlife:* | The lake supports only a small number of resident and wintering population of waterfowls. The observed bird species are *Egretta alba, Phalacrocorax niger, Ardeola grayii, Ceryle rudis.*<br>The wide ditch is suitable (prime) habitat for the marsh crocodile *Crocodilus palustris,* according to a local informant. Also found are aquatic fungi. The important fish species found in the ditch are *Labeo rohita, Labe gonius, Clarias batrachus* and *Heteropneustes fossilis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land and private land |
| *Land Use:* | Agriculture (80%), Settlement (20%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest and fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The VDC in which it lies has a total household of 1,650 and population of 11,841. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Surrounded by agricultural land and settlement. |
| *References:* | x |

## 18. Shova Tal (शोभा ताल)

| | |
|---|---|
| *Situation:* | Chhoti Palia, Ward No. 7, Shankarpur VDC, 8 km north of Bellore, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake does not have any perennial inlet. However, water during monsoon season gets accumulated here. The lake has been leased out to fish contractor, who catches tonnes of fish every year. The barren land on the northern and eastern side is heavily used for animal grazing. |
| *Location:* | Latitude: 28°45'28.2" N Longitude: 80°21'49.6" E Altitude: 230 m. |
| *Area:* | 25 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Only during the rainy season, flood water comes and deposits. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Sal forest in association with *Syzigium cumini* are found in the lake area. Among the aquatic plant species, *Nymphaea* sp. dominates the water surface. |
| *Importance to Wildlife:* | The lake supports a small resident and wintering population of several species of waterfowls. Important bird species are *Egretta alba, Egretta intermedia, Ardea grayii, Anas indica, Dendrocygna javanica, Tadorna ferruginea, Anas crecca, Anas acuta, Anas platyrhynchos, Anas strepera, Anas clypeata, Nettapus coromandelianus, Sarkidiornis melanotos.*<br>Fish fauna of the lake includes *Cirrhina mrigala, Catla catla, Labeo rohita, Esomus dandricus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (60%), Pasture (30%), Grassland (10%) |
| *Uses:* | Fishing, grazing, fodder, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | x |
| *Human Population:* | It lies in the VDC of Shankarpur, which has a population of 4,730 with 510 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because it is inside the open forest. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 19. Rani Tal (रानी ताल)

| | |
|---|---|
| *Situation:* | Royal Shuklaphanta Wildlife Reserve (RSWR), 11 km west-south of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is about 18 km away from the Reserve Headquarters. About three fourths of the area is covered with vegetation. The eastern portion of the lake is covered with reeds and water fern. |
| *Location:* | Latitude: 28°50'01.9" N Longitude: 80°50'15.2" E Altitude: 140 m. |
| *Area:* | 11 ha |
| *Wetland Type:* | 8, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by Sal forest. In many places of the lake area, the more characteristic species are *Phragmites karka, Saccharum munj, Nymphaea* sp., *Cymbopogon martinii, Pistia stratiotes., Saccharum spontaneum, Eulaliopsis binata, Themeda* sp., *Arundo donax, Vetiveria lawsonii,* and *Imperata cylindrica*. Due to heavy vegetational succession about 70% of the area is covered by *Phragmita karka*. The bank of the Tal is dominated by *Saccnarum spontaneum*. The remaining waterbody is covered by aquatic vegetation i.e. *Hydrilla* sp., *Pistia stratiotes, Vallisneria* sp., and *Nymphaea* sp. |
| *Importance to Wildlife:* | The lake is a wintering area for sizeable numbers of several species of waterfowls, and provides a staging area for many species during their migration. Resident species include *Nycticorax nycticorax, Ardeola grayii, Egretta alba, Egretta intermedia, Sarkidiornis melanotos* and *Ardea purpurea*. Passage migrants and winter visitors include *Phalacrocorax carbro, P. niger, Ephippiorhynchus asiaticus, Anas strepera, A. platyrhynchos, A. acuta, A. querquedula, A. clypeata* and *Motacilla cinerea*.<br><br>This wetland is very much important for wildlife such as *Axis axis, Cervus duvauceli, Axis porcinus, Panthera tigris, Lutrogale perspicillata*. The lake supports the viable population of marsh crocodiles *Crocodilus palustris*. Protected reptile species *Python molurus* is recorded from this area. |
| *Special Features:* | It is inside the protected area. |
| *Land Ownership:* | The Tal is a protected area and is owned and managed by DNPWC. |
| *Land Use:* | Dense forest (100%) |
| *Uses:* | Recreation |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Siltation and sedimentation |
| *Conservation Plan:* | No conservation measures have been taken. DNPWC is building a dam at the outflow to raise water level. The primary inflow of Chaudhar river has changed the course and it no longer continues to flow into Rani Tal. The park officials are considering to redivert the river bank into the lake. |
| *Human Population:* | It is inside the protected area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is inside the protected area. |

*References:*

Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries,* 2051/52, Central Fisheries Building, Balaju.

Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal.

Scott, D.A. (Ed). 1989. A Directory of Asian Wetlands. Gland, Switzerland: IUCN-The World Conservation Union, WWF, and IWRB.

Bhatta D.D. and T.K. Shrestha. 1977. The Environment of Sukla Phanta. Curriculum Development Centre, T.U.

## 20. Bahunne Nala (बाहुन्ने नाला)

| | |
|---|---|
| *Situation:* | Royal Shuklaphanta Wildlife Reserve (RSWR), 32 km south-west of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The place is a narrow ravine amidst the dense forests of the Reserve and is a good habitat for crocodile. This creek meanders in the Reserve area and finally makes it way to India. |
| *Location:* | Latitude: 28°25'10.9" N Longitude: 80°50'15.2" E Altitude: 138 m. |
| *Area:* | 781 ha |
| *Wetland Type:* | 4 |
| *Climate:* | Tropical |
| *Hydrology:* | It has both inlet as well as outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The site is surrounded by dense Sal forest. Other important tree species found in the area are Vijaya Sal (*Pterocarpus marsupium*), Gutel (*Trewia nudiflora*), Haldu (*Adina cordifolia*), Gular (*Ficus glomerata*), Palas (*Butea monosparma*), Khair (*Acacia catechu*), Sindhuri (*Mallotus phillipinensis*), White Siris (white) (*Albizzia procera*), Satisal (*Dalbergia latifolia*), Kavro (*Ficus lacor*), Akha (*Calotropis procera*), Tooni (*Cedrela toona*), Tatari (*Dillenia pentagyrna*), Simal (*Bombax ceiba*), Jamun (*Syzigium cumini*). The shore area is covered by the *Sachharum spontaneum, S. munj, Phragmites karka, Vetiveria lawsonii* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | The Bahunne Nala is important for wildlife and waterfowl conservation. The Nala supports a sizeable number of waterfowl species. The Nala is an wintering and staging area for many bird species during their migration. The important bird species are *Anas crecca, Anas platyrhynchos, Miophoneus caeruleus, Gallinula chloropus, Tringa totanus, Spizaetus cirrhatus.*<br><br>The creek also supports a viable population of marsh crocodile *Crocodylus palustris*. The wetland is important for wildlife e.g. *Cervus duvauceli, Axis axis, Axis porcinus, Muntiacus muntjac, Panthera tigris, Sus salvanius, Lutra perspicillata*, and wild elephant (*Elephas maximus*). |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is a government owned land, situated in the Royal Shuklaphanta Wildlife Reserve. |
| *Land Use:* | Dense forest (100%) |
| *Uses:* | Fodder and Recreation |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | Away from human settlement and is inside the protected area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the Reserve area. |
| *References:* | Bhatta D.D. and T.K. Shrestha. 1977. The Environment of Sukla Phanta. Curriculum Development Centre, T.U. |

## 21. Shikari Tal (शिकारी ताल)

| | |
|---|---|
| *Situation:* | Royal Suklaphanta Wildlife Reserve, 40 km south-west of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | About three hectares of land is permanently covered with water. The rest is inundated during the monsoon season. This lake has served as a refuge for endangered species of wildlife inside the reserve. |
| *Location:* | Latitude: 28°48'18.3" N Longitude: 80°10'53.3" E Altitude: 136 m. |
| *Area:* | 3 ha |
| *Wetland Type:* | 7, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet but only natural spring. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal tree species found in the lake area are Palas (*Butea monosperma*), Jamun (*Syzigium cumini*) and asna (*Terminalia tomentosa*). Most of the area is covered by *Saccharum spontaneum, Saccharum munj* and *Phragmites karka.* |
| *Importance to Wildlife:* | The lake is important for wildlife and waterfowl conservation. The lake supports important birds such as *Egretta alba, Anas crecca, Tringa nebularia, Mycteria leucocephala, Ciconia ciconia, Ephippiorhynchus asiaticus* and *Pseudibis papillosa.*<br>This lake support some marsh crocodile *Crocodilus palustris* and this lake also serves as a water hole for wildlife such as *Axis axis, Cervus duvauceli, Muntiacus muntjac, Axis porcinus, Panthera tigris* and *Elephas maximus.* |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is inside the protected area and is owned and managed by DNPWC. |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Water hole for wildlife, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural siltation, vegetation succession |
| *Conservation Plan:* | x |
| *Human Population:* | The area is inside the protected area and is visited by tourists. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is inside the protected area. |
| *References:* | Bhatta D.D. and T.K. Shrestha. 1977. The Environment of Sukla Phanta. Curriculum Development Centre, T.U. |

## 22. Lalpani Tal (लालपानी ताल)

| | |
|---|---|
| *Situation:* | Lalpani, Ward No. 3, Rauteli Bichawa VDC, 10 km east of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is a narrow ravine of stagnant water. This site is being planned to be included in the extension of the Royal Suklaphanta Wildlife Reserve. Marsh crocodiles are reported to have lived here. |
| *Location:* | Latitude: 28°51'31.3" N Longitude: 80°15'06.6" E Altitude: 150 m. |
| *Area:* | 3 ha |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by Sal forest. Sal associates such as *Terminalia tomentosa*, and *Mallotus philippinensis* also occur here. Riverine forests of *Bombax ceiba* and *Syzigium cumini* are also found. Heavy growth of the *Ipomoea fistulosa* and *Eichhnornia crassipes* were noticed in the marshy and lake surface. |
| *Importance to Wildlife:* | The lake is important for breeding, staging and wintering birds. The important birds recorded are *Egretta alba, Egretta intermedia, Ibidorhyncha struthersii, Gallinula chloropus, Ciconia nigra* and *Sterna albifrons*.<br>The lake also supports some marsh crocodile *Crocodilus palustris*. Twelve species of freshwater fishes have been recorded. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is being considered for inclusion into the wildlife reserve. Currently this is surrounded by private lands. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Fishing, grazing, domestic use, fodder, plant harvest |
| *Conversion Practices:* | Shorelines being gradually converted into rice fields. |
| *Threats and Disturbances:* | Pollution, filling, monospecific domination |
| *Conservation Plan:* | The government has an extension programme. No development plans. |
| *Human Population:* | Presently, the poeple of Rauteli Bichawa VDC are using the lake. The population of VDC is 6,718 with 1,186 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It is still undisturbed. |
| *References:* | x |

## 23. Kalikitch Tal (कालीकिच ताल)

| | |
|---|---|
| *Situation:* | Beldandi, Ward No. 7, Beldandi VDC, 30 km east of Mahendranagar, , Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The irrigation project excavated the area to fill in the irrigation canal. It has dug out 20 pits averaging 20 x 30 m. Pasture/flood area makes excellent flood water storage potential. In the monsoon season water covers all the pits and makes a huge lake. Also, people from the Irrigation Project pump water out to to use in compacting the irrigation canal. |
| *Location:* | Latitude: 28°48'07.2"N Longitude: 80°15'37.3"E Altitude: 145 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No outlet but runoff water deposits in the lake area. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by scattered old Sal forest. The common associates of the sal forest are *Ougeinia dalbergioides*, Jamuna (*Syzigium cumini*), and Kyamuno(*Syzigium cerasoides*). Aquatic species includes *Nymphaea* sp., *Typha* sp., *Ipomoea* sp., *Marsilea* sp., *Trapa bispinosa* and *Eichhornia crassipes*. |
| *Importance to Wildlife:* | Water accumulates during the monsoon season and becomes a large lake. It is considered for inclusion in the protected area. With the completion of the Mahakali Irrigation Project, the water will be fed from the canal to the lake. Thus, it serves as an important habitat for waterfowls, swamp deer and wild elephants. The important bird species recorded are *Egretta alba, Anas acuta, Anas crecca, Merops* sp., *Ceryle rudis, Alcedo atthis, Ibidorhyncha struthersii.* Sarus crane is recorded here and is western range for sarus crane in Nepal.<br><br>Marsh crocodile (*Crocodilus palustris*) was introduced in the lake by the Irrigation Project. Ten species of fish have been reported. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is considered for inclusion in the protected area. |
| *Land Use:* | Open Forest (50%), Agriculture (20%), Settlement (10%), Pasture (20%) |
| *Uses:* | Fishing, grazing, fuel source |
| *Conversion Practices:* | Currently, many pits are dug inside the lake area. |
| *Threats and Disturbances:* | Siltation, vegetation succession, runoff from the agricultural field, buffalo wallowing. Dirt road along east and south of shore area. Pumping of water for use in compacting soil in the canal. |
| *Conservation Plan:* | The Mahakali Irrigation Project has a plan to provide water from the canal to the pond and release fish and crocodiles. The lake is being considered for its inclusion in the protected area system. |
| *Human Population:* | The Beldandi VDC which has a population of 9,301 and 1,483 househlds use the lake and shoreline. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Less disturbed and close to the Mahakali Irrigation Canal under construction. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br><br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 24. Tara Tal (तारा ताल)

| | |
|---|---|
| *Situation:* | Tarapur, Ward No. 1, Pipaladi, 30 km east of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal will be inside the Royal Shuklaphanta Wildlife Reserve when it is extended. Tara Tal is in the worst condition. The water from the lake is used for irrigating agricultural fields. The site is religiously important for Hindus and its shore area, especially on the west is used to cremate dead bodies. Encroachment, grazing and reclamation are rapidly taking place. |
| *Location:* | Latitude: 20°56'27.2" N Longitude: 80°19'28.6" E Altitude: 175 m. |
| *Area:* | 30 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet but has an outlet for irrigation. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Sal forest dominates and surrounds the lake. The other important tree species are Saj (*Terminalia tomentosa*), Jamuna (*Syzigium cumini*), Kyamuno(*Syzigium cerasoides*), Sandan (*Cugeinia dalbergioides*), Sindhure (*Mallotus phillippinensis*), Khair (*Acacia catechu*), and Gular (*Ficus glomerata*). About 70% of the area has been completely dried out due to vegetational succession. The remaining water bodies (30%) support the aquatic vegetation e.g. *Nymphaea* sp., *Pistia* sp., and *Dryopteris* sp. |
| *Importance to Wildlife:* | The lake is considered for inclusion in the protected area system. The wetland is important for breeding and migratory birds. The large waders recorded are *Mycteria leucocephala, Anastomus oscitans, Ciconia ciconia, Sarkidiornis melanotus, Egretta alba, Vanellus indicus, Hydrophasianus chirurgus, Merops* sp. Nine species of fish have been reported from the lake. |
| *Special Features:* | Religiously important for cremation. |
| *Land Ownership:* | The wetland is considered for inclusion in the protected area system. |
| *Land Use:* | Agriculture (50%), Open Forest (30%), Pasture (20%) |
| *Uses:* | Fishing, grazing, religious value, fodder and fuel source |
| *Conversion Practices:* | The area has been intensively used for pasture and the water to irrigate rice fields at the periphery. |
| *Threats and Disturbances:* | Siltation, agricultural runoff and encroachment at the lake, vegetational succession, building construction, agricultural runoff, draining, filling. |
| *Conservation Plan:* | DNPWC's extension plan for protected area system. |
| *Human Population:* | The Pipaladi VDC which has a population of 11,071 and 4,739 household use lake resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Deforestation and human pressure occuring rapidly. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52. Central Fisheries Building, Balaju. |

## 25. Peli Tal (पेली ताल)

| | |
|---|---|
| *Situation:* | Daiji, Ward No. 1, Daiji VDC, 16 km east of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | A small pond surrounded by open forest, settlement, agricutlural land and road has a permanent out flow. The pond is covered with reeds and lotus. The shoreline is full of *Ipomoea* bushes. It is vulnerable to subsisdence due to its closeness to road, settlement and rice fields. |
| *Location:* | Latitude: 20°56'27.2" N Longitude: 80°16'23.7" E Altitude: 145 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet but only outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by open forest of Jamun (*Syzigium cumini*) and Saj (*Terminalia tomentosa*). The water body is supporting the growth of *Nymphaea* sp. The shoreline of the Tal is greatly invaded by *Ipomoea* sp. |
| *Importance to Wildlife:* | The lake supports a small resident and migragory population of several species of waterfowls. Bird species of the area are *Egretta* some *alba, Dendrocygna javanica, Nettapus coromandelianus, Ibidorhyncha struthersii, Ciconia nigra, Gallinula chloropus, Hydrophasianus chirurgus*. Six species of fishes have been reported from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is owned by the government but used by local communities. |
| *Land Use:* | Open Forest (60%), Agriculture (10%), Pasture (10%), Other (20%) |
| *Uses:* | Irrigation, fishing, grazing and fodder |
| *Conversion Practices:* | Draining out water to convert it into rice fields. |
| *Threats and Disturbances:* | Agricultural runoff, grazing, encroachment by farmers, lotus succession, human encroachment, over grazing |
| *Conservation Plan:* | x |
| *Human Population:* | A population of 12,967 with 2,088 households in Daiji VDC use the area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. It is near the settlement and encroachment. |
| *References:* | x |

## 26. Nun Khaini Tal (नून खौनी ताल)

| | |
|---|---|
| *Situation:* | Krishnapur, Ward No. 2, Krishnapur VDC, 2 km west of Bani settlement, Kanchanpur. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The highway just crosses the site into two parts. The southern part is bigger in size and is full of water in the monsoon season. Many stubs and dead trees are still seen and provides refuge to waterfowls and amphibians. |
| *Location:* | Latitude: 28°51'17.3" N Longitude: 80°25'40.9" E Altitude: 190 m. |
| *Area:* | 6 ha |
| *Wetland Type:* | 9 |
| *Climate:* | Tropical |
| *Hydrology:* | Only seasonal. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important tree species occurs in the Tal area are Sissoo (*Dalbergia sissoo*), Saj (*Terminalia tomentosa*), Khair (*Acacia catechu*), Jamun (*Syzigium cumini*), Kyamuno (*Eugenia jambolana*) and Sindhure (*Mallotus philippinensis*). |
| *Importance to Wildlife:* | The lake supports a small resident and migratory population of waterfowls.The wetland supports the bird species such as *Egretta alba, Dendrocygna javanica, Nettapus coromandelianus, Anas crecca, Hydrophasianus chirurgus, Sterna albifrons, Gallinula chloropus, Ciconia nigra,* and *Hirundo rustica*. Fourteen species of fishes have been reported from the lake. |
| *Special Features:* | The Mahendra Highway passes through the Tal area. |
| *Land Ownership:* | The wetland is a government owned land and a nursery on the southern shore is run by the Department of Forest. |
| *Land Use:* | Open Forest (70%), Pasture (20%), Agriculture (10%) |
| *Uses:* | Fishing, grazing, fodder, plant harvest and fuel source |
| *Conversion Practices:* | Overgrazing and felling of trees. |
| *Threats and Disturbances:* | Felling of the tree, road construction, building construction, monospecific domination |
| *Conservation Plan:* | x |
| *Human Population:* | The populaiton of 13,892 with a total of 2,125 households from Krishnapur VDC use the area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because trees felled down and stumps around. |
| *References:* | x |

## 27. Dhaderi Khola (ढडेरी खोला)

| | |
|---|---|
| *Situation:* | Chaupheri, Ward No. 3, Rauteli Bichawa VDC, 15 km east of Mahendranagar, Kanchanpur District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The wetland is seasonal in nature. It dries in the winter season. Because of its situation in the middle of the forest, it provides refuge to wildlife and water hole for wildlife and domestic animals. |
| *Location:* | Latitude: 28°53'17.4" N Longitude: 80°16'19.9" E Altitude: 160 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Inlet and outlet only during the monsoon season. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Rich in floral diversity, this wetland is surrounded by dense forest. The important tree species occuring in the river floodplain are Saj (*Terminalia tomentosa*), Gular (*Ficus glomerata*), Sindhure (*Mallotus philippinensis*), and Khair (*Acacia catechu*). The seasonal in type, it supports the growth of *Ipomoea* sp. and *Dryopteris* sp. |
| *Importance to Wildlife:* | The river, floodplain, marsh and swamp serves as ideal habitat for large waders e.g. *Mycteria leucocephala, Anastomus oscitans, Ciconia ciconia, Ciconia episcopus, Ciconia niger, Threskiornis melanocephala, Egretta alba, Gallinula chloropus*. Seven species of fishes have been reported. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is considered for inclusion in the protected area system. |
| *Land Use:* | Dense forest (100%) |
| *Uses:* | Fishing, fodder, fuel source. |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Vegetational succession, road construction, building construciton |
| *Conservation Plan:* | Proposed for inclusion into the Royal Shukla Phanta Wildlife Reserve. |
| *Human Population:* | This site is in the middle of dense forest and its population (6,718) use the area. This VDC has 1,186 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Undisturbed conditions, though it is freely accessible. |
| *References:* | x |

## 28. Ojhuwa Tal, Narayanpur (ओझुवा ताल, नारायणपूर)

| | |
|---|---|
| *Situation:* | Baidi Phanta, Ward No. 9, Narayanpur VDC, 15 km south of Tikapur town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This is an oxbow lake created by the Mohana river. This is amidst the agricultural lands and settlements. All the runoff goes to the Tal. The Tal is covered by *Ipomoea* sps. and other aquatic weeds. |
| *Location:* | Latitude: 28°27'91.8"N Longitude: 81°01'24.9"E Altitude: 193 m. |
| *Area:* | 9 ha. |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Some tree species such as Jamun (*Syzigium cumini*), Sisoo (*Dalbergia sissoo*) and Bet (*Calamus tenuis*) are found around the oxbow lake. The Tal is fully covered by *Nymphaea* sp., *Ipomoea* sp. and *Trapa bispinosa*. |
| *Importance to Wildlife:* | The oxbow lake is created by the Mohana river and provides an optimal feeding ground for migratory and resident birds. The Tal is restocked with fish every monsoon when the river floods.The wetland harbour many species of birds such as *Egretta alba, Dendrocygna javanica, Anas acuta, Anas crecca, Anas platyrhynchos, Anas strepera, Anas clypeata, Nettapus coromandelianus, Phalacrocorax niger, Ciconia nigra, Ciconia eposcopus, Mycteria leucocephala, Pseudibis papillosa*. Five species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and private land. |
| *Land Use:* | Agriculture (70%), Settlement (30%) |
| *Uses:* | Irrigation, fishing, domestic use, plant harvest, waste disposal |
| *Conversion Practices:* | Encroachment to the shore area to convert it into agricultural land. |
| *Threats and Disturbances:* | Agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Narayanpur VDC houses this lake. The population of this VDC is 9,091 and households 1,346. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Intensive cultivation around the lake. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 29. Dudhwa Tal (दुधवा ताल)

| | |
|---|---|
| *Situation:* | Dudhwa Phanta, Ward No. 7, Lalbhoji VDC, 25 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This is an oxbow lake created by the Mohana river at Dhudhwa Phanta. The Tal is tending towards subsidence and the shore area is covered by *Ipomoea* sps. |
| *Location:* | Latitude: 28°27'42.3" N Longitude: 80°58'15.4" E Altitude: 208 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet and outlet |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Some forest trees of riverine forest occurs in the lake area such as Simal (*Bombax ceiba*), Jamun (*Syzigium cumini*), and Bhelar (*Trewia nudiflora*). The Tal is invaded by the growth of *Ipomoea* sp. |
| *Importance to Wildlife:* | The oxbow lake provides an optimal feeding ground for migratory and resident birds. The lake is restocked with fish every monsoon when the river floods. The wetland supports many species of birds: *Egretta alba, Ardeola grayii, Phalacrocorax niger, Gallinula chloropus, Porphyrio porphyrio, Dendrocygna javanica, Anas acuta, Anas crecca, Anas platyrhynchus, Anas strepera, Anas clypeata, Nettapus coromandelianus, Ciconia nigra, Ciconia episcopus, Mycteria leucocephala, Pseudibis papillosa.* Five species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and private ownership. |
| *Land Use:* | Agriculture (80%), Settlement (20%) |
| *Uses:* | Fishing, fodder, plant harvest |
| *Conversion Practices:* | Human encroachment to convert the shoreline into agricultural fields. |
| *Threats and Disturbances:* | Agricultural runoff, draining, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | Lalbhojhi VDC which houses this lake has a population of 6,720 with the household of 1,019. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. The shore area is being converted into agricultural fields. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries,* 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 30. Kusaiya Tal (कुशैया ताल)

| | |
|---|---|
| *Situation:* | Prithivinagar, Ward No. 4, Lalbhoji VDC, 25 km south of Sukhad, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Kusaiya Tal is near the border area. Half of its water dries in the summer. Local farmers draw its water to irrigate their fields. Its shore area is covered with *Ipomoea* sp. and used for animal grazing. |
| *Location:* | Latitude: 28°27'58.5" N Longitude: 80°55'49.5" E Altitude: 206 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is surrounded by the open forest. The surrounding vegetations are Haldu (*Adina cordifolia*) and Bhelar (*Trewia nudiflora*). The southern part of the Tal has been turned into grassland due to vegetational succession. The water body is covered with aquatic plant species of *Nymphaea* sp., *Eichhornia crassipes* and *Ipomoea* sp. |
| *Importance to Wildlife:* | The Kusaiya Tal is a wintering and staging ground for avifauna. The wetland supports many species of birds: *Egretta alba, Ardeola grayii, Phalacrocorax niger, Gallinula chloropus, Porphyrio porphyrio, Dendrocygna javanica, Anas acuta, Anas crecca, Anas platyrhynchus, Anas strepera, Anas clypeata, Nettapus coromandelianus, Ciconia nigra, Ciconia episcopus, Mycteria leucocephala, Pseudibis papillosa*. Three species of fish have been reported from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, private land |
| *Land Use:* | Agriculture (80%), Open Forest (20%) |
| *Uses:* | Grazing, irrigation |
| *Conversion Practices:* | Water being pumped out to irrigate rice fields. |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, draining, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | A total population of 6,720 use this lake. The total number of households in Lalbhoji VDC is 1,019. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Subsisdence is taking place. |
| *References:* | x |

## 31. Piparawa Tal (पिपरवा ताल)

| | |
|---|---|
| *Situation:* | Piparawa, Ward No. 3, Lalbhoji VDC, 30 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Situated at the village of Piparawa, the Tal is an oxbow lake created by the Mohana river. It does not have inlet nor outlet. Local people, especially Tharus intensively fish in the Tal and people are reclaiming the dried area for rice cultivation. |
| *Location:* | Latitude: 28°26'27.0"N Longitude: 80°58'27.9"E Altitude: 206 m. |
| *Area:* | 40 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No water source and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Lake is surrounded by riverine forest tree species of Jamun (*Syzigium cumini*). Most of its area has been covered by *Ipomoea* sp. Floating species *Nymphaea* is also observed in the water surface. |
| *Importance to Wildlife:* | The wetland supports many species of birds both migratory and resident. They are: *Egretta alba, Ardeola grayii, Phalacrocorax niger, Gallinula chloropus, Porphyrio porphyrio, Dendrocygna javanica, Anas acuta, Anas crecca, Anas platyrhynchus, Anas strepera, Anas clypeata, Nettapus coromandelianus, Ciconia nigra, Ciconia episcopus, Mycteria leucocephala, Pseudibis papillosa*. Seven species of fishes have been reported from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, private land. |
| *Land Use:* | Agriculture (80%), Settlement (10%), Barren Land (10%) |
| *Uses:* | Irrigation, fishing, grazing, fuel source |
| *Conversion Practices:* | Common use of high powered pumpset to extract water. |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, dredging/ draining and filling. |
| *Conservation Plan:* | x |
| *Human Population:* | The VDC which surrounds this Tal has a population of 6,720 and a household of 1,019. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Water level decreasing and vegetation succession. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 32. Sonia Tal (सोनिया ताल)

| | |
|---|---|
| *Situation:* | Dongpur, Ward No. 8, Khailad VDC, 19 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Sonia Tal is situated amidst the dense forest near Dongpur. It has two extensions, one being large and long, while other is small but deep. *Ipomoea* is gradually invading the lake area. |
| *Location:* | Latitude: 28°34'10.5" N Longitude: 80°54'44.5" E Altitude: 203 m. |
| *Area:* | 40 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | Water is retained perennially and the Tal has neither an outlet nor an inlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Lake is surrounded by dense sal forest. Sal associate species found in the lake area are Kusum (*Schleicheria trijuga*), Saj (*Terminalia tomentosa*), Haldu (*Adina cordifolia*), and Bayar (*Zizyphus mauritiana*). The water bodies is supported by free floating species of *Nymphaea*. |
| *Importance to Wildlife:* | Large lake surrounded by dense sal forest support a large number of resident and wintering population of several species of waterfowls. The important birds are: *Egretta alba, Ardeola grayii, Phalacrocorax niger, Gallinula chloropus, Porphyrio porphyrio, Dendrocygna javanica, Anas acuta, Anas crecca, Anas platyrhynchus, Anas strepera, Anas clypeata, Nettapus coromandelianus, Ciconia nigra, Ciconia episcopus, Mycteria leucocephala, Pseudibis papillosa, Alcedo atthis, Pelargopsis capensis*. Five species of fishes have been reported from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government forest |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Fishing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Vegetation succession and siltation. |
| *Conservation Plan:* | x |
| *Human Population:* | Total population and household of the Khalid VDC are 5,734 and 610 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the dense forest and away from settlement. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 33. Ghor Tal (घोर ताल)

| | |
|---|---|
| *Situation:* | Himmatpur, Ward No. 9, Khailad VDC, 15 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The area is covered by shrubs of Dhodia (*Aeschynomene* sp.) and aquatic weeds. Since it is near the rice field, high powered pump sets are used to draw water for irrigation. The area covered by water is decreasing thereby inducing succession of aquatic weeds. |
| *Location:* | Latitude: 28°54'37.1"N Longitude: 80°34'54.1"E Altitude: 200 m. |
| *Area:* | 24 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is surrounded by sal forest. The other associates of sal are Saj (*Terminalia tomentosa*), Jamun (*Syzigium cumini*), Kusum (*Schleicheria trijuga*), and Bayar (*Zizyphus mauritiamia*). The extraction of water from the Tal has turned the lake into dried and marshy areas inducing the growth of *Khekri (Aeschynomene* sp.) weeds. *Khekri* is scattered throughout the marshy areas of the lake. |
| *Importance to Wildlife:* | The important bird species found in this Tal are *Egretta alba, Anas acuta, Dendrocygna javanica, Phalacrocorax niger, Ardeola grayii, Ciconia ciconia, Ciconia nigra, Ciconia episcopus, Pseudibis papillosa, Gallinula chioropus, Porphyrio porphyrio.* The protected species of reptile i.e. *Python molurus* is also reported from the lake. Six species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, government forest, private land |
| *Land Use:* | Open Forest (90%), Agriculture (10%) |
| *Uses:* | Irrigation, fishing, grazing, plant harvest |
| *Conversion Practices:* | Irrigation canal and use of high powered pump set |
| *Threats and Disturbances:* | Monospecific domination, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Khailad VDC which surrounds the Tal has a population of 5,734 and 610 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Massive vegetation succession. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 34. Badka Tal (बडका ताल)

| | |
|---|---|
| *Situation:* | Khurkhuria, Ward No. 1, Chaumala VDC, 10 km east of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is surrounded partly by open forest and partly by agricultural fields. A dirt road that passes through its southern border has worked as barrier to retain water in the lake. The lake is covered with lotus and other aquatic vegetation. |
| *Location:* | Latitude: 28°43'30.7"N Longitude: 80°46'23.5"E Altitude: 215 m. |
| *Area:* | 6 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The Tal has a outlet for an irrigation canal. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by sal forest. The other important associates of sal occuring in the area are Asna (*Terminalia tomentosa*) and Jamun (*Syzigium cumini*). Aquatic species of free floating plants includes *Nymphaea* sp. all over the lake. |
| *Importance to Wildlife:* | The lake supports a small population of resident and wintering population of waterfowls. The important birds are *Egretta alba, Dendrocygna javanica, Anas acuta, Anas crecca, Nettapus coromandelianus, Vanellus indicus, Alcedo atthis, Pelargopsis capensis, Halcyon smyrnensis.* Four species of fish have been reported. |
| *Special Features:* | x |
| *Land Ownership:* | Government forest, agricultural land |
| *Land Use:* | Agriculture (10%), Open Forest (90%) |
| *Uses:* | Fishing, grazing, fodder, fuel source |
| *Conversion Practices:* | Irrigation canal |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | x |
| *Human Population:* | The populaiton of surrounding VDC is 10,492, with 1,647 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because it is still inside the open forest. |
| *References:* | x |

## 35. Louka Bhouka Tal (लौका भौका ताल)

| | |
|---|---|
| *Situation:* | Bijulia, Ward No. 2, Khailad VDC, 24 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is lung-shaped in appearance. In winter, lakes become two and in monsoon due to high water level, become one. It has an earthen dam prepared by villagers to irrigate their rice fields. |
| *Location:* | Latitude: 28°35'04.9" N Longitude: 80°56'30.6" E Altitude: 210 m. |
| *Area:* | 30 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by sal forest. The other important trees are Asna (*Terminalia tomentosa*), and Kusum (*Schlencheria trijuga*). |
| *Importance to Wildlife:* | The lake is a resident, staging and wintering area for waterfowl species. Resident species include *Ardeola grayii, Egretta garzetta, E. intermedia*. Passage migrants and winter visitors include *A. strepera, A. crecca* and some shore birds (*Tringa totanus, T. stagnatilis, T. nebularia* and *T. glareola*) *Ciconia episcopus, C. nigra* are regular visitors. Six species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government owned forest |
| *Land Use:* | Open Forest (100%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Dredging, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The lake lies in Khailad VDC, which has a population of 5,734 and 610 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the open forest and away from the settlement. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 36. Sahadev Tal (शहदेव ताल)

| | |
|---|---|
| *Situation:* | Rampur, Ward No. 4, Urma VDC, 6 km south of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | An earthern dam constructed at the southern end has raised the water level. The tail is three fourths surrounded by forest and one forth by agricultural field. It never dries and is covered by *Nymphaea* and surrounded by *Ipomoea* sp. Locally it is also called Bhutai Tal. |
| *Location:* | Latitude: 28°44'03.7" N Longitude: 80°43'38.0" E Altitude: 223 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | It has only outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by sal forest. The important tree species that occurs in the area are Saj (*Terminalia tomentosa*), Bot Dhayaro (*Lagerstroema parviflora*), Bel (*Aegle marmelos*), Haldu (*Adina cordifolia*) and Kusum (*Schleicheria trijuga*). The shoreline of the lake is covered by *Ipomoea* sp. The water body is covered by water lily (*Nymphaea* sp). |
| *Importance to Wildlife:* | The important birds are *Egretta alba, E. intermedia, Dendrocygna javanica, Anas crecca, Nettapus coromandelianus, Anas acuta, Anas clypeata.* The lake also provide a suitable habitat for turtles. The largest *Chitra chitra* and smallest *Melanochelys tricarianat* are said to be occuring in the lake area. Blind snake *Typhlops brahminus* also occurs in the area. |
| *Special Features:* | The temple of Mahadev situated nearby has enhanced the significance of the area. |
| *Land Ownership:* | Government land, school land |
| *Land Use:* | Open Forest (60%), Dense Forest (10%), Pasture (20%), Settlement (10%). |
| *Uses:* | Irrigation, fishing, grazing, religious value, fodder, domestic use, plant harvest and fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Mostly 7,997 population of Urma VDC use the lake resources. The number of household of the VDC is 845. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Still undisturbed and is in natural condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries,* 2051/52, Central Fisheries Building, Balaju. |

## 37. Mahadev Tal (महादेव ताल)

| | |
|---|---|
| *Situation:* | Rampur, Ward No. 4, Urma VDC, 8 km south of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This is a beautiful lake situated amidst the forest area. The Tal area is covered with lotus and the southern end by *Ipomoea* sp. It has four-finger like extensions. The temple of Mahadev has provided the religious significance to the lake. It has an earthen dam at the southern end. |
| *Location:* | Latitude: 28°44'31.9" N Longitude: 80°42'36.0" E Altitude: 223 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | It has outlet only. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by sal forest. The other important tree species that occurs in the area are Saj (*Terminalia tomentosa*), Bot Dhayaro (*Lagerstroema parviflora*), Bel (*Aegle marmelos*), Haldu (*Adina cardifolia*) and Kusum (*Schleicheria trijuga*). *Nymphaea* is seen scattered throughout the water bodies. The shoreline of the lake is gradually invaded by the successional growth of *Ipomoea* species. |
| *Importance to Wildlife:* | The important birds recorded in the area are *Egretta alba, Egretta intermedia, Anas acuta, Anas crecca, Nettapus coromandelianus, Dendrocygna javanica, Phalacrocorax niger, Ardeola grayii*. The lake serves as a ideal habitat for the marsh crocodile (*Crocodilus palustris*). Two species of fish have been reported from the Tal area. |
| *Special Features:* | The temple of Mahadeva has provided the religious significance to the lake. |
| *Land Ownership:* | Government owned forest land, school compound |
| *Land Use:* | Dense Forest (50%), Open Forest (30%), Pasture (10%), Agriculture (10%) |
| *Uses:* | Irrigation, fishing, grazing, religious value, plant harvest, recreation. The school and Mahadeva Temple are a plus point to the signficiance of the lake. A religious fair is held in the winter season. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | The population of Urma VDC, in which the Tal lies has a populaiton of 7,997, together with 845 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is inside the forest area. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 38. Rupia Tal (रुपिया ताल)

| | |
|---|---|
| *Situation:* | Dongpur, Ward No. 8, Khailad VDC, 19 km south of Sukhad Chourah , Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is in the middle of the dense forest and is covered with *Ipomoea* sp. The level of water goes down in the water. |
| *Location:* | Latitude: 28°34'10.5" N Longitude: 80°53'09.5" E Altitude: 202 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake is surrounded by dense sal forest. The associates of the sal are Asna (*Terminalia tomentosa*), Kusum (*Schleicheria trijuga*) and Bayar (*Zizyphus mauritiana*). *Ipomoea* sp. of aquatic plants is also found in the lake area. |
| *Importance to Wildlife:* | The Tal is of little importance as a staging, and watering area for waterfowl species. The important birds are *Egretta alba, Phalacrocorax carbo, Ardeola grayii.* Three species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government forest |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Fishing, grazing, fodder, plant harvest and fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The Tal is inside the dense forest of Khailad VDC, the population of which is 5,734 and household, 610. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It is in undisturbed condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries,* 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 39. Koilia Tal (कोइलिया ताल)

| | |
|---|---|
| *Situation:* | Koilia, Ward No. 8, Gadariya VDC, 12 km east of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal has a long, about 2 m high earthen dam at the south to retain water in the lake. The Tal is bifurcated into two parts. The eastern part is huge and full of water. The dam is used to divert water into the rice fields. In winter half of the water dries up. |
| *Location:* | Latitude: 25°41'03.7" N Longitude: 80°46'02.3" E Altitude: 202 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | Irrigation canal and an earthen dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Important forest trees found in the lake area are Sal (*Shorea robusta*), Simal (*Bombax ceiba*), Khair (*Acacia catechu*), Saj (*Terminalia tomentosa*), and Haldu (*Adina cordifolia*). The water bodies of the Tal is covered by *Nymphaea* sp. and *Trapa bispinosa*. |
| *Importance to Wildlife:* | The lake serves as a wintering and staging ground for waterfowls. Resident species include *Anhinga melanogaster, Ardeola grayii, Egretta alba, E. intermedia, Porzana fusca, Amaurornis akool, Amaurornis phoenicurus, Metopidius indicus. Falco peregrinus* is a winter visitor. Passage migrants and winter visitors include *Anas acuta*. Five species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Four-fifths Government land, one-fifth private land. |
| *Land Use:* | Open Forest (90%), Agriculture (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest and fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The Tal is situated in Godariya VDC, which has a population of 7,355 and 726 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Still there is not much disturbance. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 40. Puraina Tal, Hasulia (पुरैना ताल, हसुलिया)

| | |
|---|---|
| *Situation:* | Bhadari, Ward No. 2, Hasulia VDC, 7 km west of Hasulia Bazar, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal has two big extensions, covered with water. An earthen dam at the north side helps keep the level of water in the lake. The Tal is surrounded by Tall old sal trees and big pasture land. |
| *Location:* | Latitude: 28°35'03.3" N Longitude: 80°47'03.9" E Altitude: 210 m. |
| *Area:* | 30 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | It has an earthen dam to retain water. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The lake area is surrounded by matured sal forest. The associates of sal such as Asna (*Terminalia tomentosa*), Haldu (*Adina cordifolia* ) and Kusum (*Schleicheria trijuga*) also occurs in the lake area. The shoreline of the Tal is gradually invaded by *Ipomoea* sp. |
| *Importance to Wildlife:* | The lake supports few resident and migratory population of waterfowls. The important birds are *Egretta alba, Dendrocygna javanica, Anas acuta, Anas crecca, Nettapus coromandelianus, Ardeola grayii*. Six species of fish have been reported. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Open Forest (100%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest and fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | People of Hasulia VDC use the lake. The VDC has a total of 1,405 households and 10,638 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. The area is intensively used for pasture. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 41. Sunhara Tal (सुनहरा ताल)

| | |
|---|---|
| *Situation:* | Chhoti Palia, Ward No. 3, Pawera VDC, 3 km south of Hasulia Bazar, Kailai District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is an oxbow lake created by the Mohana river. Because of its cutoff from the river, the level of water has never risen. As a result, the Tal is covered with healthy water hyacinth, *Typha* and *Ipomoea* sp. |
| *Location:* | Latitude: 28°32'03.3" N Longitude: 80°47'51.1" E Altitude: 203 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 6, 10, 11, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | The Tal is cutoff from the Mohana River. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The eastern and southern part of lake area is surrounded by Tropical riverine forest i.e. *Bombax ceiba* trees. *Typha* is grown in marshy area. At the middle of lake, *Ipomoea* sp. has grown prolifically. The water bodies of the lake is increasingly invaded by the *Eichhornia crassipes*. |
| *Importance to Wildlife:* | This oxbow lake supports small resident and migragory population of waterfowls. The important birds are *Egretta alba, Dendrocygna javanica, Anas acuta, Anas crecca, Ardeola grayii, Nettapus coromandelianus*. Three species of fish have been reported from the Tal. The largest turtle *Chitra chitra* is said to occur in the lake area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, surrounded by government land and private lands |
| *Land Use:* | Agriculture (50%), Barren Land (50%) |
| *Uses:* | Fishing, grazing, fodder, domestic use, fuel source |
| *Conversion Practices:* | The shoreline is being converted into rice fields |
| *Threats and Disturbances:* | Pollution, agricultural runoff, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Mainly people of Chhoti Palia use lake resources. However, the population of Hasulia VDC is 10,638 with 1,405 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. The area is near the settlement and heavy vegetation succession. |
| *References:* | x |

## 42. Jugeda Tal (जुगेडा ताल)

| | |
|---|---|
| *Situation:* | Durgabasti, Ward No. 2, Dhangadi Municipality, 7 km east of Dhangadi town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | In Jugeda, there are three lakes within a radius of 500 meters. All these three are called after the name of the place. The middle one is the largest one. The other two lakes are of similar size.. |
| *Location:* | Latitude: 28°40'18.3" N Longitude: 80°38'13.9" E Altitude: 215 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The stagnant shallow water lake is covered by aquatic plant species of *Nymphaea* and *Ipomoea* sp. |
| *Importance to Wildlife:* | The important bird species found in the lake are *Egretta alba, Ardeola grayii, Anas acuta, Anas crecca, Nettapus coromandelianus, Sarkidiornis melanotos, Metopidius indicus, Hydrophasianus chirurgus.* |
| *Special Features:* | There is a temple of Durga Devi. |
| *Land Ownership:* | Government land, private land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Fishing |
| *Conversion Practices:* | Cultivation is extending beyond the shoreline. |
| *Threats and Disturbances:* | Building construction, monospecific domination, pollution, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Dhangadi Municipality has a population of 44,753 and 7,240 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Human encroachment and shallow water. |
| *References:* | x |

## 43. Larbarai Tal (लरबराई ताल)

| | |
|---|---|
| *Situation:* | Prithivinagar, Ward No. 3, Lalbhojhi VDC, 25 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is an oxbow lake created by the Mohana river and is the border for Nepal and India. Half of its belongs to India. From Indian side, cultivation reaches the water level. |
| *Location:* | Latitude: 28°28'05.6" N Longitude: 80°56'41.3" E Altitude: 206 m. |
| *Area:* | 6 ha |
| *Wetland Type:* | 6, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | The Tal has no inlet or outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Riverine forest species such as Dhak (*Butea frondosa*) and Jamun (*Syzigium cumini* ) were seen in the lake area. |
| *Importance to Wildlife:* | Birds of the area include are *Egretta alba, Ardeola grayii, Ciconia nigra, Ciconia episcopus, Pseudibis papillosa, Tringa ochropus, T. hypoleucos, T. nebularia* and *T. totanus*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land in the northside in Nepal and private lands in the southern side in India. |
| *Land Use:* | Agriculture (50%), Pasture (50%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | Cultivation of shore area on the Indian side. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The lake resources are used by Nepali and Indian people. The population of Lalbhojhi VDC in Nepalese side is 6,720 with 1,019 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Despite human pressures the Tal is still in good condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 44. Puraina Tal, Lalbhoji (पुरैना ताल, लालभोजी)

| | |
|---|---|
| *Situation:* | Prithvinagar, Ward No. 3, Lalbhoji VDC, 25 km south of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | |
| *Location:* | Latitude: 28°29'00.7" N Longitude: 80°55'03.2" E Altitude: 206 m |
| *Area:* | 60 ha |
| *Wetland Type:* | 6, 1 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | A large part of the Tal is being reclaimed for cultivation. The remaining water area has *Ipomoea* sp. and other aquatic weads. |
| *Importance to Wildlife:* | This is a foraging ground for birds such as *Egretta alba, Ciconia nigra, Ciconia episcopus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private lands. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Fodder collection, Irrigation |
| *Conversion Practices:* | Agricultural land |
| *Threats and Disturbances:* | Agricultural runoff, draining and siltation |
| *Conservation Plan:* | x |
| *Human Population:* | The site is situated in Lalbhoji VDC, of which population is 6,720 and household 1,019. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Tremendous human pressure for reclamation of shore area. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries,* 2051/52, Central Fisheries Building, Balaju. |

## 45. Gadbhijala Tal (गडभिजला ताल)

| | |
|---|---|
| *Situation:* | Batanpur, Ward No. 1, Dhansinghpur VDC, 14 km south of Tikapur town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is a meander of the Karnali river. It is the biggest of all lakes in Kailali District. It extends north south and is about 3 km long and 1 km wide. But the shape and size of the lake keeps on changing annually and is surrounded by private rice fields. |
| *Location:* | Latitude: 28°40'18.3"N Longitude: 81°03'34.8"E Altitude: 192 m. |
| *Area:* | 300 ha |
| *Wetland Type:* | 6, 10, 11, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | During the rainy season, flood water from the Karnali River covers the area. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Some Jamun (*Syzigium cumini* ) trees representative of Tropical riverine forest are found in the lake area. The Tal is greatly invaded by the *Eichhornia crassipes, Nymphaea* sp., *Ipomoea* sp. and *Phragmitis karka*. Floods from the Karnali River enters the lake, thereby changing the ecological characteristics of the Tal. The occassional flooding of the area threatens the existence of aquatic flora of floodplain areas. |
| *Importance to Wildlife:* | The lake is visited by large variety of waterfowls and often foraging habitat for both resident and migratory birds. The important birds are *Anser indicus, Dendrocygna javanica, Tadorna ferruginea, Anas acuta, A. crecca, A. platyrhynchos, A. strepera, A. clypeata, Nettapus cormandelianus, Porphyrio porphyrio, Gallinula chloropus, Amaurornis phoenicurus, Sarkidiornis melanotos, Mergus merganser, Rostratula benghalensis, Charadrius dubius, Hydrophasianus chirurus, Metopidius indicus, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus*. Eight species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | Government and Private lands |
| *Land Use:* | Agriculture (80%), Pasture (10%), Barren land (10%) |
| *Uses:* | Irrigation, fishing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | Conversion of the area into rice fields. |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Dhansinghpur VDC in which Tal is located has 1,446 households with a populaiton of 8,952. The nearest town Batanpur has a direct access to the lake area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because its ecology is linked to the flood of the Karnali River. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 46. Budi Nakhrodi Tal (बुढी नखरोडी ताल)

| | |
|---|---|
| *Situation:* | Dipnagar, Ward No. 8, Sadepani VDC, 3 km north of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is near rice fields. About three forths of it is surrounded by shrubs and open forest with a group of bush and shrubs in the middle. |
| *Location:* | Latitude: 28°42'06.0"N Longitude: 80°57'33.0E Altitude: 213 m |
| *Area:* | 6 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | It has only outlet for irrigation and excess runoff. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is surrounded by Sal (*Shorea robusta*), Haldu (*Adina cordifolia*), Bot Dhavero (*Lagerstroemia parviflora*), Kusum (*Schleicheria trijuga*), Jamun (*Syzigium cumini*) and Khair (*Acacia catechu*). Some Bainsha (*Salix* sp.) are on the edge and in the middle of the lake on northern side. The aquatic vegetation of the lake includes water lily (*Nymphaea* sp.), cat tail (*Typha* sp.), Narkot (*Phragmitis karka*), Besaram (*Ipomoea* sp.), Bainsha (*Salix* sp.), Singada (*Trapa quadrispinosa*), *Pistia* sp., etc. |
| *Importance to Wildlife:* | The lake is one of the cluster of the large Ghodaghodi lake system. Situated away from the Nakhrodi Tal, the lake supports a small resident, and migratory population of waterfowls. It provides a foraging ground for resident and migratory birds. The important birds are *Sarkidiornis melanotos, Nettapus coremandelianus, Amaurornis phoenicurus, Gallinula chloropus, Porphyrio porphyrio, Halcyon smyrnensis, Pelargopsis capensis, Ichthyoplaga ichthyaetus, Hydrophasianus chirurgus*. The site provides a suitable habitat for smooth otter *Lutrogale perspicillata*. Some water holes serves for wild ungulates and carnivores living near the forest. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, mainly forest and private lands |
| *Land Use:* | Open Forest (50%), Agriculture (25%), Pasture (25%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The people of Sadepani VDC use the resources. The total population is 10,729 and household is 1,537. |
| *Research Works:* | x |
| *Others:* | |
| *Overall Ranking:* | Average. It is still undisturbed. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 47. Singrowa Tal (सिंग्रोआ ताल)

| | |
|---|---|
| *Situation:* | Dipnagar, Ward No. 9, Sadepani VDC, 2 km north of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This lake looks like a ditch of about 5 ha in size. It is in the middle of the open forest. The lake is covered with lotus and reeds. |
| *Location:* | Latitude: 28°40'44.0"N Longitude: 80°58'35.0"E Altitude: 218 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This lake is surrounded by tree species of Sal (*Shorea robusta*), Saj (*Terminalia tomentosa* ) and Kusum (*Schleicheria trijuga*). The aquatic vegetation of the lake includes water lily (*Nymphaea* sp.) and water chestnut (*Trapa bispinosa*). |
| *Importance to Wildlife:* | The wetland supports small resident and migratory population of several species of waterfowls. The important bird species reported are *Phalacrocorax niger, Butorides striatus, Egretta alba*. The lake provides a suitable habitat for smooth coated other (*Lutrogale perspicillata*). Also serves as a water hole for wild carnivores and ungulates. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Open forest (100%) |
| *Uses:* | Fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, dredging/draining |
| *Conservation Plan:* | x |
| *Human Population:* | Sadepani VDC which has a total household of 1,537 and population of 10,729 use the resources of the lake. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. The Tal is inside the open forest. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 48. Godavari River Floodplain(गोदावरी नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Attariya, Ward No. 3, Malakheti VDC, 2 km west of Attariya, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This river floodplain originates from Malakheti VDC and ends in the Mohana river near Geta VDC. Its wide sand flats with tall trees are good refuge for birds. |
| *Location:* | Latitude: 28°48'43.6" N Longitude: 80°32'29.1" E Altitude: 215 m. |
| *Area:* | 2,160 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial water with many tributaries, which dry up in winter. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The riverine floodplain is dominated mainly by the tree species of sal (*Shorea robusta*), Simal (*Bombax ceiba* ) and Khair (*Acacia catechu*). The area also consist of riverine tree species. |
| *Importance to Wildlife:* | The riverine floodplain provide suitable habitat for several species of fish, amphibians, reptiles, birds and mammals. The important bird species are *Ciconia episcopus, Ciconia nigra, Pseudibis papillosa, Phalacrocorax niger, Pelargopsis capensis, Tadorna ferruginea, Vanellus indicus, Vanellus spinosus*. The perennial water attracts several species of waterfowls and wildlife. Serves as watering place for wild ungulates and carnivores. Riverine floodplain also serve as suitable habitat for smooth coated otter (*Lutrogale perspicillata*) and *Turtle* sp. |
| *Special Features:* | x |
| *Land Ownership:* | Private as well as government owned land |
| *Land Use:* | Agriculture (25%), Open Forest (25%), Pasture (20%), Settlement (20%), Dense Forest (10%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, dredging/draining and filling |
| *Conservation Plan:* | x |
| *Human Population:* | The river runs through Geta and Malakheti VDCs. The inhabitants of these VDCs, which total 16,866 with 2,739 huseholds depend on its resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Deforestation and overgrazing in the shoreline. |
| *References:* | x |

## 49. Khairena Khola Floodplain (खैरेना खोला बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Attariya, Ward No. 4, Shreepur VDC, 4 km east of Attariya Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Located only four km from the town of Attariya, this floodplain widens as it flows down south. The flat sands, doons and isles provide good refuge for bird, aquatic animals and wildlife. |
| *Location:* | Latitude: 28°48'46.5" N Longitude: 80°34'57.5" E Altitude: 230 m. |
| *Area:* | 850 ha |
| *Wetland Type:* | 2, 5, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial streams with scattered irrigation channels. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The river floodplain is dominated by Sisoo (*Dalbergia sissoo* ) and Khair (*Acacia catechu* ) trees. Other tree species growing in the floodplain area are Jamun (*Syzigium cumini*), Haldu (*Adina cordifolia*), Bhelar (*Trewia nudiflora*), Sal (*Shorea robusta*) and Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | The floodplain is rich in many species such as fish, amphibians, reptiles, birds and mammals. The important birds are *Ciconia episcopus, Ciconia nigra, Pseudibis papillosa, Pelargopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cinerea, M. maderaspatensis, M. citreola, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyaetus.* It also serves as a suitable habitat for smooth coated otter (*Lutrogale perspicillata*). |
| *Special Features:* | x |
| *Land Ownership:* | Government as well as private lands |
| *Land Use:* | Oepn Forest (40%), Agriculture (25%), Pasture (20%) Barrend Land (15%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Runoff, erosion, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of two VDCs, which depend on its resources have a total population of 17,368 and 2,703 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Human pressure is high. |
| *References:* | x |

## 50. Khutia Khola Floodplain(खुटिया खोला बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Attariya, Ward No. 4, Shreepur VDC, 8 km east of Attariya Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The vast fertile land created by the Khutia Khola is a good breeding and staging ground for birds. The tall Simal trees on the shoreline provides a place for roosting. |
| *Location:* | Latitude: 28°47'44.2" N Longitude: 80°37'57.4" E Altitude: 200 m. |
| *Area:* | 3,625 ha |
| *Wetland Type:* | 5, 2, 4 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial stream |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Khutia Khola includes both Sal forest and riverine forest trees. Tree species of Sisoo (*Dalbergia sissoo* ) and Khair (*Acacia catechu* ) dominates the floodplains. Other important tree species found in the surroundings are Jamun (*Syzigium cumini*), Haldu (*Adina cordifolia*), Bhelar (*Trewia nudiflora*), Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | Many species of fish, amphibians, reptiles, birds and mammals are reported to occur here. It is a suitable habitat for smooth coated otter (*Lutrogale perspicillata*). The river provides an optimal feeding ground for migratory and resident birds. The river is harbouring many species. The important bird species recorded are *Ciconia episcopus, C. nigra, Pseudibis papillosa, Pelargopsis capensis, Phalacrocorax niger, Vanellus indicus, Vanellus spinosus, Motacilla cinerea, M. madraspatensis, M. citreola, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyaetus*. The floodplain attracts the ungulates and carnivores. |
| *Special Features:* | x |
| *Land Ownership:* | Government land as well as private lands |
| *Land Use:* | Open Forest (30%), Pasture (30%), Agriculture (25%), Barren Land (15%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agriculture runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The four VDCs that utilize the stream and its resources have a total population of 77,128 and a total of 11,533 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Heavy human pressure on its shoreline. |
| *References:* | x |

## 51. Shiva Ganga Floodplain (शिव गंगा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Chaumala, Ward No. 9, Chaumala VDC, 4 km west of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The floodplain created by this river widens as three rivers, Chorpani Khola, Amelipani Khola and Baluwakot Khola meet about one km upstream. The tall trees on the ridges provide good shelters to aviafauna. |
| *Location:* | Latitude: 28°47'27.3" N Longitude: 80°41'51.1" E Altitude: 228 m. |
| *Area:* | 3,750 ha |
| *Wetland Type:* | 5, 2, 4 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial rivers with many small streams. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Shivaganga floddplain is surrounded by Sal (*Shorea robusta*), Jamun (*Syzigium cumini*), Bhelar (*Trewia nudiflora*), and Khair (*Acacia catechu*) trees. |
| *Importance to Wildlife:* | The river attracts a good number of ungulates and carnivores, including migrants and resident birds. Many species of fish, amphibians, reptiles, birds and mammals are found here. The common avifauna are: *Ciconia episcopus, C. nigra, Pseudibis papillosa, Perargopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cirerea, M. Moderaspatensis, M. Citreola, Tringa Ochropus, T. hypolencos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyaetus*. Smooth coated otter (*Lutrogale perspicillata*) is believed to occur here. |
| *Special Features:* | x |
| *Land Ownership:* | Government and private lands |
| *Land Use:* | Open Forest (30%), Agriculture (20%), Pasture (20%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, pollution, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total of four VDCs comprising a population of 32,376 and 4,293 households are the people who depend on its resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Human and livestock pressure. |
| *References:* | x |

## 52. Chaumala Khola Floodplain(चौमाला खोला बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Chaumala, Ward No. 2, Chaumala VDC at Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The floodplain begins about 1 km away from the highway upstream.The meandering Khola makes large sand and gravel flats along the shoreline.The tall trees are its special characteristics. |
| *Location:* | Latitude: 28°46'19.4" N Longitude: 80°44'10.9" E Altitude: 220 m. |
| *Area:* | 1,375 ha |
| *Wetland Type:* | 5, 2, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial stream |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The floodplain is characterized by tree species such as Sal (*Shorea robusta*), Jamun (*Syzigium cumini*), Bhelar (*Trewia nudiflora*), Khair (*Acacia catechu*) and Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | The area is a wintering and staging ground for many bird species such as *Ciconia episcopus, C. nigra, Pseudibis papillosa, Perargopsis capensis, Phalacrocorax niger, Vanellus indicus, Vanellus spinosus, Motacilla cinerea, M. Maderaspatensis, M. citreola, Tringa ochropus,T. hydencos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyaetus.* Additionally, smooth coated otter (*Lutrogale perspicillata*) is believed to have occured in the area because it provides a good habitat for them. |
| *Special Features:* | x |
| *Land Ownership:* | Government and private lands |
| *Land Use:* | Agriculture (25%), Open Forest (20%), Dense Forest (25%), Pasture (10%), Settlement (15%), Barren Land (5%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The two VDCs through which the Khola flows has a total population of 18,939 and total households of 2,492. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It has large undisturbed area. |
| *References:* | x |

## 53. Gauri Ganga Floodplain (गौरी गंगा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Chaumala, Ward No. 3, Chaumala VDC, 8 km east of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The river widens its shoreline after the confluence of Mangalpur Khola and Rajipur Khola and eventually meets the Mohana river down south. The wide flatland is, in many ways, good for wildlife and waterfowl. |
| *Location:* | Latitude: 28°45'19.2" N Longitude: 80°45'36.4" E Altitude: 216 m. |
| *Area:* | 6,375 m |
| *Wetland Type:* | 5, 2 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The floodplain of Gauri Ganga is dominated by riverine forest trees, Khair (*Acacia catechu*) and Simal (*Bombax ceiba.*) Other important trees are Sal (*Shorea robusta*), Jamun (*Syzigium cumini*), Haldu (*Adina cordifolia*) and Bhelar (*Trewia nudiflora*). |
| *Importance to Wildlife:* | The river floodplain is a suitable feeding ground for migratory and resident birds, fish, amphibians and reptiles. Bird species reported are *Ciconia episcopus, Ciconia nigra, Pseudibis papillosa, Perargopsis capensis, Phalacrocorax niger, Vanettus indicus, Vanellas spinosus, Motacilla cinerea, M. Maderaspatensis, M. Citreola, Tringa ochropus, T. hypolencos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyactus* are reported here. |
| *Special Features:* | x |
| *Land Ownership:* | Government as well as private lands |
| *Land Use:* | Irrigation, fishing, grazing, domestic use, fodder, fuel source, drinking water |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | This river runs through five VDCs of Kailali District. The inhabitants of these VDCs utilize its resources. Their total population is 48,224 and households, 7,498. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Felling of trees upstream and heavy sedimentation. |
| *References:* | x |

## 54. Lekma River Floodplain (लेक्मा नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Badaipur, Ward No. 3, Masuriya VDC, 7 km east of Chaumala town, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Surmi and Surma rivers meet upstream the highway to form Lekma River, which is known by the name of the Kateni River downstream at Udasipur. |
| *Location:* | Latitude: 28°43'46.9" N Longitude: 80°29'20.0" E Altitude: 205 m. |
| *Area:* | 4,313 ha |
| *Wetland Type:* | 5, 2, 4 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The riverine area is dominated by Simal (*Bombax ceiba*) and Khair (*Acacia catechu* ) trees. |
| *Importance to Wildlife:* | Rih in fauna, this floodplain harbors avifauna, fish, reptiles, amphibians, birds and mammals. The important birds are *Ciconia episcopus, C. nigra. Pseudibis papillosa, Perasgopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cirerea, M. maderaspatensis, M. Citreola,Tringa ochropus, T. hypolencos, T. nebularia, T. totanus, Spilornis cheela, Icthyophaga icthyaetus*. Smooth coated otter (*Lutrogale perspicillata*) is believed to occur. |
| *Special Features:* | x |
| *Land Ownership:* | Government forest land and private land |
| *Land Use:* | Agriculture (20%), Open Forest (30%), Dense Forest (20%), Pasture (15%), Settlement (10%), Barrend Land (5%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Eight VDCs border the river and inhabitants living in these VDCs are the main users of the river and its resources. The total population and households are 55,518 and 6,407 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Sedimentation, driftwood and livestock grazing. |
| *References:* | x |

## 55. Kandra River Floodplain (कन्द्रा नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Pahalmanpur, Ward No. 9, Pahalmanpur VDC, 4 km east of Pahalmanpur, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Three rivers that meet upstream the highway make a meandering Kandra river making huge floodplain and pools along its course. Because of its meandering shape, it has created productive and beautiful flat lands. |
| *Location:* | Latitude: 28°41'54.7" N Longitude: 80°45'14.0" E Altitude: 195 m. |
| *Area:* | 8,500 ha |
| *Wetland Type:* | 5, 2, 4 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The river is surrounded by tree species e.g. Sisoo (*Dalbergia sissoo*), Khair (*Acacia catechu*), Jamun (*Syzigium cumini*), Kusum (*Schleicheria trijuga*), Bhelar (*Trewia nudiflora*), Haldu (*Adina cordifolia*), Sadhan (*Ougenia dalbergioides*), Sal (*Shorea robusta*) and Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | Many bird species are fond here. The commonly reported ones are *Ciconia episcopus, Ciconia nigra, Pseudibis papillosa, Perargopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cirerea, M. Maderaspatensis. M. Citreola, Tringa ochropus, T. hypolencos, T. nebularia, T. totanus, Spilornis cheela, Ichthyophaga icthyaetus*. Along with different species of fish, amphibians, reptiles, birds and mammals, and smooth coated otter (*Lutrogale perspicillata*) are found here. |
| *Special Features:* | x |
| *Land Ownership:* | Private land and government forest land |
| *Land Use:* | Agriculture (25%), Open Forest (40%), Dense Forest (20%), Settlement (10%), Barren Land (5%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | The main users of the river hail from six VDCs, which comprises 43,224 people and 5,584 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Sedimentation and drift wood carrying. |
| *References:* | x |

## 56. Patharaiya River Floodplain (पथरैया नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Gapka, Ward No. 4, Chuha VDC, 3 km west of Chuha village, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The river widens as it goes down south. It becomes torrential in the rainy season and blocks the vehicular movement in the highway. During this time it brings sand and sediment to create more floodplain. |
| *Location:* | Latitude: 28°39'00.4" N Longitude: 80°04'21.1" E Altitude: 202 m. |
| *Area:* | 5,625 ha |
| *Wetland Type:* | 5, 2, 4 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | Trees species of various types such as Sisoo (*Dalbergia sissoo*), Khair (*Acacia catechu*), Jamun (*Syzigium cumini*), Kusum (*Schleicheria trijuga*), Bhelar (*Trewia nudiflora*), Haldu (*Adina cordifolia*), Sadhan (*Ougenia dalbergioides*), Sal (*Shorea robusta*) and Simal (*Bombax ceiba*) are found in riverine floodplain area. |
| *Importance to Wildlife:* | The riparian and aquatic habitats harbour many species of fish, amphibians, birds and mammals. The important bird species are *Ciconia episcopus, C. nigra, Pseudibis papillosa, Pelargopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cirerea, M. maderaspatensis, M. citreola, Tringa ochropus, T. hypoleucos, T. nebularia, T. totanus, Spilronis cheela,* and *Ichthyophaga icthyaetus*. It serves as a good habitat for smooth coated otter (*Lutrogale perspicillata*). |
| *Special Features:* | x |
| *Land Ownership:* | Private land and forest area |
| *Land Use:* | Agriculture (20%), Open Forest (20%), Dense Forest (20%), Pasture (15%), Settlement (15%), Barren Land (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The number of VDCs adjoning the river is 12. The total number of inhabitant who use its resources are 132,369 with a total number of 19,489 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. High erosion and sedimentation. |
| *References:* | x |

## 57. Kanda River Floodplain (काँड़ा नदी बाढ़क्षेत्र)

| | |
|---|---|
| *Situation:* | Muda, Ward No. 4, Dododhara VDC at Muda, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The river meaders along the flatland of Kailali and make a wide and spacious floodplain, suitable for both cultvation of grain and conservation of natural resources. Many small rivers join the Kanda River. |
| *Location:* | Latitude: 28°39'35.9" N Longitude: 80°01'28.8" E Altitude: 196 m. |
| *Area:* | 5,250 |
| *Wetland Type:* | 5, 2 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The riverine floodplains is surrounded by varieties of tree, Sal (*Shorea robusta*), Sisoo (*Dalbergia sissoo* ), Jamun (*Syzigium cumini*), Kusum (*Schleicheria trijuga*), Sadhan (*Ougenia dalbergioides*), Bhelar (*Trewia nudiflora*), Haldu (*Adina cardifolia*), Simal (*Bombax ceiba*) and Khair (*Acacia catechu* ). |
| *Importance to Wildlife:* | The riparian habitats harbor many species of fish, amphibians, reptiles, birds and mammals. No one has carried out the research of these fauna in this river, therefore hard to say the details of the species. The important birds are *Ciconia episcopus, Ciconia nigra, Pseudibis papillosa, Pelargopsis capensis, Phalacrocorax niger, Vanellus indicus, V. spinosus, Motacilla cinerea, M. maderaspatensis, M. citreola, Tringa ochropus, T. nypoleucos, T. nebularia. T. totanus, Spilornis cheela, Ichthyophaga icthyaetus.* It provides optimal feeding ground for migratory and resident birds and smooth coated otter (*Lutrogale perspicillata*). |
| *Special Features:* | x |
| *Land Ownership:* | Government and private land |
| *Land Use:* | Agriculture (30%), Open Forest (30%), Pasture (20%), Settlement (20%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, |
| *Conservation Plan:* | x |
| *Human Population:* | About 79,505 inhabitants of nine VDCs use the resources of the area. These VDCs have a total of 10,791 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Heavy human pressure. |
| *References:* | x |

## 58. Ghodaghodi Tal (घोडाघोडी ताल)

| | |
|---|---|
| *Situation:* | Sukhad, Ward No. 5, Darakh VDC, 1 km west of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | Many of the fingers become disconnected from main waterbody during low water seasons. Needs to be protected from the impact of local pressure. The wetland has a permanent flow.Recently, temple of Ghodaghodi deity has been built with the assistance from local people and District Development Committee. |
| *Location:* | Latitude: 28°41'06.0" N Longitude: 80°56'44.0" E Altitude: 205 m. |
| *Area:* | 138 ha |
| *Wetland Type:* | 6, 12, 13 |
| *Climate:* | Tropical |
| *Hydrology:* | It has an outlet near the road. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The fresh water lake is surrounded by Sal (*Shorea robusta*), Saj (*Terminalia tomentosa*), Dhangero (*Woodfordia fruticosa*), Bot Dhayaro (*Lagerstroemia parviflora*), Sandan (*Ougeinia dalbergioides*), Kumbhi (*Careya arborea*), Haldu (*Adina cordifolia*), Jamun (*Syzigium cumini*), Kusum (*Schleichera trijuga*) and Sisoo (*Dalbergia sissoo* ).<br><br>The aquatic vegetation of the lake include water lily (*Nymphaea* sp.) reeds (*Phragmites karka*), sedges (*Carex aquatilis*), Karaunte grass (*Mariscus* sp.) and water chestnut (*Trapa bispinosa*). |
| *Importance to Wildlife:* | Largest lake system of Kailali, harboring several species of fish, amphibians, reptiles, birds and mammals. According to one study (Baral, 1993), 140 species of birds have been reported, out of which 4 are resident, breed only in lowland. Oriental pied hornbill (*Anthracoceros coronatus*) may breed in the suitable area near the lake. Similarly, smoky warbler (*Phylloscopus fuligivente*), Nepal house martin (*Delichon nipalensis*), grey-hooded warbler (*Seicercus xanthoschistos*) also visits this lake in the winter. Lesser adjutant (*Leptoptilos javanicus*), a threatened bird and oriental darter (*Anhinga melanogaster*) are resident breeder of the lake. Black-bellied tern (*Sterna melanogaster*) which breeds in nearby rivers and ferruginous duck (*Aythya nyroca*) which breeds in north Asia have been reported here. Yellow-watted plover (*Holopterus malabaricus*) and grey-headed plover (*Holopterus cinereus*) have been regularly reported.<br><br>No study has been done on fish, amphibians, reptiles and mammal of Ghodaghodi Tal. According to Baral (1993) much of the fish, amphibians, reptiles are still unidentified. There are some possiblities of sighting of garden lizard (*Calotes versicolor*), rat snake (*Ptyas mucosus*), monitor lizard (*Varanus monitor*), Indian python (*Python molurus*) and marsh mugger (*Crocodylus palustris*) in the lake area.<br><br>*Lutrogale perspicillata* is also thought to occur in the lake area. Suitable habitats for the otter are burrows and many are found near the bank of lake which are covered with fern.<br><br>The lake is an important transient site for migratory species that migrate between Dudwa National Park (India), Royal Suklaphanta Wildlife Reserve and Royal Bardia National Park.<br><br>Resident population of *Nettapus coromandelianus* is about 1 per cent of total Asian populations. It is also wintering area for sizeable number of several species of waterfowls and staging area for many species during migration. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Open Forest (70%), Grassland (15%), Pasture (15%) |
| *Uses:* | Fishing, grazing, religious value, domestic use, fodder |

| | |
|---|---|
| *Conversion Practices:* | Drainage of lake to form pasture areas, slash and burn practices to inhibit trees for pasture and grazing. |
| *Threats and Disturbances:* | Drainage, vegetation succession, defoliation of surrounding ridges and siltation.<br>Building construction, drainage/trash and waste, monospecific domination. |
| *Conservation Plan:* | 1. Possible conservation area under DNPWC.<br>2. IUCN Wetland Demonstration Site under consideration.<br>3. Ministry of Forests and Soil Conservation is preparing a watershed management plan of the area.<br>4. There are some development plans for the area. Now, it is looked after by local groups in partnership with District Development Committee.<br>5. Ghodaghodi Tal Youth Club is involved in conservation of Tal. |
| *Human Population:* | Inhabitants from nearby VDCs use lake resources. Some 7,054 inhabitants of Darakh VDC use the resources of the lake. The VDC has a total of 897 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is in natural and less disturbed condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal.<br>Baral, Hem Sagar. 1992. *Ghodaghodi Lake System: A National Treasure.*<br>Bhandari, Bishnu. 1992. *Preliminary Observation on Ghodaghodi Tal.* |

## 59. Chiraiyo Tal (चिरैयो ताल)

| | |
|---|---|
| *Situation:* | Sukhad, Ward No. 4, Darakh VDC, 3 km north of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal is also locally called Chidiyo Tal. It is in the middle of shrub forest. From its ridge, one can see the valley as well as the lake. |
| *Location:* | Latitude: 28°40'45.6" N Longitude: 80°58'40.9" E Altitude: 209 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 6, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The dominant tree species are Saj (*Terminalia tomentosa*) and Kusum (*Schleichera trijuga*). The aquatic plants seen in the lake area are water lily (*Nymphaea* sp.), Reeds (*Phragmites karka*), Hydrilla (*Hydrilla verticillata*), Azolla (*Azolla* sp.) and water chestnut (*Trapa bispinosa*). |
| *Importance to Wildlife:* | The wetland supports resident, and migratory population of several species of waterfowls. The important bird species reported are *Phalacrocorax niger, Butorides striatus, Egretta alba*. The Tal provide a suitable habitat for smooth coated otter (*Lutrogale perspicillata*). Also it serves as a water hole for wild carnivores and ungulates. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is a government land, three-forths of the area is surrounded by government forest and one-forth in the east, surrounded by prvately owned cultivated lands. |
| *Land Use:* | Open Forest (100%) |
| *Uses:* | Fishing, plant harvest, recreation |
| *Conversion Practices:* | None |
| *Threats and Disturbances:* | Monospecific domination |
| *Conservation Plan:* | x |
| *Human Population:* | About 7,054 inhabitants of Darakh VDC use lake resources. The VDC has 897 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because it is still in undisturbed condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 60. Nakhrodi Tal (नखरोडी ताल)

| | |
|---|---|
| *Situation:* | Sukhad, Ward No. 8, Sadepani VDC, 3 km north of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is in the middle of the forest. It has island in the middle. Dam could be used to raise water level by 1.5 m which would increase surface area, lake viability and irrigation in dry season. It is separated from Ghodaghodi Tal by a ridge of forest. |
| *Location:* | Latitude: 28°42'06.0" N Longitude: 80°57'33.0" E Altitude: 205 m. |
| *Area:* | 70 ha |
| *Wetland Type:* | 8 |
| *Climate:* | Tropical |
| *Hydrology:* | There is a perennial inlet to the lake with a sluice gate for irrigation. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The Tal is surrounded by varieties of vegetations e.g. Sal (*Shorea robusta*), Jamun (*Syzigium cumini*), Kusum (*Schleichera trijuga*), Bot Dhayero (*Langerstroemia parviflora*), Haldu (*Adina cardifolia*), Khair (*Acacia catechu*). Aquatic plants seen in the lake are Water lily (*Nymphaea* sp.), Narkat (*Phragmites karka*), Sedges (*Carex aquatilis*), Karaunte grsss (*Mariscus* sp.), Cattail (*Typha* sp.), Besharma (*Ipomoea fistulosa*), *Salix* sp and *Trapa bispinosa*. |
| *Importance to Wildlife:* | The lake is one of the clusters of the large lake system i.e. Ghodaghodi situated a little distance from the Ghodaghodi Tal.There has been much similarities in fauna and their ecology between this lake and Ghodaghodi. Nakhrodi Tal is the regular breeding site for rare and localised Gray-headed fishing Eagle (*Ichthyophaga ichthyaetus*) and possibly the only place in Nepal where now rare comb duck (*Sarllidiornis melanotos*) may still breed (Baral, 1993). Five species of fish have been recorded from here.<br><br>Wintering area for several species of waterfowl, the lake provides a staging area for many waterfowl during their migration. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is owned by the Department of Forests |
| *Land Use:* | Open Forest (80%), Grassland (10%), Pasture (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Vegetational succession threatens open water and waterfowl habitat. |
| *Conservation Plan:* | x |
| *Human Population:* | The Tal lies in Sadepani VDC, whose populaiton is 10,729 and household 1,573. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Because it is in undisturbed condition and is away from settlement. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br><br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 61. Ojhuwa Tal, Darakh (ओझुवा ताल, दरख)

| | |
|---|---|
| *Situation:* | Sukhad, Ward No. 5, Darakh VDC, 1 km west of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal is situated near the Ghodaghodi Tal and is elongated in shape. The area is covered with lotus. |
| *Location:* | Latitude: 28°41'06.6" N Longitude: 80°56'50.4" E Altitude: 193 m. |
| *Area:* | 6 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has an inlet and dries in the winter season. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | Important forest trees includes Sal (*Shorea robusta*), Saj (*Terminalia tomenlosa*), Dhanyaro (*Woodfordia fruticosa*), Bot Dhanyaro (*Lagerstroemia parviflora*), Sadan (*Ougeninia dalbergioides*), Kumblin (*Careya arborea*), Haldu (*Adina cordifolia*), Jamun (*Syzigium cumini*), Kusum (*Schleichera trijuga*) and Sisoo (*Dalbergia sissoo*). Aquatic vegetation incudes water lily (*Nymphaea* sp.), Reeds (*Phroamites karka*), Sedge (*Carex aquatilis*) and Karaunte grass (*Mariscus* sp.). |
| *Importance to Wildlife:* | This lake is important for resident and wintering population of sizeable numbers of waterfowls and provide a staging area for many species during their migration. Important bird species recorded are *Phylloscopus* sp., *Anhinga melanogaster, Sterna acuticauda, Anthracoceros cornonatus.* Seven species of fish have been reported from the Tal area. Among the seven species *Acrossocheilus hexagonolepsis* is the endangered fish species. Ojhuwa Tal is also a cluster of the large lake system i.e. Ghodaghodi Tal. Much similarities in ecology, vegetation and fauna with that of Ghodaghodi Tal. Being a small cluster, it has a national significance for the conservation of biodiversity. |
| *Special Features:* | x |
| *Land Ownership:* | Government owned forest. |
| *Land Use:* | Open Forest (70%), Pasture (20%), Grass Land (10%) |
| *Uses:* | Fishing, grazing, fodder, fuel source |
| *Conversion Practices:* | Draining into Ghodaghodi Tal for fishing. |
| *Threats and Disturbances:* | Draining, succession |
| *Conservation Plan:* | x |
| *Human Population:* | The inhabitants of Darakh VDC which totals 8,054 with 897 households use the area and its resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Not much impact of human pressure is seen. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 62. Bainshawa Tal (बैंशहवा ताल)

| | |
|---|---|
| *Situation:* | Sukhad, Ward No. 5, Darakh VDC, 3 km north of Sukhad Chourah, Kailali District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is a part of the bigger Ghodaghodi Tal area. It is seperated by Ghodaghodi Tal by a ridge of forest. |
| *Location:* | Latitude: 28°41'54.0" N Longitude: 80°57'04.6" E Altitude: 203 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 13, 12, 6 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet, nor outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The important tree species are Sal (*Shorea robusta*), Jamun (*Syzigium cumini*), Kusum (*Schleichera trijuga*), Bot Dhagero (*Lagorspoemia parviflora*), Haldu (*Adina cardifolia*) and Khair (*Acacia catechu*). The aquatic vegetation of the lake includes water lily (*Nymphaea* sps.), reeds (*Phragmites karka*), sedges (*Carex aquatilis*), and Karaunte grass (*Mariscus* sp.). |
| *Importance to Wildlife:* | The Bainshawa Tal is one of the clusters of the large lake system (situated close to the large Ghodaghodi lake). The wetland is a resident, staging and wintering area for a large number of waterfowl species. The observed bird species is *Hydrophasianus chirurgus*.<br>Four species of fish have been recorded from the Tal area.<br>There is similarities in landscape, physiography, vegetation, fauna and ecology of the lake system with that of Ghodaghodi lake system. Being a small cluster, situated a little far from Ghodaghodi Tal, it has a national significance for the conservation of biodiversity. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is a government land under the control of the Department of Forest. |
| *Land Use:* | Open Forest (80%), Pasture (20%) |
| *Uses:* | Fishing, grazing, plant harvest, fuel source. |
| *Conversion Practices:* | None |
| *Threats and Disturbances:* | Due to shallow nature and large macrophyte density succession is the greatest threat. |
| *Conservation Plan:* | x |
| *Human Population:* | The populaiton of Darakh VDC is 7,054 and household, 897. They are the main users of the lake and its resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is fairly in good condition. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju.<br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 63. Tara Tal, Bardia (तारा ताल, बर्दिया)

| | |
|---|---|
| *Situation:* | Shukrabasti, Ward No. 1, Tara Tal VDC, 15 km south west of Gularia, the district headquarters, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The lake is under a grove of mixed trees including Bael (*Aegle marmelos*) and Pipal (*Picus religiosa*). A temple of Mahadev on the northern end has enhanced the religious values of the Tal. The Tal is square in shape. |
| *Location:* | Latitude: 28°17'00.8" N Longitude: 81°14'52.1" E Altitude: 219 m. |
| *Area:* | 3 ha |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | Water comes from natural springs. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The important trees found in the Tal area are Sal (*Shorea robusta*), Saj (*Terminalia tomentosa*), Harro (*Terminalia chebula*), Kusum (*Schleichera trijuga*), Pipal (*Ficus religiosa*) and Bel (*Aegle marmelos*). |
| *Importance to Wildlife:* | The Tal has very little importance to the waterfowls and wildlife. The observed birds are *Egretta alba, Ardeola grayii* and *Phalacrocorax carbo*. Two species of fish have been reported from this lake. |
| *Special Features:* | Temple of Mahadev enhanced the religous value of the Tal. |
| *Land Ownership:* | Government land but surrounded by private lands |
| *Land Use:* | Agriculure (100%) |
| *Uses:* | Fishing, religous value. |
| *Conversion Practices:* | Because of raised shoreline and religious significance, no conservsion practices are under way. |
| *Threats and Disturbances:* | Filling, pollution |
| *Conservation Plan:* | x |
| *Human Population:* | Many people including the inhabitants of Tara Tal VDC visit the temple of Mahadev on religius days. The population and households of the VDC are 5,558 and 718 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Surrounded by and close to dense settlement. |
| *References:* | x |

## 64. Bhagairia Tal (भगैरिया ताल)

| | |
|---|---|
| *Situation:* | Bhagairia, Ward No. 9, Dhodhari VDC, 2 km west of Kothiaghat, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is an oxbow lake lying partly in India and partly in Nepal. The water is covered with water hyacinth and the shoreline by *Ipomoea* sp. It used to be a huge lake but has been drying out overtime since there is no inflow from the Karnali River. |
| *Location:* | Latitude: x Longitude: x Altitude: 190 m. |
| *Area:* | 12 ha |
| *Wetland Type:* | 6, 10, 11 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet, nor outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The lake is surrounded by riverine forest tree species of Khair (*Acacia catechu*), Simal (*Bombax ceiba*), Jamun (*Syzigium cumini*) and Sisoo (*Dalbergia sissoo* ) trees. The Tal area is gradually turned into grassland due to vegetational succession. The lake is greatly invaded by water hyacinth (*Eichhornia crassipes*), Besharam (*Ipomoea* sp.), Kush (*Vetiveria lawsonii* ) and Siru (*Imperata cylindrica*). Shoreline is covered by *Eichhornia crassipes* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | This oxbow lake supports a sizeable number of resident and migratory population of waterfowls. The important birds are *Phalacrocorax carbo, Egretta alba, Anas acuta, Anas crecca, Anas platyrhynchus, Anas clypeata, Dendrocygna javanica, Ardeola striatus, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Ciconia ciconia, Mycteria leucocephala, Pelargopsis capensis, Halcyon smyrnensis* and *Alledo atthis*. |
| *Special Features:* | x |
| *Land Ownership:* | Both government as well as private lands |
| *Land Use:* | Agriculture (40%), Grass Land (20%), Pasture (30%), Barren Land (10%) |
| *Uses:* | Irrigation, grazing |
| *Conversion Practices:* | Rice cultivation is expanding in the western side of lake. |
| *Threats and Disturbances:* | Monospecific domination, pollution, agricultural runoff, draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The inhabitants of Dhodhari VDC are the main users and their total number is 10,568 and households 1,810. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Vegetation succession. |
| *References:* | Inland Water Fisheries Programme. 1996. *Survey Report of Inland Water Fisheries*, 2051/52, Central Fisheries Building, Balaju. |

## 65. Kaurahi River Floodplain (कौराही नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Royal Bardia National Park, Thakurdwara VDC, 17 km west of Bhuri Gaon, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The river flows by the side of the Park Headquarters. It has a clean water and serves as watering place for wild animals. Its forested swamp and trees provide an excellent refuge for birds, mammals and amphibians. The river also provides irrigation canal to the village and joins the Geruwa river. |
| *Location:* | Latitude: x Longitude: x Altitude: 210 m. |
| *Area:* | 375 ha |
| *Wetland Type:* | 2, 5, 10, 17, 18 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important tree species found in the riverine area are Simal (*Bombax ceiba*), Gular (*Ficus glomerata*), Haldu (*Adina cardifolia*), Bhelar (*Trewia nudiflora*), Khair (*Acacia Catechu*), and Jamun (*Syzigium cumini*). |
| *Importance to Wildlife:* | This river harbours important resident and migratory birds e.g. *Mycteria leucocephala, Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papillosa, Tadorna ferruginea, Anhinga melanogaster, Nycticorax nycticorax, Tringa nebularia. T. totanus, Rostratula benghalensis, Halcyon pileata, Motacilla citreola, M. cinerea, M. maderaspatensis, Phalacrocorax carbo, P. niger. Halcyon pileata* is the newly recorded bird of Bardia National Park. Two types of turtles have been found in the area such as *Chitra chitra* and *Melanochelys tricarianata*. The water serves as a watering place for wildlife e.g. *Cervus duvauceli, Axis axis, Boselaphus tragocamelus, Axis porcinus, Panthera tigris* and *Elephas maximus*. |
| *Special Features:* | It is inside the protected area. |
| *Land Ownership:* | Royal Bardia National Park (RBNP) |
| *Land Use:* | Dense Forest (80%), Grassland (20%) |
| *Uses:* | Irrigation, thatch grasses |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | RBNP has developed a management plan of the protected area. |
| *Human Population:* | Before it meet the Geruwa River, this Karnali distributory adjoins three VDC's, the population of which is 20,461 and 2,597 households. |
| *Research Works:* | KMTNC and WWF Nepal are doing conservaiton works there. |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Because it is inside the protected area. |
| *References:* | Upreti B.N. *Royal Bardia National Park* Nepal: NPC/IUCN-The World Conservation Union. |

## 66. Aurahi River Floodplain (औराही नदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Ambasa, Ward No. 2, Shivpur VDC, 6 km west of Bhuri Gaon, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The river makes a big flat plain as it advances meandering south. In rainy season, it becomes torrential and is difficult to cross it on foot or by vehicle. In winter it dries near the highway but water leaches down at south, where ferry is required to cross it. |
| *Location:* | Latitude: x Longitude: x Altitude: 217 m. |
| *Area:* | 375 ha |
| *Wetland Type:* | 5, 2 |
| *Climate:* | Tropical |
| *Hydrology:* | In the summer season, water dries out. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important tree species occuring in the area are Simal (*Bombax ceiba*), Gular (*Ficus glomerata*), Haldu (*Adina cordifolia*), Bhelar (*Trewia nudiflora*), Khair (*Acacia catechu*) and Jamun (*Syzigium cumini*). |
| *Importance to Wildlife:* | Though smaller than Geruwa and Babai, it supports important resident and migratory bird species e.g. *Mycteria leucocephala,Ciconia ciconia, Anastomus oscitans, Ciconia episcopus, Pseudibis papilloa, Todorna ferruginea, Anhinga melanogaster, Nycticorax nycticorax, Tringa nebularia, T. totanus, Rostratula benghalensis, Halcyon pileata, Motacilla citreola, M. cinerea, M. maderaspatensis, Phalacrocorax carbo, P. niger. Haleyon pileata* is the newly recorded bird of Bardia National Park.<br>Two types of turtles have been found in the area such as *Chitra chitra* and *Melanochelys tricarianata*.<br>The river serves as a watering hole for wildlife e.g. *Cervus duvauceli, Axis axis, Boselaphus tragocamelus, Axis porcinus, Panthera tigris* and *Elephas maximus*. |
| *Special Features:* | x |
| *Land Ownership:* | Government and private lands |
| *Land Use:* | Agriculture (40%), Open Forest (15%), Dense Forest (30%), Pasture (10%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of VDCs along the river area is 31,403, with a total household of 3,978. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Tremendous anthropogenic pressures. |
| *References:* | Upreti B.N. *Royal Bardia National Park* Nepal: NPC/IUCN-The World Conservation Union. |

## 67. Badhaiya Tal (बदैया ताल)

| | |
|---|---|
| *Situation:* | Badhaiya, Ward No. 1, Sorhawa VDC, 5 km south of Bansgadhi, Bardia District. |
| *Development Region:* | Mid–Western |
| *Physiography:* | Terai |
| *Overview:* | The lake covers a huge area spreding east-west. It is all surrounded by agricultural land. There is an intensive human pressure as well as rampant hunting.The area could be used as an oasis in the dry, lowland of mid-western region. Presently, the lake has been leased out to a contractor by the Bardia District Development Committee. |
| *Location:* | Latitude: 28°12'08.2" N Longitude: 81°30'34.9" E Altitude: 197 m. |
| *Area:* | 105 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No water source. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The aquatic vegetations which are common in the Tal are water lily (*Nymphaea* sp.), Besharam (*Ipomoea fistulosa*), Makhan (*Euryale ferox*), Hydrilla (*Hydrilla* sp.), Azolla (*Azolla* sp.), Kanthakari (*Solanum xanthocarpum*) and Fern (*Dryopetris* sp.). |
| *Importance to Wildlife:* | The lake is visited by a large variety of waterfowls and offers excellent foraging habitat for both resident and migratory species. The important birds are *Ardea cinerea, Egretta alba, E. intermedia, E. garzetta, Alcedo atthis, Porphyrio porphyrio, Nettapus coromandelianus, Dendrocygna javanica. Anastomus oscitans, Tandorna ferruginea, Anas penelope. A. strepera, A. acuta, A. clypeata, Caladris temminckii, Gallinago gallinago, G. stenura, Limosa limosa, Tringa totanus, T. stagnatilis, T. glareola, Mycteria leucocephala, Ciconia episcopus, Platalea leucophala, Pandion haliaetus* and *Grus antigone*. The lake harbours a small population of *Lutrogale perspicillata*. The soft shell turtle sp. *Aspidertes gongetius* is said to be occuring in the Tal area. Four species of fish have been reported from the Tal. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is owned by the District Development Committee of Bardia. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, grazing domestic use, aquaculture, plant harvest |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Wetlands maintained for fishing, microphytes removed to keep water area open. Monospecific domination. Overfishing by contractor. |
| *Conservation Plan:* | x |
| *Human Population:* | The population of the two adjoining VDCs are 15,771 and households, 2,407. |
| *Research Works:* | x |
| *Others:* | Overfishing by the contractor. The contractor catches tonnes of fish in a year. |
| *Overall Ranking:* | Fair. Large wetland, important for waterfowl, but, highly disturbed. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 68. Karnali Floodplain (कर्णाली बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Chisapani, Ward No. 4, Baliya VDC at Chisapani near the Karnali bridge, Bardia District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The floodplain is a flat fertile land bordering Royal Bardia National Park in east and part of the Karnali in west. The river bifurcates into the Geruwa and the Karnali about 3 km from the birdge site and makes an island of 10 VDCs of Bardia District. |
| *Location:* | Latitude: 28°37'59.8" N Longitude: 81°16'20.9" E Altitude: 227 m. |
| *Area:* | 15,625 ha. |
| *Wetland Type:* | 2, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial and one of three big river ystem in Nepal. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | On the floodplains, patches of grassland and riverine forest predominates. The tree species such as *Ficus glomerata, Eugenia jambolana* and *Mallotus philippinensis* were seen in the riverine forest. The floodplain grasslands consist of *Saccharum spontanoum - Tamarix dioica, Eryanthus ravennae, Arundo donax, Phragmitis karka, Vetiveria zizanoides.* Interspersed in the grassland are tree species such as Sisoo (*Dalbergia sissoo*), Khair (*Acacia catechu*) and Simal (*Bombax ceiba*), especially on the mid-river gravel island and on the sand bank of the Karnali river. |
| *Importance to Wildlife:* | The floodplain community i.e. *Saccharum spontaneurum - Tamarix dioica* is serving suitable habitat for greater one horned rhinoceros (*Rhinoceros unicornis*) and hog deer (*Axis porcinus*). The Savannah grassland and riverine forest are important habitat for ungulate as well as for predator species (Upreti, 1994). |

The waters of Karnali emerge from the narrow gorge at Chisapani, fan out over a gentle slope and enventually slows down to a sluggish pace on the plains. A couple of miles downriver of the gorge it branches out into two main channels or distributaries – Karnali to the west and Geruwa to the east, which endorse large and small island of sand and gravel. Here Sisoo (*Dalbergia sissoo*), Khair (*Acacia catechu* ) and Simal (*Bombax ceiba* ) flourish. Such an assortment of trees is common on all riverine sites, these islands are the favorite place for Nilgai, the subcontinent's largest antelope.

On the river we may see many species of birds - duck, heron, gull, tern, kingfisher, cormorant and osprey; and perhaps rhesus monkey (*Macaca mulatta*), Langur (*Semnopithecus entellus*), Nilgai (*Boselaphus tragocamelus*) and Otter (*Lutrogale perspicillata*). Also we may glimpse the Gangetic dolphin.

If the rhinos introduced here in early 1986 flourish, they are then likely to become Bardia's star attraction. Predator of Bardia also include hyena, wild dog, jackal, the large and the small Indian civet, mongoose, python, mugger and gharial. The tall grass also harbours some hispid hare, believed until recently to have become extinct. Over 350 species of birds have been reported. *Halcyon pileata* (black capped kingfisher) is the newly recorded characteristic avian fauna of this region.

Royal Bardia National Park is the largest and most pristine wilderness areas in Terai and is known to be one of the most picturesque and relatively unexplored parks in Asia. The park provides an excellent habitat for the endangered animals like rhinoceros, Asiatic elephant, bluebull, swamp deer, black buck, Gangetic dolphin, Royal Bengal tiger, Asiatic wild dog, gharial, marsh crocodile and more than 350 species of birds.

The endangered fish species *Tor putitora* (Mahasheer) is found in the Karnali river.

| | |
|---|---|
| | The team identified only two species of turtles among the three.They are largest softshelled turtle Badhar (*Chitra chitra*) and smallest Thotori (*Melanochelys tricarianata*). |
| *Special Features:* | x |
| *Land Ownership:* | The floodplain owned by the government, partly owned by the DNPWC, partly by DFO and is also surrounded by private lands. |
| *Land Use:* | Agriculture (20%), Open forest (20%), Dense forest (60%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, rafting |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Road construction, building construction, filling, monospecific domination (sedimentation) |
| *Conservation Plan:* | Management Plan of the RBNP. The proposed Karnali Multipurpose Project. |
| *Human Population:* | The floodplain covers five VDCs of Kailali and 14 VDC of Bardia Districts and the total population is 95,701 with 12,449 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because of RCNP, the east of the river is undistrubed. |
| *References:* | Scott, 1989. A Directory of Asian Wetlands. Malaysia, AWB. |
| | Himalayan Power Consultant, 1992. Karnali (Chisapani)Multipurpose Project Nepal:HMG/Ministry of Water Resources |
| | Upreti,B.N., 1994. Royal Bardia National Park, Kathmandu:NCS Implementation Project. |
| | Scott, D.A. (Ed). 1989. A Directory of Asian Wetlands. Gland, Switzerland: IUCN–The World Conservation Union, WWF, and IWRB. |

## 69. Babai Floodplain (बबई बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bhurigaon, Ward No. 9, Bhurigaon VDC, 5 km west of Bhurigaon, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The site has sluice gate at the highway to provide water to Babai Irrigation Canal. Good sand flats and banks are good for crocodiles. It covers a large area of watershed in Bardia. |
| *Location:* | Latitude: 28°22'46.9" N Longitude: 80°25'26.3" E Altitude: 235 m. |
| *Area:* | 12,812 ha |
| *Wetland Type:* | 10, 5, 2 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river with a dam on the Mahendra Highway. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | Babai floodplain, though smaller in size than in Karnali, there has been similarities in ecosystem and vegetation type. The riverine forest comprises tree species such as *Ficus glomerata, Eugenia jambolana Tamarix dioica* and *Mallotus philippinensis*. Grasses such as *Saccharum spontanoum, Eryanthas ravennac, Arundo donax, Phragmitis karka, Vetiveria lawsonii* are dominated in the floodplain areas. The other tree species occuring in floodplain community are Sisoo (*Dalbergia sissoo*), Khair (*Acacia catechu*) and Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | The Babai river valley is one of the most scenic river valley of the world which provides most favourite habitat for the greater one horned rhinoceros, asiatic wild dog, asiatic elephant, swamp deer and several other mammals and birds.<br><br>The Babai river attract a large number of migratory waterfowls. Black capped kingfisher (*Halcyon pileata*) is the newly recorded bird in this area. Much of the park is drained by Babai which courses down the Siwalik range from its numerous seasonal and perennial tributories. The reserve was known to contain indigenous Terai fauna, which included Asiatic elephant (*Elephas maximus*), tiger (*Panthera tigris*), Gangetic dolphin (*Platanista gangetica*), swamp deer (*Cervus duvauceli*), and Asiatic wild dog (*Cuon alpinus*) and more than 350 species of birds. After the inclusion of the Babai River Valley in RBNP in 1988 Bardia (area 986 $km^2$) became the only park in Nepal large enough to accomodate the translocation of mammals like rhinos.<br><br>To avoid the consequence of any stochastic event to Nepal's only rhino population in Chitwan, 38 rhinos were translocated to the Babai Valley (Habitat Himalaya, 1994). Today, this park is the only representation of the Terai and Churia hills combined with certain 'forests with site fragility'.<br><br>In the Babai River we may also see gharial or mugger crocodile. Their population is encouraging. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, partially surrounded by private lands. |
| *Land Use:* | Agriculture (10%), Grassland (20%), Open Forest (20%), Pasture (20%), Dense Forest (30%). |
| *Uses:* | Recreation, thatch grass collection. |
| *Conversion Practices:* | Irrigation canal. |
| *Threats and Disturbances:* | Agricultural runoff, siltation and sedimentation, overfihsing and overgrazing. |
| *Conservation Plan:* | The conservation measures have been taken within the Royal Bardia National Park. There are some development plans for the area. Recently, completed Babai Irrigation Canal has a command area of 10,000 ha. |
| *Human Population:* | The Babai River passes through nine VDCs of Bardia District. The population of these adjoining VDCs is 83,604 and household 12,324. |

| | |
|---|---|
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. |
| *References:* | Upreti, B.N. 1994. Royal Bardia National Park, Kathmandu, Nepal: NCS Implementation Programme. |
| | Himalayan Power Consultant, 1992. Karnali (Chisapani) Multipurpose Project Nepal:HMG/Ministry of Water Resources |
| | Habitat himalaya, Resources Nepal Newsfile, January-February, Vol. 1, No. 1, Edited by Pralad Yonzon. |

## 70. Bathuwa Ghol (बथुवा घोल)

| | |
|---|---|
| *Situation:* | Bathuwa, Ward No. 2, Motipur VDC, 5 km north of Bansgadhi, Bardia District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The wetland has no permanent inflow, outflow or dam. About 20 years ago, water was drained out to cultivate grains.The eastern lake used to be Baluwa Tal and the western one, Bathuwa Tal. |
| *Location:* | Latitude: x Longitude: x Altitude: 212 m. |
| *Area:* | 25 ha |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Only some aquatic weeds. |
| *Importance to Wildlife:* | Lake area is converted into agricultural land. |
| *Special Features:* | |
| *Land Ownership:* | Privately owned lands surrounded by private lands. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Rice and vegetable growing |
| *Conversion Practices:* | Converted into rice fields. |
| *Threats and Disturbances:* | Agricultural runoff, pollution |
| *Conservation Plan:* | x |
| *Human Population:* | About 100 households of Motipur VDC own the land amidst the population of 14,760 and 2,151 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Degradation of environment is rapidly taking place. |
| *References:* | x |

## 71. Khasre Tal (खस्रे ताल)

| | |
|---|---|
| *Situation:* | Gyabar, Ward No. 5, Khaskusma VDC, 14 km east of Kusum town, Banke District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | At present the river has changed its course and the floodplian has created an oxbow lake, Khasre. This is an oxbow lake formed by the Rapti River a few generations ago.Still there are two other lakes.The smallest one is at the verge of subsisdence. It is situated in the middle of forests. It was reported that crocodiles are found. |
| *Location:* | Latitude: x Longitude: x Altitude: 260 m. |
| *Area:* | 7 ha |
| *Wetland Type:* | 7, 10, 17, 18 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet, nor outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is surrounded by tree such as Gular (*Ficus glomerata*), Khair (*Acacia catechu* ) and Sindhure (*Mallotus philippinensis*). The aquatic vegetation are Reeds (*Phragmitis karka*) and Bainsha (*Salix* sps.). Some of the *Salix* trees are growing in the middle and shoreline of the Tal on south western side, which shows a typical characteristic of the lake. This lake differs from other lake system of Nepal. *Phragmites karka* are seen in the middle of the water, which seems to be changing into grassland due to vegetational succession. |
| *Importance to Wildlife:* | Situated in the floodplain of Rapti river, it is rich in biodiversity. The lake supports a small resident and wintering population of several species of waterfowls. The important birds are *Egretta alba, Phalacrocorax niger, Halcyon smyrnensis, Pelargopsis capensis, Vanellus indicus, Vanellus spinosus, Tadorna ferruginea, Anas acuta, Dendrocygna javanica, Ardeola grayii, Anas crecca, Nettapus coromandelianus.*<br>The lake harbours some population of marsh crocodile *Crocodilus palustris*. Also, it provides suitable habitat for smooth coated otter *Lutrogale perspicillata.* |
| *Special Features:* | x |
| *Land Ownership:* | Government forest |
| *Land Use:* | Grassland (30%), Open Forest (20%), Dense Forest (30%), Pasture (20%) |
| *Uses:* | Fishing, grazing, domestic use, plant harvest, fuel source. |
| *Conversion Practices:* | Natural sedimentation and siltation |
| *Threats and Disturbances:* | Draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | 3,839 inhabitants of Khaskusma VDC use the lake resources. It has 658 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Inside the forest, across the Rapti River in an isolated place. |
| *References:* | x |

## 72. Man Khola (मान खोला)

| | |
|---|---|
| *Situation:* | Godari, Ward No. 2, Titihiriya VDC, 10 km west of Kohalpur, Banke District. |
| *Development Region:* | Mid-Western |
| *Physiography:* | Terai |
| *Overview:* | The river originates from the hills of the Churiya range and collects water from various seasonal and permanent rivers. The river widens and meanders as it proceeds south and creates a big floodplain. |
| *Location:* | Latitude: x Longitude: x Altitude: 213 m. |
| *Area:* | 2,125 ha |
| *Wetland Type:* | 5, 2 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial water source. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The riverine area is characterized with wetland vegetation such as Sal (*Shorea robusta*), Sisso (*Dalbergia sissoo*), Khair (*Acacia catechu*), and Simal (*Bombax ceiba*). |
| *Importance to Wildlife:* | The area is a suitable habitat for resident and migratory birds. |
| *Special Features:* | x |
| *Land Ownership:* | Government and private land ownership |
| *Land Use:* | Agriculture (40%), Open Forest (15%), Pasture (20%), Grassland (15%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | Encroachment for grazing, reclamation of floodplain. |
| *Threats and Disturbances:* | Agricultural runoff, draining, filling and sedimentation. |
| *Conservation Plan:* | x |
| *Human Population:* | The Khola passes through three VDCs of Banke District and seven of Bardia District and comprises 7,275 households with 43,218 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Due to growing encroachment and reclamation of floodplain. |
| *References:* | x |

## 73. Kanti Pokhari (कान्ति पोखरी)

| | |
|---|---|
| *Situation:* | Naharpur, Ward No. 2, Puraini VDC, 3 km from Nepalganj, Banke District. |
| *Development Region:* | Mid Western |
| *Physiography:* | Terai |
| *Overview:* | The pokhari, which lies in the VDC's of Puraini and Puraina of Banke district is primarily used for aquacultural purposes. Due to its large water area, it provides a good habitat for avifauna. |
| *Location:* | Latitude: 28°03'42.6" N Longitude: 81°39'11.3" E Altitude: 212 m. |
| *Area:* | 16 ha |
| *Wetland Type:* | 6, 20 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major quatic plants include *Nymphaea nouchali, Eleocharis dulcis, Ipomoea aquatica, Ludwigia adscendens , Sagittaria quayanensis* and *Marsilea quadrifolia*. The marginal plants include *Hygrophilla auriculata, Paspalum distichum*. |
| *Importance to Wildlife:* | This wetland supports many species of waterfowls. The important bird species recorded include *Mycteria leucocephala, Anastomus oscitans, Pseudibis papillosa, Grus antigone, Vanellus indicus, Himantopus himantopus*. Presently the wetland is used as a fish stocking pond. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (90%) and Settlement (10%) |
| *Uses:* | Fishing, Aquaculture |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Dredging/draining |
| *Conservation Plan:* | x |
| *Human Population:* | 6,460 people of Puraina and Puraini use this Pokhari (pond) and total households in the VDCs is 1,288. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. No significant threat to the Pokhari. |
| *References:* | x |

## 74. Rapti Floodplain (राप्ती बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bhalubang, Ward No. 4, Lalmatiya VDC 0 km at Bhalubang, Dang District. |
| *Development Region:* | Far Western |
| *Physiography:* | Terai |
| *Overview:* | The wide and largest floodplain crosses three districts, Arghakhanchi, Dang and Banke. It menaders in these districts and enter into India after Banke district. |
| *Location:* | Latitude: 27°50'21.2" N Longitude: 82°45'57.7" E Altitude: 197 m. |
| *Area:* | 37,500 ha |
| *Wetland Type:* | 2, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The Rapti Floodplain is characterised by the varieties of vegetations such as Sisoo (*Dalbergia sissoo* ), Khair (*Acacia catechu*), Gular (*Ficus glomerata*), Kyamuno (*Engenia jambolana*), Simal (*Bombax ceiba*), Saj (*Terminalia tomentosa*), Sal (*Shorea robusta*). |
| *Importance to Wildlife:* | The floodplain habitat harbour many species of fish, amphibians, reptiles, birds and mammals, providing staging and foraging grounds for migratory waterfowls. The important bird species are *Egretta alba, Alcedo atthis, Pavo cristatus, Bubo nipalensis, Dendrocygna javanica.* |
| | The Rapti River provides an optimal feeding ground for some marsh crocodiles (*Crocodilus palustris*), which are generally seen in the downstream areas close to Nepal-India border. Also smooth otter (*Lutrogale perspicillata*) occurs here. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by privately owned parcels. |
| *Land Use:* | Agriculture 40%, Dense Forest 30%, Grassland 20%, Settlement 10%. |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, fuel source, drinking water |
| | Irrigation, fishing, grazing, religious value, domestic use, fodder, transport, fuel source. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Though siltation, deforestation and soil erosion are common, not much human pressure. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 75. Lohraula Tal (लोहरौला ताल)

| | |
|---|---|
| *Situation:* | Lohraula, Ward No. 7, Bahadurganj, 10 km to Chanauta, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal being in the middle of the settlement area has an outlet to provide irrigation to the ricefields. It is being encroached by local communities to convert it into ricefields. Three-forths of the Tal area become dry in the summer season. |
| *Location:* | Latitude: 28°03'42.6" N Longitude: 81°39'11.3" E Altitude: 182 m. |
| *Area:* | 5.5 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This Tal is rich in floral diversity comprising of aquatic and semiaquatic species such as *Eleochasis dulcis, Nymphaea nouchali, Ludwigia adscendens, Ipomoea aquatica, Sagittaria quayanensis, Ipomoea fistulosa, and Paspalum scorbiculatum.* |
| *Importance to Wildlife:* | The ecology of lake is badly degraded by agricultural encroachment. It supports a few species of waterfowl. This wetland was found most promising for *Grus antigone.* Two sarus cranes with chicks were observed in this area. The sarus crane is now threatened due to the habitat destruction. The main reason for agricultural encroachment is rice cultivation in wetland. Five species of fish have been recorded from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, domestic use, fishing, grazing. |
| *Conversion Practices:* | Extensive agricultural encroachment in the area. |
| *Threats and Disturbances:* | Monospecific domination, agricultural runoff, dredging/draining. |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 8,210 people from 1,419 households of the Bahadurganj VDC use this lake. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Encroachment for agricultural land. |
| *References:* | x |

## 76. Sakhunia Tal (सखुनिया ताल)

| | |
|---|---|
| *Situation:* | Bhadaukhar, Ward No. 8, Manpur VDC, 7 km to Chanauta, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal retains water that comes from the irrigation canal. The Tal has earth embankment around to retain water which is used for irrigation. A large portion of the lake is rather marshy and gets dry in the summer season. |
| *Location:* | Latitude: 27°36'55.0" N Longitude: 82°55'05.2" E Altitude: 178 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is surrounded by Besharam (*Ipomoea fistulosa*). The other major aquatic plants include the following species *Eleocharis dulcis, Eichhornia crassipes, Nymphoides cristata, Impomoea aquatica* and *Hygrophilla auriculata*. |
| *Importance to Wildlife:* | The marsh covered with aquatic vegetation such a *Ipomoea, Eleochris, Eichhornia, Nymphoides, Paspalum, Aygrophila* attract a small number of waterfowl and other aquatic birds. This wetland is surrounded by agricultural lands on all sides providing a good foraging habitat for *Grus antigone* . Three sarus cranes were observed in agricultural field close to this wetland. Wetland harbours 4 species of wild fish. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, grazing. |
| *Conversion Practices:* | Extensive agriculture |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | Not available |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. People convert the Tal into agricultural land. |
| *References:* | x |

## 77. Buddhi Tal (बुद्धी ताल)

| | |
|---|---|
| *Situation:* | Deuri, Ward No. 7, Buddhi VDC, 4 km from Gorusinge, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is close to Mahendra Highway and comprises of two lakes Buddhi Tal and Deuriko Tal. The Tal is rich in aquatic resources and is surrounded by rice fields and open sal forests. It has no water source Wild rice grows wildly. |
| *Location:* | Latitude: 27°38'34.7" N Longitude: 83°00'35.3" E Altitude: 184 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Tal is rich in species composition. The aquatic plants are lotus (*Nelumbo nueifera*), water lily (*Nymphaea nouchali*), water hyacinth (*Eichhornia crassipes*), *Nymphoides cristata*, *Eleocharis dulcis*, *Ludwigia adscendens* and bladderwort (*Utricularia aurea*). This Tal is also agriculturally important because wild rice (*Oryrza rufipogon*) is growing there. |
| *Importance to Wildlife:* | Agricultural encroachment has occured in the wetland hence attracts only a few number of waterfowls. This wetland provide a good foraging habitat for large waders *Anastomus oscitans* and *Grus antigone*. Also this wetland is found promising area for sarus crane. This wetland provides important foraging habitat for *Gallinula chloropus*, *Phalacrocorax niger*, *Amaurornis phoenicurus*, *Sterna albifrons*, *Egretta alba*.<br><br>Seven species of fish have been recorded from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (60%), Open Forest (40%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, aquaculture, plant harvest. |
| *Conversion Practices:* | Encroachment and siltation |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, pollution, filling. |
| *Conservation Plan:* | No conservation measures have been taken at site. |
| *Human Population:* | The Buddhi VDC has 956 households and 5811 people. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Not much of the pressure, although within the Settlement area. |
| *References:* | x |

## 78. Ajingara Tal (अजिंगरा ताल)

| | |
|---|---|
| *Situation:* | Ajingara, Ward No. 1, Ajingara VDC, 4 km Bahadurganj, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal area is in the middle of the cultivated area and is heavily used by local communities and grazing livestock. Wild rice plants are found here and is used by sarus cranes. Seven cranes were seen. |
| *Location:* | Latitude: 27°31'05.8" N Longitude: 82°52'22.9" E Altitude: 180 m. |
| *Area:* | 25 ha |
| *Wetland Type:* | 6,10, 19 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The aquatic vegetation is important because it is the resource for wild rice (*Oryza rufipogon*). Other important aquatic plants constitute *Nymphaea nouchali* and *Ceratophyllum demursum*. |
| *Importance to Wildlife:* | The freshwater lake and surrounding marsh supports aquatic birds such as *Ibidorhyncha struthersii, Ardea cinerea, Podiceps cristatus, Ciconia ciconia, Porphyrio porphyrio, Acedo atthis and Grus antigone*. 19 of *Grus antigone* were observed in the first visit. This wetland is considered important for sarus crane *(Grus antigone)* conservation. But due to ever increasing tendency of conversion of marshes into agricultural land, the sarus crane is now threatened. It provides a suitable habitat for *Python molurus*.<br>Two species of fish have been reported from the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Open Forest (80%) and Dense Forest (20%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | High encroachment for agricultural land, agricultural runoff, dredging/drainage, pollution, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | 3646 people of Ajingara VDC use this lake. This VDC has 603 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because of rapid conversion of marsh into agricultural land. |
| *References:* | x |

## 79. Lambu Sagar (लम्बु सागर)

| | |
|---|---|
| *Situation:* | Srinagar, Ward No. 9, Niglihawa VDC, 10 km north to Taulihawa, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This enclosed lake receives water when the canal has overflow. Vegetation succession is its major problem. The lake being in a distance of one kilometer from the Jagadishpur Reservoir, provides a good sanctuary for a large number of avifauna. |
| *Location:* | Latitude: 27°36'67.1" N Longitude: 83°05'24.8" E Altitude: 194 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The area is badly infested by water hyacinth (*Eichhornia crassipes*) covering 100 % of the Sagar (Tal) except the edge of the Tal. The edge comprises of *Ipomoea fistulosa* as a major species together with *Alternanthera sessilis*, Ferns, *Engenia cumini* (sapling) and grasses like *Paspalum scrobiculatum* and *Paspalum distichum*. |
| *Importance to Wildlife:* | Lake ecology is badly degraded by the proliferation of *Eichhornia crassipes*, thus threatening the existence of fauna. The lake provides foraging habitat for *Grus antigone, Ardea cinerea, Porphyrio porphyrio, Ibidorhyncha struthersii, Ciconia nigra, Acedo atthis, Amaurornis phoenicurus*. The lake does not attract waterfowls due to its bad ecological condition. This freshwater pond harbourus 6 species of fishes. Due to the proliferation of water hyacinth, the wetland support less number of fish species as compared to others. |
| *Special Features:* | x |
| *Land Ownership:* | Government land and private lands. |
| *Land Use:* | Agriculture (70%), Open Forest (5%), Grassland (10%), Pasture (5%) |
| *Uses:* | Fishing and grazing. |
| *Conversion Practices:* | Grazing ground. |
| *Threats and Disturbances:* | Dredging/drainage, filling, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | The users are the people of Niglihawa VDC, which has 1231 households with 7564 people. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because of high siltation, and vegetation succession. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 80. Jagadishpur Reservoir (जगदीशपुर जलाशय)

| | |
|---|---|
| *Situation:* | Jagadishpur, Ward No. 1, Niglihawa VDC, 10 km to Taulihawa, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Being the largest dam in the country, the Reservoir is more or less rectangular in shape. The water that comes from Laxman Ghat is used for irrigation purposes. The area is visited by large number of watefowls. |
| *Location:* | Latitude: 27°35'00.0" N Longitude: 83°05'00.0" E Altitude: 197 m. |
| *Area:* | 225 ha |
| *Wetland Type:* | x |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The bank of the reservoir is planted with Sissoo (*Dalbergia sissoo*). The aquatic vegetation is composed of Lotus (*Nelumbo nucifera*), Hydrilla (*Hydrilla verticillata*), *Hygrorrhiza aristata*, *Ceratophyllum demursum*, *Potamogeton spp.* and *Eichhornia crassipes*. The water body covered by *Hygrorrhiza aristata* looks like the green football ground. The margin of the reservoir is surrounded by *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | The large irrigation reservoir is known to be most important site for migratory and wintering waterfowl in western Nepal. It is considered important for waterfowl refuge. This large irrigation reservoir provides an excellent foraging ground for both resident and migratory species. The recorded bird species during the field includes *Grus antigone*, *Ciconia ciconia*, *Ephippiorhynchus*, *Leptoptilos javanicus*, *Pseudibis papillosa*, *Threskiornis aethiopica*, *Gallinula chloropus*, *Porphyrio porphyrio*, *Hydrophasianus chirurgus*, *Ixolrrychus cinnamomens*, *Phalacrocorax carbo*, *P. niger*, *Ardeola grayii* , *Ardea purpurea*, *Ardea cinerea*, *Halcyon smyrnensis*, *Pelargopsis capenis*, *Vanellus indicus*.<br><br>The wetland supports a small population of smooth coated otter (*Lutrogale perspicillata*). Their number is supposed to be 15-20 according to local fisherman. In winter, generally 3 or 4 otters are seen in the water surface.<br><br>Many fish species occur in the reservior. |
| *Special Features:* | x. |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (75%), Settlement (25%) |
| *Uses:* | Irrigation, fishing |
| *Conversion Practices:* | Nearby barren lands have been converted into rice fields. |
| *Threats and Disturbances:* | Road construction, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | 7564 people from 1231 households of Niglihawa VDC use the Reservoir. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Protected by the Department of Irrigation. |
| *References:* | Scott, 1989. A Directory of Asian Wetlands, Malayasia, AWB.<br><br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 81. Banganga Floodplain (बाणगंगा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Darakhaso, Ward No. 7, Gajedi VDC, 1.5 km to Jitpur Town, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This is a wide floodplain that passes through the historical site of Tilaurakot. The area is rich in fish fauna, plants and aquatic resources. |
| *Location:* | Latitude: 27°41'27.0" N Longitude: 83°09'47.7" E Altitude: 171 m. |
| *Area:* | 4,000 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Permanent river |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major tree species are Khair (*Acacia catechu*), Sissoo (*Dalbergia sissoo*) etc. The plain area is covered by Kans (*Saccharum spontaneum*), Dubo (*Cynodon dactylon*) and Kuro (*Choyssopogon aciculatus*). |
| *Importance to Wildlife:* | The river is important for *Podiceps cristatus* and floodplain for *Grus antigone*. It provides feeding habitat for a number of water birds including *Ibidorhyncha struthersii, Porphyrio porphyrio, Ardea cinerea, Ciconia nigra, Anas crecca.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (75%), Open Forest (10%), Pasture (5%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, dedging/draining, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | 89,404 people from 19 VDCs of the area use the floodplain and its resources. These VDCs have altogether 14,740 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Human pressure, siltation and deforestation. |
| *References:* | x |

## 82. Laxman Ghat Barrage (लक्ष्मण घाट)

| | |
|---|---|
| *Situation:* | Jagadishpur, Ward No. 4, Niglihawa VDC, 15 km to Taulihawa, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The surrounding area of dam has vegetation succession, eutrophication and siltation problem. This is the headwater for Jagadishpur Reservoir. Jatras are held in the rainy season. |
| *Location:* | Latitude: 27°36'56.8" N Longitude: 83°05'40.5" E Altitude: 190 m. |
| *Area:* | 83.5 ha |
| *Wetland Type:* | 2, 7 |
| *Climate:* | Tropical |
| *Hydrology:* | Permanent water |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Sissoo (*Dalbergia sissoo*) plant is the main tree of the Ghat area. The Ghat consist of *Hydrilla verticillata*, Besharam (*Ipomoea fistulosa*) and water lily (*Nymphaea sp.*). |
| *Importance to Wildlife:* | This wetland provides important foraging ground for a number of aquatic birds including *Ibidorhyncha struthersii, Porphyrio porphyrio, Ardea cinerea, Podiceps cristatus, Grus antigone, Ciconia nigra, Anas crecca.* Six species of fish have been reported from the area. |
| *Special Features:* | A religius place for bathing and other religious purposes. |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (95%), Settlement (5%) |
| *Uses:* | Irrigation, religious value |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Dredging/drainage, filling, monospecific domination |
| *Conservation Plan:* | x |
| *Human Population:* | The resource of Ghat is used by 7,564 people of 1,231 households of Niglihawa VDC. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. High rate of siltation and drying up problem. |
| *References:* | x |

## 83. Niglihawa Tal Cluster (निग्लिहवा ताल झुण्ड)

| | |
|---|---|
| *Situation:* | Niglihawa, Ward No. 9, Niglihawa VDC, 10 km from Taulihawa city, Kapilbastu District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The Niglihawa Tal cluster comprises of four other small ponds Nigli Tal, Purnihawa Tal, Karmahawa Tal and Mansarobar within a radius of one kilometer. The group of all these five ponds is called here Niglihawa Tals cluster. |
| *Location:* | Latitude: 27°37'16.0"N Longitude: 83°05'18.5"E Altitude: 197 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | 1 m depth |
| *Limnology:* | x |
| *Major Flora:* | Bans (*Bambusa* sp.) is found in the bank of the Tal. The water body consists of aquatic plants (like *Eichhornia crassipes* and *Lemna* spp) and semi aquatic shrub (*Ipomoea fistulosa*). |
| *Importance to Wildlife:* | The lake supports few number of waterfowl populations due to rapid growth of aquatic vegetation such as *Eichnornia* and *Ipomoea* sp. The wetland is considered important for *Grus antigone*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, filling, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | Niglihawa VDC has 7,564 population with 1,231 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. High pressure from human activities and agricultural lands. |
| *References:* | x |

## 84. Bakulla Ghat (बकुल्ला घाट)

| | |
|---|---|
| *Situation:* | Bakullaghat, Ward No. 2, Gajedi VDC, 7 km south from Bansgadhi, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Bakulla Ghat is composed of two ponds, that are used by local communities to catch fish. It has no water source. Springs crop up in the monsoon season. |
| *Location:* | Latitude:27°39'02.4"N Longitude: 27°39'02.4"E Altitude: 200 m. |
| *Area:* | 4 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The water body of the Ghat consists of *Eleocharis dulcis* in the middle and *Ipomoea fistulosa* in the margin (edge). The bank of the ghat comprises mainy *Saccharum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | The small freshwater pond with associated marshes provides an important feeding habitat for *Grus antigone, Ciconia nigra, Alcedo atthis, Ibidorhyncha struthersii, Dendrocygna javanica, Anas crecca, Sterna albifrons*. This wetland is of little importance to the waterfowl population.<br>This pond harbours four species of wild fishes. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | x |
| *Conversion Practices:* | Agriculture land/encroachment |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | 7,751 people of Gajedi VDC with 1,310 households utilize the resource. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Human encroachment and water level drawingg down. |
| *References:* | x |

## 85. Matiyara Tal (मटियारा ताल)

| | |
|---|---|
| *Situation:* | Mataria, Ward no. 7, Gajedi VDC, 8 km from Bansgadhi, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Matiyara Tal is along the road to the village of Mataria, and is extensively used by local people for the cultivation of water chestnut. This Tal also lies on the flight range of sarus crane. |
| *Location:* | Latitude: 27°37'34.3"N Longitude: 83°17'28.0"E Altitude: 207 m. |
| *Area:* | 7 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants of the area are Singada (*Trapa bispinosa*), *Hyudrilla verticillata*, Jal Kumbhi (*Eichhornia crassipes*), and *Ipomoea aquatica*. The margin of the waterbody comprises of Besharam (*Ipomoea fistulosa*), water clover (*Marsilea quadrifolia*), and *Paspalum distichum*. |
| *Importance to Wildlife:* | Few wild ducks visit the area in the winter. This wetland provides an important feeding habitat for a number of water birds including *Grus antigone, Ibidorhyncha struthersii, Alcedo atthis, Gallinula chloropus, Sterna albifrons, Ciconia ciconia*. Hunting and trapping of birds has threatened the existence of rare birds of this wetland.<br>Six species of wild fish have been recorded from the area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private farmlands. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, domestic use, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction, agricultural runoff. |
| *Conservation Plan:* | x |
| *Human Population:* | Gajedi VDC has 1,310 households with a population of 7,751 people. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because it is surrounded by agricultural lands and Settlement. |
| *References:* | x |

## 86. Gajedi Tal (गजेडी ताल)

| | |
|---|---|
| *Situation:* | Danopur, Ward No. 3, Gajedi VDC, 8 km to Bansgadhi Town, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Gajedi Tal is situated in the middle of open sal forest and cultivated lands. The Tal is rich in fish fauna and lotus, the rhizomee of which is eaten by local people. Encroachment and vegetation succession are its major problems and threats. |
| *Location:* | Latitude: 27°39'39.2" N Longitude: 83°16'34.4" E Altitude: 227 m. |
| *Area:* | 15 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Fresh water |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important aquatic plants of the Tal are *Nelumbo nucifera* and *Nymphaea* spp. The margin of the Tal is *Ipomoea fistulosa*. The bank area is covered by *Saccharum spontaneum* (kans). |
| *Importance to Wildlife:* | This wetland supports a few species of waterfowl populations. The marsh, fresh water pond and agricultural fields provide suitable foraging habitat for *Grus antigone*. Due to increasing tendency of conversion of wetland into agriculture land the wetland seems to be of little importance for widllife and waterfowl populations. Three species of wild fish have been recorded from the area. |
| *Special Features:* | |
| *Land Ownership:* | Government land surrounded by forest and private lands. |
| *Land Use:* | Agriculture (90%), Open Forest (10%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest |
| *Conversion Practices:* | Human encroachment for crop cultivation. |
| *Threats and Disturbances:* | Monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | The wetland is located in Gajedi VDC which has 1,310 households and 7,751 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because the surrounding area is degraded (forest) and overgrazed. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 87. Lausa Tal (लाउसा ताल)

| | |
|---|---|
| *Situation:* | Lausa, Ward No. 1, Gajedi VDC, 2 km south from Bansgadhi, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The Tal is near the open sal forest, and is managed by a fish contractor. The Tal has lotus, water lilly and other aquatic plants. The Tal appears to be artifically made for fisheries. |
| *Location:* | Latitude: 27°40'40.5" N Longitude: 83°17'12.5" E Altitude: 227 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The water body is chiefly dominated by *Nelumbo nucifera, Nymphoides cristata, Nymphaea nouchali, and Ipomoea aquatica*. Marginal water body of the Tal consists of *Ipomoea fistulosa, Polygonum barbatum* and *Cyperus compactus*. |
| *Importance to Wildlife:* | Small fresh water lake surrounded by sal forest supports small number of storks, egrets and other waders. The observed birds are *Ciconia nigra, Grus antigone* and *Egretta alba*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (70%), Open Forest (30%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use. |
| *Conversion Practices:* | Human encroachment. |
| *Threats and Disturbances:* | Agricultural runoff, deforestation. |
| *Conservation Plan:* | x |
| *Human Population:* | The resource of the lake is utilized by 1,310 households with 7,751 population of the Gajedi VDC. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Vulnarable to deforestation. |
| *References:* | x |

## 88. Danda Khola (डण्डा खोला)

| | |
|---|---|
| *Situation:* | Paklihawa, Ward No. 2, Siddarthnagar Municipality, 5 km south from Bhairahawa city, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | A long meandering Danda Khola provides a good santuary for birds and widlife near the Paklihawa Campus. The whole area is the range of visit by sarus cranes and it is being affected by the barrage during the rainy season. The barrage is in India and controlled by them. |
| *Location:* | Latitude: 27°28'11.1" N Longitude: 83°26'34.9" E Altitude: 900 m. |
| *Area:* | 900 ha |
| *Wetland Type:* | 2, 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This stream is an attractive wetland. *Potamogeton nodosus, P. pectinatus, P. crispus, Hydrilla vertiallata, Vallisneria spiralis, Eichornia crassipes* and *Ipomoea aquatica* are the major aquatic plants. The margins are covered by *Typha angustifolia, Ipomoea fistulosa* and *Marsilea quadifolia*. The major tree species is *Sygygium cumini*. |
| *Importance to Wildlife:* | The wetland is an important feeding habitat for a number of water bird species including *Grus antigone, Egretta alba, Ciconia nigra, Ibidorhyncha struthersii, Hydrophasianus chirurgus, Alcedo atthis, Gallinula chloropus, Anas crecca, Nettapus coromandelianus, Sterna aurantia*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by Paklihawa Campus land and private lands. |
| *Land Use:* | Agriculture (60%), Settlement (10%), Other (5%) |
| *Uses:* | Irrigation, fishing, grazing, religious value, domestic use, recreational value |
| *Conversion Practices:* | Felling trees inside the island. |
| *Threats and Disturbances:* | Agriucltural runoff, dredging/drainage, pollution, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | About 88,977 inhabitants of 9 VDCs use the wetland. These VDCs have 14,215 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because of free accessibility. |
| *References:* | x |

## 89. Tinau Floodplain (तिनाउ बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bethani Bazar, Ward No. 6, Gonah VDC, 6 km west from Bhairahawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Coming from the narrow gorge near Butwal Municipality, the river makes a wide floodplain suitable for many flora and fauna. It provides irrigation water to the villages. Siltation, boulders and flash flood are its major problems. |
| *Location:* | Latitude: 27°29'59.5" N Longitude: 83°19'59.1" E Altitude: 203 m. |
| *Area:* | 5,700 ha |
| *Wetland Type:* | 2, 7 |
| *Climate:* | Tropical |
| *Hydrology:* | Perennial source of water coming from Chure Hills. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | *Dalbergia sissoo, Terminalia tomentosa, Acacia cateachu, Ficus glonerata* and *Bombax ceiba* are the major trees of the area. The major ground flora comprise of *Clenodendrum visuasum, Cynodon dactylon, Ipomoea fistulosa,* and *Saccharum spontaneum.* |
| *Importance to Wildlife:* | This wetland is an important feeding habitat for a number of aquatic birds including *Grus antigone, Egretta alba, Ciconia nigra, Ibidorhyncha struthensii, Sterna albifrons, Nettapus coromandelianus* . Considered important for Sarus breeding. Four species of fish are found in this wetland. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (60%), Pasture (10%), Barren Land (10%), Settlement (10%), Others (10%). |
| *Uses:* | Irrigation, fishing |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, pollution, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | This river flows through 15 VDCs of Rupandehi Districts. These VDCs have 23,764 households and 135,470, population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is a perennial river. |
| *References:* | x |

## 90. Dano Floodplain (दानो बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Gunda, Ward No. 4, Kamabariya VDC, 11 km west from Bhairahawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This fertile floodplain that begins from the Butwal Municipality provides a good habitat and grazing ground for sarus crane. The floodplain also houses a good species of flora and fauna. |
| *Location:* | Latitude: 28°30'56.9" N Longitude: 83°23'49.3" E Altitude: 210 m. |
| *Area:* | 2,800 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | Inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major tree species are *Dalbergia sissoo, Terminalia tomentosa, Acacia catechus, Ficus glomerata* and *Bombax ceiba*. The embankment of the floodplain consists of *Xanthium strumarium, Calotropis gigantea, Clerochordrum viscesus, Tridax procumbens* and *Croton sparaiflorus.* |
| *Importance to Wildlife:* | This wetland is an important feeding habitat for a number of aquatic birds species including *Grus antigone, Egretta alba, Ciconia, nigra, Ibidorhyncha struthersii, Hydrophasianus chirurgus, Alcedo atthis, Gallinula chloropus, Anas crecca, Nettapus coromandelianus, Bubo nipalensis, Sterna aurantia, Dendrocygna javanica, Ardea cicenea.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private and forest lands. |
| *Land Use:* | Agriculture (60%), Pasture (10%), Barren (10%), Dense (10%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, power production, recreation. |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, filling, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | The Dano river is flowing through 20 VDCs which have 23,475 households with a population of 155,456. The inhabitants use the resources of the river. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is a permanent river flowing from hills to Bhairahawa. |
| *References:* | x |

## 91. Karbalaha Tal (करवलाह ताल)

| | |
|---|---|
| *Situation:* | Sun Barsi, Ward No. 2, Khurda Bangar VDC, 2.5 km to Koilihawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal because of its closeness to the gravelled road, a primary school and vegetable growing plot, is heavily polluted. Water hyacinth is the main problem of the lake. |
| *Location:* | Latitude: 27°30'50.2" N Longitude: 83°18'46.7" E Altitude: 198 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Only during the rainy season, flood water comes and deposits. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | *Nymphaea stellata, Azolla imbricata, Eichhornia crassipes and Ludwigia adscendens* are the aquatic plants. *Paspalum scrobiculatum, Cyperus compactus* and *Saccharum spontaneum* are also found there. The bend of Tal also consists of *Imperata cylinderica* grass. |
| *Importance to Wildlife:* | This wetland is of little importance for waterfowl populations. The endangered bird sp. *Grus antigone* also visit to this wetland. Wild ducks were not found. It provides an important foraging habitat for large waders *Leptoptilos javanicus* and *Ciconia nigia*.<br><br>Eight species of wild ducks have been observed in this wetland. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, aquaculture, other uses. |
| *Conversion Practices:* | Draining of wetlands for irrigation. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | 3,602 inhabitants of Khurda Bangar VDC use the wetland. This VDC has 509 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because of high coverage of water body by water hyacinth. |
| *References:* | x |

## 92. Amlahawa Tal (अम्लाहवा ताल)

| | |
|---|---|
| *Situation:* | Lakadi Gadhi, Ward No. 9, Khurda Bangar VDC, 3 km to Koilihawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Amlahawa Tal is in the middle of the ricefields. It is meandering in shape. Wild fish species are found here and is good for sarus crane. |
| *Location:* | Latitude: 27°30'50.2" N Longitude: 83°18'46.7" E Altitude: 198 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 7, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has inlet and outlet. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The water body is covered by *Eichhornia crassipes*. The margin of the Tal consists of *Ipomoea fistulosa, Saccharum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | This wetland provides a feeding habitat for a number of water birds including *Grus antigone, Anas crecca, Gallinula chloropus, Ibidorhyncha struthersii. Alcedo atthis, Ceryle rudis , Nettapus coromandelianus, Dedrocygna javanica, Hydrophasianus chirurgrus.*<br>The wetland is stocked with exotic carp fishes. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private lands. |
| *Land Use:* | Agriculture (90%), Grassland (10%). |
| *Uses:* | Fishing, religious value, domestic use, fodder, plant harvest. |
| *Conversion Practices:* | Human encroachment for agricultural land. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, pollution. |
| *Conservation Plan:* | x |
| *Human Population:* | Khurda Bangar VDC has 509 households with 3602 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because it is protected by the community. |
| *References:* | x |

## 93. Siktihawa Tal (सीक्टीहवा नाला)

| | |
|---|---|
| *Situation:* | Ahirauli, Ward No. 8, Dhamauli VDC, 6 km to Koilihawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This meandering oxbow lake is in the middle of the Settlements and is intensively used for water chestnut cultivation. The water is virtually covered with trailing water chestnut plants. |
| *Location:* | Latitude: 27°31'43.4" N Longitude: 83°19'21.6" E Altitude: 195 m. |
| *Area:* | 22 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | Water depth 1.5 m. |
| *Limnology:* | x |
| *Major Flora:* | *Trapa bispinosa, Ipomoea aquatica, Eleocharis dulcis, Ludwigia adscendens, Eichhornia crassipes, Nymphaea stellata, Azolla imbricata* are the major aquatic plants. The following species are found in the margin: *Ipomoea fistulosa* and *Saccharum spontaneum.* |
| *Importance to Wildlife:* | This lake is important for sarus crane (*Grus antigone)* breeding. Two sarus cranes were observed by the local people during July-August 1996. According to them sarus carnes visit this wetland for rearing their chicks. Also, the wetland is an important feeding habitat for a number of water birds including *Ciconia nigra, Ibidorhyncha struthersii, Hydrophasianus chirurgus, Gallinula chloropus, Nettapus coromandelianus, Anas crecca, sterna albifrons.*<br>Eleven species of fishes occur in the lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, domestic use |
| *Conversion Practices:* | Human encroachment |
| *Threats and Disturbances:* | Agricultural runoff, filling, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 4,060 people of Dhamauli VDC use the resources. This VDC has 628 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because it is big and has plenty of flora and fauna. |
| *References:* | x |

## 94. Padarhawa Tal (पाडरहवा ताल)

| | |
|---|---|
| *Situation:* | Dubihawa, Ward No. 8, Dhamauli VDC, 7 km to Koilihawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal, being located in the middle of the settlement is covered with plants. The middle portion is used for the cultivation of water chestnut. Vegetation succession and eutrophication are its common problems. |
| *Location:* | Latitude: 27°31'41.0" N Longitude: 83°19'21.6" E Altitude: 195 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | No inlet or outlet but only natural spring. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants are *Ipomoea aquatica, Trapa bispinosa, Eleocharis dulcis* and *Eichhornia crassipes*. The margin of the Tal is covered by *Saccharum spontaneum* and *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | The important wetland birds recorded in this lake are *Egretta alba, Ardea cinerea* and *Alcedo atthis*. Provides foraging habitat for these species. Six species of fishes have been recorded from this lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (90%), Open Forest (10%) |
| *Uses:* | Irrigation, fishing, grazing, plant harvest. |
| *Conversion Practices:* | Using for water chestnut cultivation. Contracts are given to local people to harvest. |
| *Threats and Disturbances:* | Agricultural runoff. |
| *Conservation Plan:* | x |
| *Human Population:* | About 4,060 inhabitants of Dhamauli VDC with 628 households use lake resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Privately owned and managed. |
| *References:* | x |

## 95. Gularia Tal (गुलरिया ताल)

| | |
|---|---|
| *Situation:* | Kanijawa, Ward No. 3, Suryapura VDC, 15 km from Koilihawa, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This lake is rich in aquatic plants and drainage from around accumulates here. The water is pumped out to irrigate rice fields. Wild fishes are found in the lake and is half a kilometer inside the road. |
| *Location:* | Latitude: 27°34'53.5" N Longitude: 83°18'45.3" E Altitude: 200 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | 1 m depth |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants of the Tal are *Nelumbo nucifera, Ipomoea aquatica, Nymphaea stellata, Typha angustifolia* and *Ottelia alismoides*. The major marginal plants constitute. *Aeschynomene aspera, Saccharum spontaneum*, and *Polygonum lapanthifolium*. |
| *Importance to Wildlife:* | The surrounding rice fields, marshes and freshwater pond with dense growth of aquatic vegetation provide a sutiable foraging ground for endangered sarus crane *Grus antigone*. Other recorded birds from the wetland are *Ardeola grayii* , *Ceryle rudis, Egrettu alba*. Two species of wild fish were recorded from the lake area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (100%) |
| *Uses:* | Irrigation, fishing, domestic use, plant harvest. |
| *Conversion Practices:* | Human encroachment. |
| *Threats and Disturbances:* | Agricultural runoff, filling, vegetational successions. |
| *Conservation Plan:* | x |
| *Human Population:* | Suryapura VDC has 2,220 households and a total of 13,701 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Privately managed/contracted for fish cultivation. |
| *References:* | x |

## 96. Sagrahawa Tal (सग्रहवा ताल)

| | |
|---|---|
| *Situation:* | Sagrahawa, Ward No. 9, Bishunpura VDC, 8 km to Lumbini, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This Tal covers about 5 ha including the catchment area and the water area is covered with lotus, besharam and other aquatic plants. This Tal is given on a contract to fisherman for managing fisheries. |
| *Location:* | Latitude: 27°33'34.7"N Longitude: 83°17'55.7"E Altitude: 200 m. |
| *Area:* | 5 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has no permanent inflow, outfow or dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This Tal supports a number of aquatic plants. Among them, major ones are *Nelumbo nueifera, Nymphaea nouchali, Eichhoraia crassipes, Utricularia auria, Marsilea quadrifolia* and *Sagittaria quayanenois*. The following species are found in the margin of the Tal, *Ipomoea fistubsa, Saccharum spontaneum, Imperata cylindrica, Paspalum distichum*. |
| *Importance to Wildlife:* | The wetland provide foraging ground for large number of water birds including *Grus antigone, Ardeola grayii , A. striatus, Alcedo atthis, Ceryle rudis, Leploptilus javanicus, Ciconia ciconia, Anas poecilorhyncha, Ciconia nigra, Nettapus coromandelianus, Ibidorhyncha struthersii, Hydrophasianus chirurgus, Sterna albifrons, Amaurornis phoenicurus*.<br>Six species of wild fish have been reported in the site. The wetland is stocked with exotic carp fishes. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (50%), Open Forest (25%), Pasture (20%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, aquaculture |
| *Conversion Practices:* | Vegetational succession, eutrophication |
| *Threats and Disturbances:* | Road construction, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | Some 4,405 people from 747 households of Bisunpura VDC use the resources of the lake. |
| *Research Works:* | x |
| *Others:* | |
| *Overall Ranking:* | Poor. Along the roadside encroached by the public. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 97. Gaindhawa Tal (गैंडाहवा ताल)

| | |
|---|---|
| *Situation* | Gaindahawa, Ward No. 6, Suryapura VDC, 14 km to Lumbini, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Gaindahawa Tal is a scenic and beautiful Tal in Rupandehi District. This is the largest lake in the district. In the western side, it goes along the forest area and villages and settlements in the eastern side. The water is being used for irrigation. Vegetation and siltation are its major problems. |
| *Location:* | Latitude: 27°35'39.0" N Longitude: 83°16'53.2" E Altitude: 200 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has permanent outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The water body of the Tal is covered by *Lenma* spp., *Nymphaea stellata* and *Azolla imbricata*. The margin of the area consists of *Ipomoea fistulosa, Shccharum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | Important wetland for sarus breeding. The wetland is important for a small resident and wintering population of several species of waterfowl. Underwood in 1980, 57 *Mycteria leucocephala*, 20 *Platalea leucorodia* and 20 *Sarkidiornis melanotos* were observed in this lake. All three species are uncommon in Nepal. The lake is supporting a largest number of *Mycteria leucocephala*. It is a rare resident of southeast Terai and primarily a summer visitor to the Koshi Barrage of eastern Nepal.<br><br>Ten species of fish occurs in this lake. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by community lands and agricultural fields. |
| *Land Use:* | Agriculture (45%), Dense Forest (50%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, domestic use, plant harvest. |
| *Conversion Practices:* | Encroachment, irrigation canals, permanent drainage, community. |
| *Threats and Disturbances:* | Human encroachment, entrophication, vegetation succession and siltation. The ovious threats to the wetland and local community are dredging and drainage. |
| *Conservation Plan:* | x |
| *Human Population:* | About 13,701 people of Suryapura VDC which has 2,220 households use the this wetland site. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because of human encroachment, fishing contract, siltation. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands. Technical Publication No. 1. Kathmandu, Nepal. |

## 98. Harahawa Floodplain (हरहवा बाढक्षेत्र)

***Situation:*** Lumbini Development Project, 22 km from Sidddartha Nagar, Rupandehi District.

***Development Region:*** Western

***Physiography:*** Terai

***Overview:*** The Harahawa river passes through the Lumbini Development Project area and makes a good floodplain. Some portion of it is earmarked for the restoration of wetlands and their resources. The restoration site is near the Central Link bridge of the project area.

***Location:*** Latitude: 27°29'47.8" N Longitude: 83°16'59.8" E Altitude: 152 m.

***Area:*** 500 ha

***Wetland Type:*** 5, 9

***Climate:*** Tropical

***Hydrology:*** x

***Biogeographical Realm:*** Indomalayan

***Morphometry:*** x

***Limnology:*** x

***Major Flora:*** The floodplain is characterized by many grasses and other plant species. The major grasses of the area are *Saccharum spontaneum*, Khas Khas (*Vetiveria lawsonii*) and *Dichanthium annulatum*, *Imperata cylindrica* and *Chrysopogon aciculuditus*. The ground is also covered by *Evolvulus nummularius* and *Desmodium triflorum*. The aquatic species such as *Ipomoea aquatica* occurs in the bank. The water body is very poor in vegetation, only *Vallisneria spiralis* is seen. The list of plants found in the floodplain is given below:

| Nepali Name | Botanical Name |
|---|---|
| Kans | *Saccharum spontaneum* |
| | *Vallisneria spiralis* |
| Karmisag | *Ipomoea aquatica* |
| Besharam | *Ipomoea fistulosa* |
| | *Aeschynomene indica* |
| Siru | *Imperata cylindrica* |
| Pire jhar | *Polygonum barbatum* |
| Amala jhar | *Phyllenthus simplex* |
| Jwane jhar | *Fimbristylis miliacea* |
| Pire jhar | *Polygonum lapanthifolium* |
| | *Desmodium triflorum* |
| | *Hygrophilla auriculata* |
| Mothe jhar | *Cyperus iria* |
| | *Cyperus compactus* |
| | *Evolvulus nummularis* |
| Kuro balu | *Urena lobata* |
| Khas khas | *Vetiveria zizanoides* |
| | *Ludwigia octavalvis* |
| Bhende kuro | *Xanthium strumarium* |
| | *Dichandthium annulatum* |
| Tapre jhar | *Cassia tora* |
| Jal Kumbhi | *Eichhornia crassipes* |
| Pater | *Typha latifolia* |
| Bhiringi Jhar | *Alternanthera sessilis* |
| Ghod tapre | *Centella asiatica* |
| Ban tora | *Cleome viscosa* |
| Kuro | *Chrysopogon aciculatus* |
| Kurro balu | *Triumfetta rhomboidea* |
| Bale banso | *Setaria parllide-fusca* |
| Dubo | *Cynodon dactylon* |

***Importance to Wildlife:*** The floodplain with seasonal ponds provides feeding ground for many species of aquatic and other important birds including *Grus antigone, Ceryle rudis, Circus aeruginosus, C. melanoleulos, Centropus sinensis, Bubo bubo, Saxicola torquata, Estrilda amandava, Ardea purpurea, Phalacrocorax carbo, Anastomus oscitans, Ciconia episcopus, Ardea grayii , Turdoides malcolmi, Ammomanes phoenicenus.*

| | |
|---|---|
| | Reptilian fauna includes *Bungarus caeruleus, Ptyas mucuosus*. The grassland savannah provide the habitat for mammalian fauna e.g. *Canis aureus, Vulpes bengalensis, Felis chaus, Hyaena hyaena, Boselaphus tragocamelus*. |
| | The important mammalian fauna of the floodplain is *Boselaphus tragolocamelus*. The river serves as a water hole for this animal. |
| *Special Features:* | x |
| *Land Ownership:* | Trust land |
| *Land Use:* | Grass Land (80%), Open Forest (20%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder, religious value. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Siltation and sedimentation |
| *Conservation Plan:* | x |
| *Human Population:* | This floodplain affects mainly Tenuhawa, Ekla and Jogada VDCs. A total of 11,082 people in 1,687 households of the VDCs, are affected by the floodplain. |
| *Research Works:* | x |
| *Others:* | There are development plans for the area. |
| *Overall Ranking:* | High. Because it is protected by the Lumbini Development Project. |
| *References:* | IUCN Nepal. 1997. Restoration of Wetlands in Lumbini. |

## 99. Telar Floodplain (तेलार बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Parsa Bazar, Ward No. 6, Parsa VDC 1 km east from Lumbini, Rupandehi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Telar river has a great significance from cultural perspectives. This flows near the Lumbini Development Project area. Its flat and fertile floodplain is an ideal habitat for sarus crane. |
| *Location:* | Latitude: 27°29'19.5" N Longitude: 83°17'33.4" E Altitude: 163 m. |
| *Area:* | 2,500 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The Telar floodplain is characterised by a varieties of species such as Sissoo (*Dalbergia sissoo*), Saj (*Terminalia tomentosa*), Khayar (*Acacia catechu*), Gular (*Ficus glomerata*), Simal (*Bombax ceiba*), Besharam (*Ipomoea fistulosa*) and Kans (*Saccharum spontaneum*). |
| *Importance to Wildlife:* | This floodplain is important for sarus crane (*Grus antigone*) breeding. It provides foraging ground for many species of aquatic bird species including *Grus antigone, Ibidorhyncha struthersii, Alcedo atthis, Gallinula chloropus, Anas crecca, Nettapus coromandelianus, Sterna albiforns, Ciconia nigra*. Five species of fish have been reported from the river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private as well as other lands. |
| *Land Use:* | Agriculture (90%), Barren (5%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, grazing, religous value. |
| *Conversion Practices:* | Use for irrigation purpose. |
| *Threats and Disturbances:* | Building construction, dredging/drainage, pollution, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | This river flows through 9 VDCs. A total of 5,985 households and 36,837 people are affected by the floodplain. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. The floodplain does not show any symptoms of degradation. |
| *References:* | x |

## 100. Khaireni Khola Floodplain (खैरेनी खोला बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Khaireni Bazar, Ward No. 1, Devadaha VDC, 5 km to Sunwal, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The floodplain is rich in sal, sissoo and saj. The area is good for migratory birds and wildlife. This is a perennial stream. |
| *Location:* | Latitude: 27°38'25.7" N Longitude: 83°36'26.6" E Altitude: 235 m. |
| *Area:* | 4,500 ha |
| *Wetland Type:* | 4 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has a permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major plants observed in the bank of the area comprise of Kans (*Saccharum spontaneum*), Siru (*Imperata cylindrica*), Besharam (*Ipomoea fistulosa*), Gargalo (*Boehmeria platyphylla*), Rudilo (*Pogostemon parviflora*) and Karkalo (*Colocasia escultena*). |
| *Importance to Wildlife:* | The seasonal, wetland supports a population of aquatic bird species including *Egretta alba, Ardea purpurea, Ardea grayii , Ceryle rudis, Alcedo atthis, Ciconia episcopus, Hoplopterus indicus, Hoplopterus malabaricus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Grassland (5%), Industrial Use (5%), Pasture (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | This Khola flows through 16 VDC which have 15,784 households and 94,075 inhabitants. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because of pollution and filling. |
| *References:* | x |

## 101. Nandan Ghol (नन्दन घोल)

| | |
|---|---|
| *Situation:* | Padari, Ward No. 8 and 9, Hakai and Sanai VDCs, 8 km from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The ghol, big and wide in the area, is in the state of distress. Human encroachment is a serious threat. The water is drained by a high power pump set to catch fish. |
| *Location:* | Latitude: 27°29'08.2"N Longitude: 83°37'21.8"E Altitude: 218 m. |
| *Area:* | 267 ha. |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has a small permanent inflow |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal semiaquatic plants are *Eleocharis dulcis*, Besharam (*Ipomoea fistulosa*), and Pire Jhar (*Polygonum* sp.). The other major plants found in the bank (shore) are Kans (*Saccharum spontaneum*), Siru (*Imperata cylindrica*), Dubo (*Cynodon dactylon*) and Kuro (*Chrysopogon aciculatus*). |
| *Importance to Wildlife:* | Agricultural encroachment is seen from all sides of the wetlands thereby turning the wetland into agriculture lands. People are often draining the wetland for fishing. This wetland does not attract waterfowls and other aquatic birds due to high encroachment and poor status. Four species of fish occured in this wetland, includes *Puntius ticta, Clarias batrachus, Chela laubuca* and *Mystus tengra*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (85%), Pasture (5%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Fishing, grazing, fodder. |
| *Conversion Practices:* | The wetland is gradually being encroached and converted into farm lands. |
| *Threats and Disturbances:* | Pollution, agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | The wetland is utilized by the people of two VDC, Hakai and Sanai with 1,387 households and 8,934 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because of human encroahment for cultivation of rice and wheat. |
| *References:* | x |

## 102. Hulasi Ghol (हुलासी घोल)

| | |
|---|---|
| *Situation:* | Barsar, Ward No. 3, Badahara Dubauliya VDC, 9 km from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The ghol is mainly managed for fisheries being coordinated by the agriculture office. This is a mean dering oxbow ghol and retains water throughout the season. |
| *Location:* | Latitude: 27°28'08.9" N Longitude: 83°42'48.3" E Altitude: 218 m. |
| *Area:* | 28 ha |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has a permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants *Nymphaea stellata, Ipomoea fistulosa, Ipomoea aquatica, Ludwigia adscedens,* and *Eichhornia crassipes.* The marginal plants are *Polygonum, Saccharum spontaneum* and *Paspalidium genicunlatum.* |
| *Importance to Wildlife:* | The wetland is important feeding area for a number of water birds including *Ceryle rudis, Alcedo atthis, Ardeola grayii , Ciconia eposcopus, Leptoptilos javanicus, Egretta alba.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (80%), Pasture (10%), Barren Land (10%), Settlement (5%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | About 5,255 inhabitants of the VDC utilize the lake resources. The VDC has 856 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Because of pollution, filling and agricultural runoff. |
| *References:* | x |

## 103. Dhanewa Khola Floodplain (धनेवा खोला)

| | |
|---|---|
| *Situation:* | Naudihawa, Ward No. 9, Rampur VDC, 15 km from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This Khola meanders in the district of Nawalparasi and meets the Narayani River downstream. It provides a good habitat for wildlife and birds. The area is also rich with flora. |
| *Location:* | Latitude:27°25'49.8" N Longitude: 83°44'21.1" E Altitude: 218 m. |
| *Area:* | 3,400 ha |
| *Wetland Type:* | 4 |
| *Climate:* | Tropical |
| *Hydrology:* | This Khola has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The tree planted along the ridge is *Dalbergia sissoo*. The major plants are *Cynodon dactylon, Chrysopogon aciculatus, Polygonum barbatum, Cyperus rotundus, Colocasia esculenta, Alternanthera sessilis* and *Commelina diffusa*. |
| *Importance to Wildlife:* | This wetland is important foraging ground for *Anastomus oscitans, Ciconia episcopus, Leptoptilos javanicus, Pseudibis papillosa, Ardeola grayii, Egretta alba, Ceryle rudis, Alcedo atthis*. Four species of fishes have been reported from the river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agriucltural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 46,455 population with 7,653 households from 8 VDCs use resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It is a safety valve for flash flood in the rainy season. |
| *References:* | x |

## 104. Gandak Barrage (गण्डक ब्यारेज)

| | |
|---|---|
| *Situation:* | Tribeni, Ward No. , Tribeni-Susta VDC, 25 km south-east from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Situated along the Narayani River is a barrage bordering Bihar States of India and Nawalparasi District of Nepal. It has 3 canals, one for Nepal and two for India. It irrigates 7 districts of Uttar Pradesh and Bihar States in India. |
| *Location:* | Latitude: 27°26'40.5"N Longitude: 83°54'40.7"E Altitude: 222 m. |
| *Area:* | 500 ha |
| *Wetland Type:* | 2 |
| *Climate:* | Tropical |
| *Hydrology:* | Wetland has permanent inflow, outflow and dam |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major species are *Datura stramonium, Parthenium hysterophorum, Cassia tora, Cassia occidentalis, Xanthuim strumarium, Colocasia esculenta, Saccharum spontaneum* and *Callicarpa microphylla.* |
| *Importance to Wildlife:* | The barrage (water storage reservoir ) is an important staging and wintering site of many waterfowl populations. The bird species observed were *Tadorna ferruginea, Anas crecca, Aythya ferina, Ciconia nigra, Dupetor flavicollis.* The reptilian fauna includes the endangered *Gavialis gangeticus* and *Crocodilus palustris.* The dam restricts the movement of crocodiles, gharials and migratory fishes. Wetland dependent mammal species includes *Platanista gangetica* and *Lutrogale perspicillata.* Siltation of river is threatening the ecology of rare and endangered species. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (40%), Dense Forest (50%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing fodder, religious value, transport, recreation. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | Tribeni Susta VDC has 1,477 households with 7,830 population. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Well managed by Indian Government. |
| *References:* | x |

## 105. Narsahi Ghol (नरसही घोल)

| | |
|---|---|
| *Situation:* | B colony, Ward No. 9, Narashahi VDC, 24 km south from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This ghol is a perennial area, near the Gandak Barrange about 7 km west. This area is used by mallah and local people to catch fish and other aquatic resources. |
| *Location:* | Latitude: 27°26'28.1" N Longitude: 83°51'55.2" E Altitude: 214 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important plants of the shoreline of the ghol constitute *Ipomoea fistulosa* (Besharam), *Paspalum distichum,* and *Alternanthera sessilis.* |
| *Importance to Wildlife:* | The wetland is important feeding ground for the aquatic bird species including *Anastomus oscitas, Ciconia episcopus, Leptoptilos javanicus, Pseudibis papillosa, Phalacrocorax carbo, Ardeola grayii , Egretta alba, alcedo atthis, Ceryle rudis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (85%), Pasture (5%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution and agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | About 4,639 population of Narasahi VDC use the ghol resource. This VDC has 768 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. In the middle of rice field but away from human Settlement. |
| *References:* | x |

## 106. Nepal Gandak Wetsern Canal (नेपाल गण्डक पश्चिमी नहर)

| | |
|---|---|
| *Situation:* | Belashpur, Ward No. 3, Kusma VDC, 6 km from Parasi Bazar, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | The 32 km long canal from the Gandak Barrage from Tribeni connect several VDC's of Nawalparasi. Irrigation is possible only in the rainy season. The sissoo tree along the embankment areas are good for avifauna. |
| *Location:* | Latitude: 27°28'48.0"N Longitude: 83°48'37.3"E Altitude: 208 m. |
| *Area:* | 10.300 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | The canal has inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The embankment of the canal is planted with Sissoo (*Dalbergia sissoo*). The other important plants are *Colocasia esculenta, Cassia tora, Achryranthes aspera, Chrysopogon aciculatus,* and *Cynodon dactylon.* |
| *Importance to Wildlife:* | The seepage from irrigation canal from provides an important feeding ground for a number of aquatic bird species including *Ardeola grayii , Egretta alba, Ceryle rudis, Alcedo atthis, Anastomus oscitans, Leptoptilos javanicus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (90%), Pasture (5%), Settlement (5%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The wetland is utilized by the people of 5 VDCs which have a total population of 29,156 and 5,007 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Protected by Department of Irrigation. |
| *References:* | x |

## 107. Bhumahi Khola (भूमही खोला)

| | |
|---|---|
| *Situation:* | Bhumahi, Ward No. 1, Ramnagar VDC, 7 km to Sunwal, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | This is a perennial stream that comes out of the Mahabharat range and provides good habitat for wildlife including birds. The floodplain contains sissoo , sal and other vegetation. |
| *Location:* | Latitude: 27°34'47.8"N Longitude: 83°41'51.7"E Altitude: 215 m. |
| *Area:* | 3,800 ha |
| *Wetland Type:* | 4 |
| *Climate:* | Tropical |
| *Hydrology:* | It has inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major plants comprise of *Ipomoea fistulosa, Chrysopogon aciculatus, Colebrookea oppositaefolia, Saccharum spontaneum, Cassia tora, Cynodon dactylon, Cyperus rotundus.* |
| *Importance to Wildlife:* | This wetland is an important feeding area for a number of water birds including *Anastomus oscitans, Leptoptilos javanicus, Amaurornis phoenicurus, Ceryle rudis, Alcedo atthis, Ardeola grayii , Butorides striatus.* Wild fishes mostly *Barilius bendelisis* and *Noemacheilus botia* are common in this river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (85%), Pasture (5%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, plant harvest, fishing, grazing, fodder, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | This Khola flows through 6 VDCs which have 5,539 households and 33,838 popualtion. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It passes through the middle of the forests. |
| *References:* | x |

## 108. Narayani Floodplain (नारायणी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Gaidakot, Ward No. 9, Gaidakot VDC, 3 km west to Gaidakot town, Nawalparasi District. |
| *Development Region:* | Western |
| *Physiography:* | Terai |
| *Overview:* | Narayani floodplain houses RCNP and Tribeni dam. The floodplain spreads in Chitwan and Nawalparasi districts. The floodplain and river are good for rhinocers, dolphins and gharial crocodiles. |
| *Location:* | Latitude: 27°42'15.3" N Longitude: 84°21'15.3" E Altitude: 263 m. |
| *Area:* | 38,000 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | This river has inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The inlands formed by the river is chiefly covered by *Saccharum spontaneum*. The area has *Bombax ceiba, Dalbergia sissoo, Tecoma grandis* (papaya plants in Nagar Ban). The bank of the area also consists of many grasses and sedges. |
| *Importance to Wildlife:* | The floodplain support a number of water birds including *Ceryle rudis, Anastomus oscitans, Ephippiorhynchus asiaticus, Pavo cristatus, Tadorna ferruginea, Anas crecca, Aythya ferina, Ciconia nigra, Dupetor flavicollis*. Floodplain with grasses, *Sachharum* sp., *Imperata* sp., *Phragmites* sp., *Narenga* sp., *Themeda* sp. are the rhinos (*Rhinoceros uniceroni*) favourite habitats.<br>Notable repitle in the river includes *Gavialis gangeticus*.<br>Another notable aquatic fauna in the Naryani river is rare *Platanista gangetica*. The Smooth Coated Otter (*Lutrogale perspicillata*) also occurs in the river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (25%), Grass Land (25%), Open Forest (15%), Dense Forest (30%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest, fuel source, religious value |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | About 25 VDC's are affected by the floodplain. Their total population is 105,203, which covers Chitwan and Nawalparasi Districts. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Because it is one of the biggest river housing the RCNP. |
| *References:* | x |

## 109. Rampur Ghol (रामपुर घोल)

| | |
|---|---|
| *Situation:* | IAAS Rampur, Ward No.2, Mangalpur VDC, 9 km south-west from Narayanghat Bazar, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This ghol is located inside the campus of the Institute of Agricultureal and Animal Science (IAAS). It provides water to the villagers for irrigation. Aquifers and springs are its source of water and is perennial in nature. |
| *Location:* | Latitude:27°38'14.1" N Longitude: 84°21'25.2" E Altitude: 257 m. |
| *Area:* | 15 ha |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | This ghol has inflow, outflow and small earthen weir. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic and semi aquatic plants of the Ghol are *Colocasia esculenta, Utricularia aunea, Monochoria vaginalis, Monochoria hastata, Sagittaria quayanensis, Typha aungustifolia, Scirpus mucronatus, Leersia hexandra, Azolla imbricata* and *Lemna* sp. The major trees species is *Bombax ceiba.* |
| *Importance to Wildlife:* | This wetland provide foraging ground for a number of water birds including *Ceryle rudis, Alcedo atthis, Ardeola grayii , Egretta alba, Ciconia episcopus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (65%), Grass Land (10%), Pasture (25%), Settlement (5%). |
| *Uses:* | Irrigation, plant harvest, fishing, grazing,fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | Mangalpur VDC has 2,580 households with 12,969 population. |
| *Research Works:* | Some research works have been carreid out to investigate wetland plants, snails, etc. |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is protected by IAAS. |
| *References:* | Dangol and Gurung 1995. Plant Communities of Chitwan, Report submitted to IUCN/NEMP.<br>Shah, Sham Kishor 1987. Snail submitted to Winrock International. |

## 110. Khageri Canal (खगेरी नहर)

| | |
|---|---|
| *Situation:* | Kappar Khori, Ward No. 9, Ratnanagar VDC, 3 km east to Ratnanagar (Tandi), Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | A 22.5 km long canal built in 1969 is vitally important for irrigating rice fields of over 8 VDC's in Chitwan. This canal is a source of water for Beesh Hazar Tal. Its shore area are covered with sal and saj trees. |
| *Location:* | Latitude: 27°37'54.4" N Longitude: 84°29'30.7" E Altitude: 286 m. |
| *Area:* | 4,750 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | This canal has inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The water body of the canals consists of aquatic and semiaquatic plants such as *Potamogeton nodosus, Hydrilla verticillata, Ottelia alismoides, Lemna* spp. etc. The following plants are chiefly found in the margin of the canal: *Alternanthera sessilis, Cyperus iria, Ipomoea fistulosa* and *Eclipta prostrata.* |
| *Importance to Wildlife:* | The canal and reservoir provides an important foraging ground for aquatic birds including *Alcedo atthis, Halcyon smyrnensis, Egretta alba, Anas crecca,Gallinula chloropus, Nettapus coromandelianus, Bubo nipalensis, Corvus macrorhynchos.*<br>Six species of wild fish occurs in this canal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agricultue (60%), Barren Land (5%), Dense Forest (30%), Settlement (5%) |
| *Uses:* | Irrigation,domestic use, plant harvest, fishing, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | This canal provides the irrigation for 8 VDCs which has a total population of 64,648. About 12,122 households are benefitted from this canal. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Good water source for irrigation and is protected by Department of Irrigation. |
| *References:* | Dangol, Gurung and Bhandari 1995. Studies on Plant Communities of Natural and Man-engineered Ecosystems in Chitwan. A Report submitted to IUCN/NEMP. |

## 111. Khageri Floodplain (खगेरी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Kappar Khori, Ward No. 9, Ratnanagar VDC, 3 km to Ratnanagar Bazar, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This floodplain runs through the forest of Tikauli and meet the Rapti River downstream near Saurah. It also provides water to Khageri canal and is a good habitat for avifauna. |
| *Location:* | Latitude: 27°38'03.1" N Longitude: 84°29'25.1" E Altitude: 286 m. |
| *Area:* | 4,750 ha |
| *Wetland Type:* | 2, 5, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has permanent inflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The waterbody consists of *Lemna* spp. and *Azolla imbricata* and margin of the stream is covered by *Ipomoea fistulosa*. Some tree species of the area are *Dalbergia sissoo, Bombax ceiba* and *Terminalia tomentosa*. |
| *Importance to Wildlife:* | The following water bird species have been recorded from the floodplain, *Halcyon smyrnensis, Nettapus coromandelianus, Anas crecca, Gallinula chloropus, Alcedo atthis, Egretta alba*.<br>Wetland dependent threatened mammal i.e. *Rhinoceros unicornis* visit this area.<br>Six species of wild fish occurs in the area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (50%), Grassland (4%), Open Forest (10%), Pasture (3%), Barren (2%), Dense Forest (20%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder |
| *Conversion Practices:* | Irrigation and fishing |
| *Threats and Disturbances:* | Siltation, human encroachment, use of fertilizers, flooding, road construction. |
| *Conservation Plan:* | x |
| *Human Population:* | This floodplain affects 127,042 population within 24,336 households of 9 VDCs of Chitwan District. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Protected by District Forest Office of Chitwan. |
| *References:* | x |

## 112. Pancha Kanya Ghol (पञ्च कन्या घोल)

| | |
|---|---|
| *Situation:* | Tikauli Mangalpur, Ward No. 7. Pancha Kanya VDC, 4 km north from Tandi (Ratnanagar). |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This ghol is important for irrigation. The ghol is perennial in nature. |
| *Location:* | Latitude: 27°38.43.0" N Longitude: 84°29'48.8" E Altitude: 282 m. |
| *Area:* | 60 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | This wetland has a permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The wetland provides habitat for many aquatic plants. The major aquatic plants are *Hydrilla verticillata, Eichhornia crassipes, Lemna* spp., *Azolla imbricata, Ottelia alismoides,* etc. The margin of the area is covered by *Ipomoea fistulosa, Polygonum barbatum* and *Polygonum lapanthifolium.* |
| *Importance to Wildlife:* | This wetland is an important feeding habitat for a number of water bird including *Alcedo atthis, Ardeola grayii , Sterna albifrons.*<br>Two species of wild fish have been recorded from this wetland. |
| *Special Features:* | x |
| *Land Ownership:* | Goverment land |
| *Land Use:* | Agriculture (95%), Settlement (5%) |
| *Uses:* | Irrigation, fishing, grazing, plant harvest |
| *Conversion Practices:* | The land is being invaded by local people for agricultural production. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | This canal is used by 5 VDCs for irrigation and is useful for 8,879 households and 47,946 popualtion of the area. |
| *Research Works:* | x |
| *Others:* | Pancha Kanya Irrigation Project for the area. |
| *Overall Ranking:* | Fair. This is in good condition because of irrigation canal. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 113. Budhi Rapti Floodplain (बुढी राप्ती बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Parsa Bazar, Ward No. 7, Khairhani VDC, 1 km east from Parsa Bazar, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Budhi Rapti River that comes from the foothill of the Mahabharat range makes a floodplain that is fertile and good for birds. It meet the Khageri Khola before meeting the Rapti River. |
| *Location:* | Latitude: 27°36'50.2" N Longitude: 84°33'34.6" E Altitude: 290 m. |
| *Area:* | 5,470 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | The Budhi Rapti River has a permanent inflow and outflow |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The embankment area of the river near the bridge comprise of *Ipomoea fistulosa, Colocasia esculenta, Cassia tora, Saccharum spontaneum, Chrysopogon aciculatus* and *Cynodon dactylon.* |
| *Importance to Wildlife:* | The Budhi Rapita Floodplain support a number of water birds including *Egretta alba, Ceryle rudis, Alcedo atthis Ardeola grayii , Ciconia episcopus.*<br>Four species of wild fish have been reported from this area. |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, domestic use, plant harvest and fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | This floodplain affects 53,729 people of 7,500 households of 5 VDCs of Chitwan District. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Less human encroachment. |
| *References:* | x |

## 114. Chitwan Rapti Floodplain (चितवन राप्ती बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Sauraha, Ward No. 2, Bachhauli VDC, 8 km south from Ratnanagar Tandi, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Rapti floodpian houses touristic town of Saurah in Chitwan. This is famous for elephant ride, rhino watching and other recreation and entertainment for tourists. The floodplains also covers the small valleys and floodplain of Lothar and Monohari rivers. |
| *Location:* | Latitude: 27°50'21.2" N Longitude: 84°45'57.7" E Altitude: 254 m. |
| *Area:* | 16,875 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | This wetland has permanent inflow and outlfow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The dry part (area) of the river is heavily covered by *Saccharum spontaneum*. The major trees of the floodplain area are *Terminalia tomentose, Tewia nudifolia, Adiona crodifolia, Bombax ceiba* and *Dalbergia sissoo*. |
| *Importance to Wildlife:* | The Rapti River and small ox-bow lakes provide an optimal feeding ground for migratory and resident birds and crocodiles (*Crocodylus palustris*). The riparian and aquatic habitats harbour many species of fish, amphibians, reptiles, birds and mammals including *Rhinoceros unicornis*.<br><br>The floodplain, which is prone to waterlogging conditions, has patches of grassland and harbor the bird species, *Pavo cristatus, Houbaropsis bengalensis, Egretta alba, Alcedo atthis, Anas crecca, Bubo nipalensis*.<br><br>Notable reptiles in the river are *Gavials gangeticas* and *Crocodilus palustris*. Areas with high sand banks and deep pools in depth are the most suitable foraging and nesting habitat for *Gharial*.<br><br>The Rapiti floodplain habitats characterized by grass species. *Sachharum spontaneum, Imperata cylindrica, Phragmites* sp., *Narenga* sp. and *Themeda* species, supports population of the greater one horned *Rhinoceros* and deers such as *Axis axis* and *Axis porcinus*.<br><br>*Lutrogale pesspicillata* is another common aquatic fauna occuring in the river.<br><br>Ten species of fish are reported from the Rapti floodplain. |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Agriculture (20%), Open Forest (30%), Dense Forest (50%) |
| *Uses:* | Irrigation, fishing, grazing, religious value, domestic use, transport, plant harvest, recreation. |
| *Conversion Practices:* | The fertile shore area is being invaded by Sukumbasi (landless people). |
| *Threats and Disturbances:* | Filling, dreding, building construciton. |
| *Conservation Plan:* | x |
| *Human Population:* | About 186,234 people of Makawanpur (5 VDC) and Chitwan (5 VDC) districts are affected by the Rapit river. There are a total of 33,692 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It flows along the Royal Chitwan National Park. |
| *References:* | x |

## 115. Beesh Hazar Tal (बीस हजार ताल)

| | |
|---|---|
| *Situation:* | Tikauli Ward No. 3, Gitanagar VDC, 7 km from Tandi Bazar, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Situated along the Khageri canal amidst the Tikauli forest near Bharatpur Municipality is the lake called Beesh Hazar Tal, which is ecologically very important. It is connected with other six ponds, ghols and swamps. It has both inflow and outflow of water from the canal. |
| *Location:* | Latitude: 27°37'04.6" N Longitude:84°26'11.3" E Altitude: 286 m. |
| *Area:* | 100 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | Khageri Irrigation Canal and rain accumulation are its sources of water. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants in the rainy season comprise of *Trapa bispinosa, Hydrilla verticillata, Ipomoea aquatica, Ceratophyllum demurgum, Potamogeton nodosus, Potamogeton crispus*. The marginal area of the Tal comprised of *Commelina difusa, Flocospa scandens, Hemarthria compressa, Alterranthera sessilis, Eclipta prostrata, Ipomoea fistulosa, Polygonum barbatum*, etc. The major trees are *Shorea robusta, Terminalia tomentosa, Mallotus philippinensis* and *Engenia jambolana*. |
| *Importance to Wildlife:* | Prominent lakes situated outside the RCNP, surrounded by tropical mix hard wood sal forest supports a resident and wintering population of many species of waterfowls. The lake supports number of fish, turtles, marsh crocodile (*Crocodylus palustris*). The observed bird species includes *Halcyon smyrnensis, Ceryle rudis, Anhinga melanogaster, Butorides striatus, Ardeola grayii , Alcedo atthis, Dendrocygna javanica, Ciconia episcopus, Anastomus oscitans, Hydrophasianus chirurgus, Anas crecca, Ibidorhynacha struthersii, Pseudibis pappilosa, Ichthyophaga ichthyaetus, Metopidius indicus, Sterna albifrons, Bubo nipalensis*.<br><br>Other natble reptile species include *Crocodylus palustris, Varanus flavescens, Python molurus*.<br><br>Adjoing with RCNP, this mixed hard wood sal forest serves as a wildlife corrider between Churia and Mahabharat range.<br><br>Mammal species includes *Axis axis, Muntiacus muntjac* and *Cervus unicolor* . This forest supports small population of Rhino<br><br>*Benthic fauna* includes chironomids and snails. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, recreation, fuel source. |
| *Conversion Practices:* | Fodder collection, livestock grazing, fuelwood collection. |
| *Threats and Disturbances:* | Fishing practices by contractors to drain the lake to extract the fish. But now stopped. Hotel buildings are proposed at the lake side. Dredging/drainage, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | Many researches on different disciplines have been carried out. |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Because it is beautiful with rich in biodiversity and adjacent to RCNP. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 116. Jaya Mangala Ghol (जय मङ्गला घोल)

| | |
|---|---|
| *Situation:* | Jaya Mangala village, Ward No. 7, Padampur VDC, 2 km from Sauraha, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This ghol is seasonal and is situated close to the village of Jaya Mangala in Padampur VDC. This ghol area is heavily used by local people. |
| *Location:* | Latitude: 27°30'36.6" N Longitude: 84°28'39.3" E Altitude: 214 m. |
| *Area:* | 3 ha |
| *Wetland Type:* | 9 |
| *Climate:* | Tropical |
| *Hydrology:* | No permanent inflow, outflow or dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic plants comprised of *Hydrilla verticillata* and *Ipomoea aquatica*. The margin of the ghol area is dominated by *Saccharum sportaneum, Dryopteris* sp., and *Lantana camara*. The major tree species recorded are *Trewia nudiflora, Terminalia tomentosa, Adina cardifolia* and *Bombax ceiba*. |
| *Importance to Wildlife:* | Recorded bird species of this wetland (ghol) includes *Ardeola grayii , Alcedo atthis, Bubo nipalensis, Houbaropsis bengalensis, Pavo cristatus* Wetland dependent mammal species includes *Rhinoceros unicornis* and *Panthera tigris*. |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Agriculture (10%), Grass Land (75%), Open (5%), Pasture (5%), Barren Land (5%). |
| *Uses:* | Fishing, grazing, domestic use, fodder, plant harvest. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Building construction, agricultural runoff, filling, monspecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | About 8,884 inhabitants of the Padampur VDC use this ghol. This VDC has 1,559 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It is inside the protected area but near the village. |
| *References:* | x |

## 117. Devi Tal (देवी ताल)

| | |
|---|---|
| *Situation:* | RCNP, 51 km west from Kashara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Inner Terai |
| *Overview:* | A beautiful Tal near the Narayani floodplain is surrounded by *Phragmites* and sal forest. The lake is invaded by water hyacinth. This is a good place for rhinoceros and tigers. |
| *Location:* | Latitude: 27°32'00.0" N Longitude: 84°07'00.0" E Altitude: 225 m |
| *Area:* | 11.1 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has permanent inflow and outlfow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | Watershed area (745.7 ha) depth (3m), water volume 340,000 $m^3$, Retention time 55 months. |
| *Limnology:* | x |
| *Major Flora:* | The principal aquatic plants consists of *Eichhornia crassipes, Potamogeton* spp., *Hydrilla verticillate* etc. The margin of the Tal is covered by *Phragmites karka* and *Saccharum spontaneum*. The Tal is surrounded by following major trees: *Dalbergia sissoo, Acacia catechu, Bobax ceiba,* and *Trewia nudiflora*. |
| *Importance to Wildlife:* | This lake is one of the prominent lake of Chitwan and is very important wintering area for a wide variety of waterfowls. Chitwan is very important for wintering birds (about 160 in total) - both for winter visitors from outside Nepal and for many altitudinal migrants which descend to the lowland outside breeding season - as well as being a valuable staging point for numerous passage migrant species (Inskipp, 1989). Detail description of the aviafauna are given by Scott (1989). The observed bird speices are *Anastomus oscitans, Nycticorax nycticorax, Anhinga melanogster, Phalacrocora niger, Egretta intermedia, Egretta alba, Leptoptilos javanicus, Egretta garzetta, Amaurornis phoenicurus, Anas acuta, Dendrocygna javanica*.<br><br>The RCNP is renowned for its rich mammalian fauna of over 43 species. The wetland's riparian vegetation consist of *Shorea robusta* forest with sparsely distributed grass sp. e.g. *Sachharum, Imperata, Phragmites, Narenga,* and *Themede* which supports the viable population of the threatened mammal species e.g. *Panthera tigris* and *Rhinoceros unicornis*. This wetland area is considered suitable habitat for *Panthera tigris*.<br><br>The lake is in hypereutrophic condition. The upper surface of the lake is almost covered by water hyacinth *Eichhornia crassipes*, thereby threatening the existence of many fishes, reptiles, birds and mammals present there. |
| *Special Features:* | x |
| *Land Ownership:* | DNPWC. |
| *Land Use:* | Grass Land (90%), Dense Forest (10%). |
| *Uses:* | Fishing, other uses. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road and building construction, filling, monospecific domination. |
| *Conservation Plan:* | Water hyacinth cleaning programme is launched by International Turst for Nature Conservaiton in collaboration with RCNP. |
| *Human Population:* | x |
| *Research Works:* | Limnological survey research. |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the RCNP. |
| *References:* | McEachern, Preston, 1994. Limnological Survey of Devi Tal Wetland, Chitwan, Nepal. Kathmandu: NSC Implementation Project.<br><br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 118. Reu Floodplain (रिऊ बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | RCNP, 9 km west from Kashara HQ, Chitwan district. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This floodplain that is situated at the sourthern side of the protected area is a fertile plain. The Reu river meets the Rapti at Meghauli. This area is rich in aquatic resources. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | 5,500 ha |
| *Wetland Type:* | 2, 5, 13 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Major trees are *Bombax ceiba, Acacia catechu* and *Trewia nudiflora*. The other important plants are *Eupatorium odoratrem, Colebrookia oppositaefolia, Pogostemone benghalensis,* and *Saccharum spontareum.* |
| *Importance to Wildlife:* | Reu River has formed one of the important floodplain of RCNP, providing a foraging ground for a large number of wetland dependent birds and important mammals. The important bird species includes *Phalacrocorax carbo, Butorides striatus, Anastomus oscitans, Ciconia episcopus, C. ciconia, C. nigra, Ephippiorhynchus, asiaticus, Leptoptilos javanicus, Tadorna ferruginea, Aythya ferina, Anas crecca.* The floodplain habitat sutiable for wildlife e.g. *Cervus cinicolor, Axis porcinus* and *Rhinoceros cinicornis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. It is inside the RCNP. |
| *References:* | x |

## 119. Tamar Tal (तमर ताल)

| | |
|---|---|
| *Situation:* | RCNP, 5 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This small oxbox lake is rich in flora. Its marshes are good habitat for wildlife and birds. |
| *Location:* | Latitude: 27°31'59.0"N Longitude: 84°21'03.0"E Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major aquatic flora constitute *Hydrila verticillata* and water lily (*Nymphaea* sp.). The wetland is gradually changed into eutrophic. |
| *Importance to Wildlife:* | The wetland is one of the prominent lake of RCNP harbouring waterfowl. Chitwan is very important for wintering birds (aobut 160 in total) - both for winter visitors from outside Nepal and for many altitudinal migrants which descend to the lowlands off the breeding seasons - as well as being a valuable staging point for numerous passage migrant species (Inskipp, 1989). Detail description of the waterfowl are given by Scott (1989). The wetland provides an important feeding habitat for a number of aquatic birds including *Anastomus oscitans, Nycticorax nycticorax, Ardea purpurea, Phalacrocorax niger, Anhinga rufa, Leptoptilos javanicus, Egretta alba, E. intermedia, E. grarzetta, Amaurornis phoenicurus*. The wetland is in eutrophic condidtions. Large number of benthic fauna such as snails are found on the surface as well as in bottom of water. Serves as a waterhole for many wildlife of the area. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural eutrophicatian and vegetational succession. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is situated inside the protected area. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 120. Lami Tal (लामी ताल)

| | |
|---|---|
| *Situation:* | RCNP, 5 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Tal is rich in aquatic vegetation and provides a good habitat for wildlife. Some crocodiles are found here. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | x |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The wetland is surrounded by riparian vegetation consisting of *Bombax ceiba* with grasses. The major aquatic plant is *Hydrilla verticillata*. |
| *Importance to Wildlife:* | One of the prominent oxbow lake of RCNP, providing breeding, wintering and staging areas for variety of waterfowls. RCNP is very important for wintering birds (about 160 in total) both for winter visitors from outside Nepal and for the many altitudinal magrants which descend to the lowlands outside the breeding season as well as valuable staging point for numerous passage migrant species (Inskipp, 1989). The waders and waterfowl includes *Podiceps cristatus, Phalacrocorax carbo, Anhinga mlanogaster, Ardea purpurea, Butorides striatus, Nycticorax nycticorax, Egretta alba, E. intermedia, E. garzetta, Dupetor flaviollis, Anastomus oscitans, Ciconia ciconia, Ciconia episcopus, Leptoptilos javanicus, Denodrocygna javanica, Anas acuta, Anas crecca, Nettapus coromandelianus, Amaurornis phoenicurus*. Detailed information of the ormithological fuana are given by Scott (1983).<br><br>The wetland's riparian vegetation consisting of grass species e.g. *Sachharum* sp., *Imperata* sp., *Narenga* sp., *Themeda* sp., *Phragmits* sp. and scattered *Bombax ceiba* trees provide suitable habitat for greater one horned rhino (*Rhinoceros unicornis*). The *Bombax ceiba* trees provide good roosting site for storks. The wetland has been considered important habitat for *Rhinoceros cunicornis* which frequently visit to this area for wallowing. Sloth bear (*Ursus ursinus*) also occurs in this area. The Lami Tal is of two types; Sano Lami Tal and Thulo Lami Tal. The Sano Lami Tal consists of savanna grassland (grassland with *Bombax ceiba* trees) whereas Thulo Lami Tal is having scattered Sal forest with grassland. Sano Lami Tal is located near the Kasara. Here birds are more in number than in Tamar and Thulo Lami Tal. The lake is in eutrophic condition. One can easily see the large number of benthic fauna on the water surface as well as in the bottom of water. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | Natural eutropication and vegetational succession. |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the protected area. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 121. Nandan Tal (नन्दन ताल)

| | |
|---|---|
| *Situation:* | RCNP, 4 km of Saurah, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Two small ponds I and II are in the Dense Forest of RCNP. This area is a good habitat for wildlife and birds. |
| *Location:* | Latitude: 27°32'26.5" N Longitude:84°28'17.8" E Altitude: 209 m. |
| *Area:* | 9 ha |
| *Wetland Type:* | 6, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | The wetland has no permenent inflow, outflow or dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | *Hydrilla verticillata*, a submerged aquatic, is found in the lake. The other plants recorded in the area are *Calotropis gigantea* and *Saccharum spontaneum*. The trees of the area comprised of *Terminalia tomentosa, Engenia jambolana* and *Sygygium cumini*. |
| *Importance to Wildlife:* | This wetland supports many species of waterfowls. This wetland provides foraging habitat for a number of aquatic birds including. *Anastomus oscitans, Nycticorax nycticorax, Ardea purpurea, Phalacrocorax niger, Anhinga melanoaster, Leptoptilos javanicus, Egretta alba, E. intermedia, E. garzetta, Amaurornis phoenicurus, Anas acuta.*<br>The RCNP consist of over 43 species of mammals, the great one horned Rhinoceros (*Rhinoceros unicornis*) visit this wetland. Among the reptilian fauna marsh crocodile *Crocoylus palustris* and *Aspideretes gangeticus* occurs in this wetland. The wetland serves as a water hole for many wildlife. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area. |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Eutrophication, vegetational succession |
| *Conservation Plan:* | No. |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is situated inside the protected area. |
| *References:* | x |

## 122. Chamka Floodplain (चम्का वाढक्षेत्र)

| | |
|---|---|
| *Situation:* | RCNP, 31 km west of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | - |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The floodplain is characterized by the tree species like Vellar (*Trewia nudiflora*), Sal (*Shorea robusta*) and Simal (*Bombax ceiba*), *Saccharum* spp. and *Imperata* sp. are the major shore line species. |
| *Importance to Wildlife:* | This floodplain provides an important feeding ground for a large number of aquatic and other bird species. The important bird species in this wetland includes *Phalacrocorax cerbo, Anhinga rufa, Butorides, striatus, Ardeola grayii , Egretta alba, E. Intermedia, E. garzetta, Ixobrychus sinensis, Anastomus oscitans, Ciconia ciconia, Ephippiorhynchus asiaticus, Leptoptilos javanicus, Ciconia episcopus, Pseudibis papillosa, Anas acuta*. The *Bombax* trees provide the roosting site for large wader birds. The wetland serves as a water hole for many mammals. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area. |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the protected area. |
| *References:* | x |

## 123. Dhakre Tal (धाक्रे ताल)

| | |
|---|---|
| *Situation:* | RCNP, 28 km of Kasara HQ, Chitwan |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | - |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The wetland is surrounded by Sal trees. The important aquatic plants consitute duck weeds (*Lemna* spp.), *Azolla, Hydrilla verticillata.* |
| *Importance to Wildlife:* | This wetland is smaller in size than Tamar Tal and Lami Tal and is supporting small waterfowl population. It is providing an important feeding ground for a number of aquatic birds including *Podiceps cristatus, Phalacrocorax niger, Anhinga rufa, Ardea purpurea, Butorides striatus, Nycticorax nycticorax, Anastomus oscitans, Ciconia episcopus, Ciconia ciconia, Leptoptilos javanicus, Anas acuta, A. crecca, Dendrocygna javanica, Amaurornis phoenicurus.* |
| *Special Features:* | |
| *Land Ownership:* | Protected area |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural eutrophication and vegetational succession. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the protected area. |
| *References:* | x |

## 124. Kamal Tal (कमल ताल)

| | |
|---|---|
| *Situation:* | RCNP, 10 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | A small pond inside the protected area. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The wetland is surrounded by sal forest. The major aquatic plants are water hyacinth (*Eichhornia crassipes*) and hydrilla plant (*Hydrilla verticillata*). |
| *Importance to Wildlife:* | It is smaller than Lami Tal, Tamar Tal and Nandan Tal. The lake is in eutrophic condition. The growing water hyacinth (*Eichornia crassipes*), along the shoreline area has threatened the fishes. Therefore, this wetland harbors less number of waterfowl populations. The important bird species in this lake includes *Podiceps cristatus, Phalacrocorax carbo, Ardea purpurea, Nycticorax nycticorax, Egretta alba, E. intermedia, E. garzetta, Ciconia ciconia, Ciconia episcopus, Leptoptilos javanicus,Anhinga melanogaster, Amauroruis phoenicurus*. Benthic snails and chironomids are found along the lake surface and bottom of the lake.<br><br>The wetland is surrounded by sal forest. Therefore it is occasionally used by the Great One Horned Rhinoceros (*Rhinoceros unicornis*). It serves as a waterhole for deer species such as *Axis axis, Axis porcinus, Cervus unicolor, Muntiacus muntjac*. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area |
| *Land Use:* | x |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural eutrophication and vegetational succession. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is situated inside the protected area. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 125. Munda Tal (मुण्डा ताल)

| | |
|---|---|
| *Situation:* | RCNP, 35 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Tal is a good habitat for wildlife in the RCNP area. |
| *Location:* | Latitude: 27°33'17.0" N Longitude: 84°21'38.0" E Altitude: N/A |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | *Shorea robusta* trees surrounds the lake. *Eichhornia crassipes* (water hyacinth) and *Hydrilla verticillata* (hydrilla) are the major aquatic plants. |
| *Importance to Wildlife:* | The wetland is in eutrophic condition. It is surrounded by Sal (*Shorea rubusta*). This wetland supports fewer waterfowl populations. Important water birds includes *Phalacrocorax carbo, Anhinga melanogaster, Ardea purpurea, Ciconia ciconia, Ciconia episcopus, Nycticora nycticorax, Leptoptilos javanicus, Egretta alba, E. intermedia,E. garzetta, Amaurornis phoenicurus, Anas acuta*. More number of benthic fauna is seen on the lake surface due to its eutrophic condition.<br><br>The great one horned Rhinoceros (*Rhinoceros unicornis*) occasionally visit to this wetland. But occasionally rhino uses sal forest. The deer species such as *Axis axis, Axis porcinus, Muntiacus muntjac, Cervus unicolor* use this wetland as a water hole. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area |
| *Land Use:* | x |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural eutrophication and vegetational succession. |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is situated inside the protected area. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 126. Nanda-Bhauju Tal (नन्द-भाउजु ताल)

| | |
|---|---|
| *Situation:* | RCNP, 20 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Nanda-Bhauju Tal is a small Tal in the middle of protected area. It is vitally important for wildlife. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 6 |
| *Climate:* | Subropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Surrounded by Sal trees, this wetland consists of common aquatic plants include *Hydrilla verticillata* and water hyacinth (*Eichhornia crassipes*). |
| *Importance to Wildlife:* | The wetland is considered important as breeding area for few turtle species occuring in the wetland. Smooth coated otter (*Lutrogale perrcipillata*) occurs here. And this wetland serves as a water hole for many wildlife species. |
| *Special Features:* | x |
| *Land Ownership:* | Protected area. |
| *Land Use:* | x |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Natural eutrophication, vegetational succession |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is inside the RCNP. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 127. Sapnabati Ghol (सप्नावती घोल)

| | |
|---|---|
| *Situation:* | RCNP, 8 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This ghol because of its situation inside the protected area is important for wildlife. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 10, 18 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major plants are *Lemna* spp., *Monochoria hastata, Azolla* spp., *Leersia hexandra, Scirpus* spp. (*S. mucronatus, S. erectus*), *Cyperus* sp., and *Paspalum distichum.* |
| *Importance to Wildlife:* | This wetland is supporting a few number of waterfowl population. It is a important foraging ground for aquatic birds including *Phalacrocorax carbo, Anhinga melanogaster, Nycticorax nycticorax, Ciconia episcopus, Leptoptilos javanicus, Egretta alba, E. intermedia, E. garzetta, Amaurornis phoenicurus, Alcedo atthis, Halcyon smyrnensis.* |
| *Special Features:* | x |
| *Land Ownership:* | Protected Area |
| *Land Use:* | x |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because it is situated inside the protected area. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 128. Simaron Ghol (सिमरोन घोल)

| | |
|---|---|
| *Situation:* | RCNP, 5 km of Kasara HQ, Chitwan District. |
| *Development Region:* | Chitwan |
| *Physiography:* | Terai |
| *Overview:* | x |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 10, 18 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The important plants are *Lemna* spp., *Monochoria hastata, Azolla, Leersia hexandra, Paspalum distichum, Scirpus* spp. and *Cyperus* sp. |
| *Importance to Wildlife:* | The wetland is of little importance to the waterfowl population. The wetland provides as a foraging ground for a number of waterbird species including *Phalacrocorax carbo, Ardeola grayii , Egretta alba, Ciconia episcopus, Ciconia ciconia, Leptoptilos javanicus, Ceryle rudis, Alcedo atthis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | No |
| *Human Population:* | x |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Marginal areas being encroached for rice fields. |
| *References:* | x |

## 129. Rani Pokhari (रानी पोखरी)

| | |
|---|---|
| *Situation:* | Sharda Nagar, 10 km of Bharatpur, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | This small pond is in the middle of settlements. It never dries and water is used by livestock in the winter season. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The shoreline vegetation of the pond include *Paspalum distichum, Eclipta prostrata, Alternanthera sessilis, Lemna* spp. and *Cyperus iria.* |
| *Importance to Wildlife:* | This wetland is of little importance to waterfowl population. It is used as a fish stocking pond. Some of the important birds visiting this wetland for foraging includes *Phalacrocorax, Anhinga melangaster, Ardeola grayii , Egretta alba, Ciconia episcopus, Ciconia ciconia, Ceryle rudis, Alcedo atthis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fishing, aquaculture, grazing. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff |
| *Conservation Plan:* | No |
| *Human Population:* | About 7,133 inhabitants of Sharadanagar use the resources of the lake. The VDC has a total of 1,334 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. It is inside the protected area. |
| *References:* | x |

## 130. Gobreni Ghol (गोब्रेनी घोल)

| | |
|---|---|
| *Situation:* | Gunj Nagar, 10 km of Bharatpur, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The ghol is largely seasonal but becomes marsh in the winter. The seasonal streams and springs are the source of water. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major grasses of the ghol constitute *Paspalum dinstichum, Leersia hexandra,* and *Paspalum scrobiculatum*. Other important plants include *Fimbistylis* sp., *Lemna* spp., *Azolla,* etc. |
| *Importance to Wildlife:* | The wetland is of little importance to the waterfowl population. It provides a foraging ground for *Phalacrocorax carbo, Ardeola grayii , Egretta alba, Ciconia episcopus, Ciconia ciconia, Leptoptilos javanicus, Ceryle rudis, Alcedo atthis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, |
| *Conservation Plan:* | x |
| *Human Population:* | About 11,076 inhabitants of Gunjnagar VDC use the resources of the lake. The VDC has a total of 2,025 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Marginal land encroached for rice cultivation. |
| *References:* | Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands, Technical Publication No. 1. Kathmandu, Nepal. |

## 131. Kerunga Ghol (केरुङ्गा घोल)

| | |
|---|---|
| *Situation:* | Jagatpur, Ward No. 4, Jagatpur VDC 10 km of Bharatpur, Chitwan District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The ghol is in the middle of the ricefield. During the rainy season the water from the ghol is used to irrigate the surrounding lands. |
| *Location:* | Latitude: x Longitude: x Altitude: x |
| *Area:* | x |
| *Wetland Type:* | 10 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The most of the ghol area is covered by different species of grasses such as *Leersia hexandra* and *Paspalum distichum*, and sedges (*Scirpus* spp.). Other important plants include *Monochoria vaginalis, Sagittaria quayanensis, Eclipta prostrata* & *Colocasia exulenta.* |
| *Importance to Wildlife:* | The wetland is of little importance to waterfowl population. It is supporting a number of aquatic birds including *Phalacrocorax carbo, Ardeola grayii, Egretta alba, Ciconia episcopus, Ciconia ciconia, Leptoptilos javanicus, Ceryle rudis, Alcedo atthis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%). |
| *Uses:* | Irrigation, domestic use, plant harvest, fishing, grazing. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | Some 7,737 inhabitants of Jagatpur VDC use the resources of the lake. The VDC has a total of 1,493 huseholds. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Seasonal and in the middle of agricultural lands. |
| *References:* | x |

## 132. Pasaha Floodplain (पसाहा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Pathlaiya, Ward No. 7, Pumbarwana, 10 km of Pathlaiya, Bara District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The river is seasonal but its wide floodplain that passes through **Char Koshe Jhadi** is vitally important for wildlife for watering and grazing. |
| *Location:* | Latitude: 27°10'59.6"N Longitude: 85°03'58.6" E Altitude: 240 m. |
| *Area:* | 8,750 ha |
| *Wetland Type:* | 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The principal tree species found in the floodplain area are *Dalbergia sissoo*, and *Bombax ceiba*. *Saccharum spontaneum*, *Lantana camara*, *Xanthium strumarium*, *Polygonum barbatum* and *Enpatorium odoratum* are also found here. |
| *Importance to Wildlife:* | The wetland is an important feeding habitat of *Vanellus indicus*, *Alcedo atthis*, *Nycticorax nycticorax*. Three species of fish have been reported from this area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (20%), Open Forest (10%), Barren (5%), Dense Forest (60%), Settlement (5%) |
| *Uses:* | Irrigation, plant harvest, fishing, grazing, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 20 VDC's share their boarder with it. Their population is 93,278 with 16,117households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is in good condition. |
| *References:* | x |

## 133. Halkhoria Daha (हदखोरिया दह)

| | |
|---|---|
| *Situation:* | Ratanpur, Ward No. 3, Ratanpuri VDC, 10 km of Pathlaiya, Bara District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Situated in the middle of the Char Koshe Jhadi in Bara District. Harkhoria Dah is the largest lake in the area. Due to draining and siltation the lake is becoming smaller and smallr. The lake is a heaven for wildlife and domestic animals in the dry season. |
| *Location:* | Latitude: 27°12'08.5" N Longitude: 85°04'52.6" E Altitude: 245 m. |
| *Area:* | 50 ha |
| *Wetland Type:* | 6, 10, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The trees of the Daha areas comprise of *Dalbergia sissoo, Terminalia tomentosa, Sygygium cumini* and *Adina codifolia*. The margin of the Daha is covered by *Saccharum spontaneum*. |
| *Importance to Wildlife:* | The lake is surrounded by sal forest, provides foraging ground for large number of birds including *Alcedo atthis, Ceryle rudis, Ketupa zeylonensis, Hirundo rustica, Sterna acuticauda, S. aurantia, Burhinus oedicnemus, Capella gallinago, Actitis hypoleucos, Tringa ochropus, T. heularia, Hoplopterus duvaucelii, Hoplopterus malabaricus, Porphyrio prophyrio, Amauromis phoenicurus, Aythya fuliula, Anas strepera, Anas crecca, Gallinago stenura, Tadorna feruiginec, Dendrolygna javanica, Pseudibis papillosa, Threskiornis melanocephalus, Leptoptilos javanicus, Ephippiorhynchus asiaticus, Ciconia episcopus, Anastomus oscitans, E. intermedia, E. garzetta, Nycticorax nycticorax, Ardeola grayii , Anhinga melanogaster* and *Phalacrocorax carbo*.<br><br>Eleven species of reptilian fauna have been recorded from the area including two protected species e.g. *Varanus flaveceus* and *Python molarus*. Among the Amphibian fauna, frog (*Rana tigrina*) is common. Three species of fishes have been recorded. Wetland serves as a waterhole for wildlife. |
| *Special Features:* | Temple of Mahadeva and Saranath Mahadev. |
| *Land Ownership:* | Government land and forest owned by the government. |
| *Land Use:* | Dense Forest (100%) |
| *Uses:* | Fishing, grazing, religious value, domestic use, fuel source |
| *Conversion Practices:* | Locals use primarily for grazing and watering cattle. |
| *Threats and Disturbances:* | Building construction, dredging/drainage/filling, monospecific domination. Water level is lowering. Filling of wetland is taking place. |
| *Conservation Plan:* | Bara Forest Management Plan is to be implemented by the Department of Forests for sustainable utilization of forest resources. |
| *Human Population:* | Approximately 6,463 inhabitants of Ratanpuri VDC use the resources of the lake. The VDC has a total of 1,167 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is less affected by human pressure and is inside the forest. |
| *References:* | EIA Report of the Bara District by IUCN Nepal<br><br>Operational Management Plan for the Bara District Area (1994/95-98-99 by FMUDP.<br><br>Biodiversity Profile Project (BPP). 1995. Biodiversity Assessment of Terai Wetlands. His Majesty's Government of Nepal and Government of the Netherlands. Technical Publication No. 1. Kathmandu, Nepal.<br><br>Bhandari. Socioeconomic Realities of Halkhoria Daha. |

## 134. Bakeya Floodplain (बकेया बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Tamagadhi, Ward No. 8, Tamagadhi VDC, 1.5 km of Nijgadh, Bara District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Bakeya River is perennial in nature and its water flowing through broad and fertile floodplain supports a good population of avifauna and wildlife. |
| *Location:* | Latitude: 27°10'47.4" N Longitude: 85°10'07.4" E Altitude: 251 m. |
| *Area:* | 13,875 ha |
| *Wetland Type:* | 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outlfow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | *Saccharum spontaneum* and *Imperata cylindrica* are two major grass species of the area. The tree species comprised of *Terminalia tomentosa, Sygygium cumini, Dalbergia sissoo* and *Mallotus philippinensis*. |
| *Importance to Wildlife:* | The wetland supports population of *Egretta alba, Alcedo atthis, Ciconia nigra, Ibidorhyncha struthersii, Bubo nipalensis, Ficedula strophiata* and *Nettapus coromandelianus*. About four species of wild fish have been reported from the area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private lands. |
| *Land Use:* | Agriculture (50%), Grass Land (50%) |
| *Uses:* | Irrigation, fishing, grazing, domestic use, fodder, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, pollution, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Twenty two VDC's from Bara and Rautahat district are along this floodplain area. Their total population is 102,114 and household, 18,543. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because of less human activities. |
| *References:* | x |

## 135. Gandak Nepal East Canal (गण्डक नेपाल पूर्वी नहर)

| | |
|---|---|
| *Situation:* | Gandak Chok, Ward No. 9, Bahuwari VDC, 5 km of Birgunj, Bara District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The canal starts from Tribeni at the district of Nawalparasi and passes through India to continue to Bara, Parsa and Rautahat. This canal is 80 km long but water is available upto 50 km near Bara. The embarkment areas are good for avifauna. |
| *Location:* | Latitude: 27°02'01.5" N Longitude: 84°54'49.8" E Altitude: 221 m. |
| *Area:* | 24,500 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow/outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The sissoo tree (*Dablergia sissoo*) is planted in the margin of the canal. The major flora of the canal comprises of *Colocasia esculenta, Croton sparsiflorus, Cassia tora, Chrysopogon aciculatus, Clerodendrum viscosum* and *Achryranthes aspera*. |
| *Importance to Wildlife:* | This wetland provides foraging habitat for *Egretta alba, Ceryle rudis, Alcedo atthis, Ardeola grayii , Ciconia episcopus.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (90%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fishing, grazing, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total of 46 VDCs from Bara and Parsa districts are the users of the canal. And their total population is 154,044 and total household number is 25,078. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Protected and maintained by the Irrigation Management Project. |
| *References:* | x |

## 136. Barahawa Tal (बरहवा ताल)

| | |
|---|---|
| *Situation:* | Barahawa Bazar, Ward No. 9, Gaur Municipality, 0 km of Gaur, Rautahat District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Situated near the Barhawa Bazar, this Tal has water throughout the year. The shrine of Shivaji near the bridge has enhanced the beauty of the area. Its marginal land is covered with water hycinth. |
| *Location:* | Latitude: 26°45'51.2" N Longitude: 85°16'53.5" E Altitude: 190 m. |
| *Area:* | 10 ha |
| *Wetland Type:* | 2, 9 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major submarginal plants of the Tal are *Hydrilla verticillata* and *Najas graminea*. *Ipomoea aquatica* and *Eichhornia crassipes* are floating aquatics. The principal marginal emergent plants are *Eclipta prostrata, Alternanthera sessilis, Paspalum distichum* and *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | This wetland provides a feeding ground for *Egretta alba, Ceryle rudis, Alcedo atthis, Ardeola grayii* and *Ciconia episcopus*. |
| *Special Features:* | Shrines and temples, chanting and prayer's place. |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculure (80%), Barren Land (5%), Settlement (15%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fishing, grazing |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | Four VDC's that surround the Tal have a population of 17,668 and households of 3,136. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. It flows along the Bazar. |
| *References:* | x |

## 137. Chandi Floodplain (चाँदी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Nijgadh, Ward No. 1, Chandra Nigahapur VDC, 1 km of Nijgah, Rautahat District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Due to perenniality of the Chandi River, the flat shore area and floodplain provides refuge to wildlife and birds. This floodplain extend beyond Nepal's borders. |
| *Location:* | Latitude: 27°06'44.3"N Longitude: 85°22'06.3"E Altitude: 234 m. |
| *Area:* | 5,062 ha |
| *Wetland Type:* | 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal plants of the bank of the river consists of *Saccharum spontaneum* and *Imperata cylindrica*. The tree species comprised of *Terminalia tomentosa*, *Sygygium cumini*, *Dalbergia sisso* and *Mallotus philippinens*. |
| *Importance to Wildlife:* | This wetland supports the following important bird species e.g. *Egretta alba*, *Ibidorhyncha struthersii*, *Bubo nipalensis*, *Alcedo atthis*, *Ciconia episcopus*, *Ficedula strophiata*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by private lands. |
| *Land Use:* | Agriculture (50%), Open Forest (20%), Pasture (10%), Dense Forest (10%), Settlement (10%) |
| *Uses:* | Irrigation, grazing, fishing, fodder, plant harvest, fuel source. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction, agricultural runoff, monospecific domination. |
| *Conservation Plan:* | x |
| *Human Population:* | The total population of 6 VDC's adjoining the floodplain is 45,179 with the household of 8,242. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Siltation, deforestation and overgrazing. |
| *References:* | x |

## 138. Kishauria Chaur (किसौरिया चउर)

| | |
|---|---|
| *Situation:* | Jhunkhunma, Ward No. 7, Jhunkhunma VDC, 7 km of Gaur, Rautahat District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Surrounded by branches of Gandak Nepal Eastern Canal and the highway to Gaur is a water logged and marshy land, that provides sanctuary to birds and aquatic life in Rautahat. |
| *Location:* | Latitude: 26°49'28.9"N Longitude: 85°17'06.3"E Altitude: 190 m. |
| *Area:* | 30 ha |
| *Wetland Type:* | 10, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | Leaches from the canal. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This wetland is very attractive and important for growing sedges called Kishauria. It also provides habitat for *Eleocharis dulcis, Nymphoides cristatata, Najas graminea, Ipomoea aquatica, Polygonum hydropiper, Paspalum distichum* and Iottelia alismoides. |
| *Importance to Wildlife:* | This wetland provides important feeding ground for *Leptoptilos dubius, Ardeola grayii , Phalacrocorax niger, Anhinga melanogester, Vanellus indicus, Amaurornis phoenicurus, Alcedo atthis* and *Pelrargopsis capensis*. Six species of fish have been reported from this area.<br>Notable reptilian fauna includes *Varanus flavescens* which is common in the area and protected species of HMG/N. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Plant harvest, fuel source, fishing, grazing. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | No. |
| *Human Population:* | About 4,336 inhabitants of Jhunkhunma VDC use the resources. The VDC has a total of 831 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. The area is close to the canal. |
| *References:* | x |

## 139. Bagmati Floodplain (बागमती बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Karmaihiya, Ward No. 1, Karmaihiya VDC, 0 km of Karmaihiya, Sarlahi District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The broad and fertile floodplain that starts from the foothills of the Mahabharat is a good habitat for wildlife . |
| *Location:* | Latitude: 27°07'55.5"N Longitude: 85°28'57.2"E Altitude: 239 m. |
| *Area:* | 10,690 ha |
| *Wetland Type:* | 4, 7 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal trees recorded are *Terminalia tomentosa, Sygygium cumini, Dalbergia sissoo,* and *Mallotus philippinensis*. The bank of the river consists of *Ipomoea fistulosa, Saccharum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | The important bird species recorded from the Bagmati floodplain were *Ardea alba, Ibidorhyncha struthersii, Bubo nipalensis, Alcedo atthis, Ficedula strophiata, Anas crecca* and *Ciconia nigra*. It is ess suitable for waterfowl population. According to local people smooth coated otter is thought to occur in the floodplain areas. Four species of wild fish have been reported from the area. |
| *Special Features:* | x |
| *Land Ownership:* | Private land surrounded by forest. |
| *Land Use:* | Agriculture (50%), Open Forest (10%), Dense Forest (20%), Pasture (20%) |
| *Uses:* | Irrigation, fishing, grazing, religious value, domestic use, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | Bagmati Irrigation Canal has brought out some changes in the lifestyle of the people. There are some develpment plans for the area; Bagmati Irrigation Project and other community development project. |
| *Human Population:* | Thirty seven VDC's from two districts, Rautahat and Sarlahi are the direct users of the area. Their total population is 182,518 with households of 38,794. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Protected by the government and some river training activities |
| *References:* | x |

## 140. Bagmati Canal (बागमती नहर)

| | |
|---|---|
| *Situation:* | Karmaihiya, Ward No. 1, Karmaihiya VDC, 0 km of Karmaihiya, Sarlahi District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Bagmati canal that provides irrigation water from Karmaihiya to Rautahat and Sarlahi covers an area of 42,000 ha of land. The dam and its surroundings were washed away by the flashflood of 1993. |
| *Location:* | Latitude: 28°07'59.0" N Longitude: 85°29'03.7" E Altitude: 238 m. |
| *Area:* | 42,000 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | Inlet,outleat and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal vegetations are *Dalbergia sissoo, Syzigium cumini, Mallotus philippinensis* and *Terminalia tomentosa*. The bank of the canal is covered by *Ipomoea fistulosa, Sachharum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | The seepage from the canal provides important foraging ground for *Ardea alba, Ibidorhyncha struthersii, Bubo nipalensis, Alcedo atthis, Ficedula strophiata, Anas crecca* and *Ciconia nigra*. Four species of wild fish have been recorded from the canal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%). |
| *Uses:* | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Siltation, road construction, pollution, agricultural runoff, filling. |
| *Conservation Plan:* | x |
| *Human Population:* | There are 50 VDC's that are under the catchment area of the Bagmati Canal project. Their total population is 39,816 and households number is 6,970. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Protected and maintained by the Bagmati Irrigation Canal. |
| *References:* | x |

## 141. Manusmara Floodplain (मनुस्मारा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Puraina, Ward No. 4, Laukat VDC, 18 km of Naya Road, Sarlahi District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The Manusmara River that originates from the forests of Sarlahi makes a wide floodplain good for wildlife and waterfowls. It has three barranges and the newest one is Sudama barrage, which is under construction. |
| *Location:* | Latitude: 26°57'41.0" N Longitude: 85°27'51.3" E Altitude: 190 m. |
| *Area:* | 9,180 ha. |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Three major tree species are *Dalbergia sissoo, Acacia catechu* and *Bombax ceiba*. *Potamogeton nodosus, Hydrilla verticillata, Eichhornia crassipes* and *Azolla imbricata* are the major aquatic plants. The marginal area of the Manusmara is covered by *Ipomoea fistulosa*. |
| *Importance to Wildlife:* | The floodplain provides suitable foraging habitat for a number of large waders such as *Ciconia ciconia, Ciconia nigra, Ciconia episcopus, Leptoptilos javanicus*. Other important bird species of the area are *Nettapus coromandelianus, Anas crecca, Bubo nipalensis, Coracias benghalensis, Alcedo atthis, Halcyon smyrnensis, Ardeola grayii* . |
| | Seven species of fishes have been recorded from the river. |
| *Special Features:* | x |
| *Land Ownership:* | Government land surrounded by privately owned agricultural lands. |
| *Land Use:* | Agriculture (80%), Open Forest (10%), Pasture (10%) |
| *Uses:* | Irrigation, fishing, grazing |
| *Conversion Practices:* | No. |
| *Threats and Disturbances:* | There are some development plans for the area including Manusmara Irigation Project. |
| *Conservation Plan:* | No. |
| *Human Population:* | A total population of 67,029 from 15 VDC's are the users and their household number is 11,940. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because natural enviornment is fairly in intact position. |
| *References:* | x |

## 142. Hirapur Barrage (हिरापुर ब्यारेज)

| | |
|---|---|
| *Situation:* | Haripur, Ward No. 5, Haripur VDC, 20 km of Naya Road, Sarlahi District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | About 8 km away from the Manpur Barrage is located Hirapur Barrage along the road in the Manusmara River. |
| *Location:* | Latitude: 26°56'59.9" N Longitude: 85°26'48.1" E Altitude: 190 m. |
| *Area:* | 2,000 ha |
| *Wetland Type:* | 2 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major flora constitutes *Ceratophyllum demursum, Potamogeton nodosus, Eichornia crassipes* and *Ipomoea aquatica*. The bank of the canal is chiefly dominated by *Colocasia esculanta* and *Polygorum barbatum*. *Dalbergia sissoo* is planted along the embankment. |
| *Importance to Wildlife:* | Just like Manusmara Barrage, this barrage provides foraging habitat for *Ciconia episcopus, Alcedo atthis,* and *Egretta alba, Ceryle rudis, Ardeola grayii, Ciconia ciconia,Ciconia nigra, Halcyon smyrnensis, Leptoptilos javanicus, Coracias benghalensis.* |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, fishing, grazing |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | No. |
| *Human Population:* | The total population of 8 VDC's is 38,316 and households, 6,641. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Excellent canal system in the country. |
| *References:* | x |

## 143. Manpur Barrage (मानपुर ब्यारेज)

| | |
|---|---|
| *Situation:* | Manpur, Ward No. 9, Manpur VDC, 25 km of Naya Road, Sarlahi District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | Previously known as Juddha Canal, which was washed away in 1957, it is a new canal built with assistance from the Government of India. This is in an excellent condition and irrigates many VDCs of Sarlahi district. |
| *Location:* | Latitude: 26°55'01.3"N Longitude: 85°25'26.5"E Altitude: 182 m. |
| *Area:* | 3,200 ha |
| *Wetland Type:* | 2 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The bank of the Barrange is beautifully planted with *Dalbergia sissoo. Thevetia peruviana* and *Dendroealamus* sp. are also seen. *Ipomoea aquatica, Ceratophyllum demursum* and *Eichhornia crassipes* are aquatics of floating and submerged types. The bank of the barrage area is coverd with *Saccharum spontaneum.* |
| *Importance to Wildlife:* | The penphery *of* water reservior provides feeding ground for *Ciconia episcopus, Pelargopsis capensis, Ardea alba* and *Alcedo atthis.* The team had sighted a single *Ciconia episcopus* birdspecies foraging in agricultural land close to the reservoir. Six species of wild fishes have been reported from this reservoir. |
| *Special Features:* | x |
| *Land Ownership:* | Government |
| *Land Use:* | Agriculture (80%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, fishing, grazing. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The total population and households from 6 VDC's and 34,150 with 5,643 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Maintained by the Irrigation Project Office. |
| *References:* | x |

## 144. Ratu Floodplain (रातु बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bardibas, Ward No. 7, Bardibas VDC, 1.5 km of Bardibas, Mahottari District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The floodplain along the Ratu River is wide and fertile that separates Mahottari and Dhanusha. The floodplain provides a good habitat for birds and other wildlife species. |
| *Location:* | Latitude: 26°59'12.1"N Longitude: 85°54'37.4"E Altitude: 327 m. |
| *Area:* | 9,750 ha |
| *Wetland Type:* | 2, 10, 17 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major planted tree is *Dalbergia sissoo*. The bank is the habitat for *Ipomoea fistulosa, Saccharum spontaneum, Tridax procumbens, Dactyloctenium aegyptium* and *Cyperus rotundus*. |
| *Importance to Wildlife:* | Floodplain provides suitable feeding habitat for aquatic birds such as *Ceryle rudis, Alcedo atthis, Egretta alba* and *Leptoptilos javanicus*. Three species of wild fish have been reported from the area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Open Forest (10%), Barren Land (5%), Dense Forest (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | No. |
| *Human Population:* | 14 VDCs from Dhanusha and Mahottari districts are affected and their total population and households are 81,334 and 14,933 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Less human encroachment. |
| *References:* | x |

## 145. Badhari Floodplain (बड्हरी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Badhari, Ward No. 3, Begadawar VDC, 3 km of Lalgadh, Dhanussha District. |
| *Development Region:* | Central |
| *Physiography:* | Terai |
| *Overview:* | The floodplain passes through the Mahendra Highway and provides ideal feeding habitat for resident and migratory birds. |
| *Location:* | Latitude: 26°57'02.7"N Longitude: 85°56'54.9"E Altitude: 398 m. |
| *Area:* | 3,938 ha |
| *Wetland Type:* | 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The bank of the river is chiefly covered by *Saccharum spontaneum* and other grass species (like *Chrybopogon aciculatus* and *Imperata cylindrica)* and non grass species (*Ipomoea fistulosa* and *Desmodium triflorum*). |
| *Importance to Wildlife:* | Floodplain habitat provides feeding habitat for aquatic birds such as *Egretta alba, Alcedo atthis Leptoptilos javanicu* and *Ceryle rudis.* |
| *Special Features:* | |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (75 0%), Grass Land (5%), Open Forest (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder, religious value |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | No |
| *Human Population:* | Total population is 48,674 from 8,811 households. They are distributed in 11 VDC's of Dhanusa and Mahottari districts. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Less human encroachment. |
| *References:* | x |

## 146. Kamala Canal (कमला नहर)

| | |
|---|---|
| *Situation:* | Bandipur, Ward No. 2, Badhara Mal VDC, 2 km of Bandipur, Siraha District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The boundry river of Siraha and Dhanusa districts provides irrigation to both districts through its western and eastern canals that combinedly has a length of 36.5 km. The eastern one is 31 km. These canals altogether irrigate 24,000 hectares of land in both districts. |
| *Location:* | Latitude: 26°53'15.0" N Longitude: 86°08'27.9" E Altitude: 235 m. |
| *Area:* | 24,000 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | Yes |
| *Major Flora:* | The ground flora of the embankment of the canal comprise of *Saccharum spontaneum, Cassia tora, Cassia occidentalis, Tridax procumbens* and Chrysopogon *aciculatus*. Khayar (*Acacia catechu*) and masala (*Eucalyptus* sp.) were the trees of the canal. |
| *Importance to Wildlife:* | The seepage from the canal provides important feeding habitat for a large number of wetland dependent birds such as *Ceryle rudis, Alcedo atthis, Egretta alba Leptoptilos javanicus* and *Ciconia episcopus*.<br>Three species of fish have been recorded from the canal area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (75%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | x |
| *Human Population:* | The canal serves the population of 57 VDC's from Siraha and Dhanusha districts. Their total population is 54,992 with 10,318 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Maintained by Kamala Irrigation Project Office. |
| *References:* | x |

## 147. Kamala Floodplain (कमला बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bandipur, Ward No. 2, Badhara Mal VDC, 2 km of Bandipur, Siraha District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The floodplain along the Kamala River is a suitable feeding habitat for waterfowls. The river becomes torrential in the monsoon season and provides source of water for Kamala irrigation canal. |
| *Location:* | Latitude: 26°52'39.0"N Longitude: 86°08'12.4"E Altitude: 233 m |
| *Area:* | 7,875 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The bank of the river chiefly comprises of *Saccharum spontaneum* and *Imperata cylindrica*. The major tree species growing in the vicinity forest area are *Terminalia tomentosa*, *Sygygium cumini*, *Dalbergia sissoo* and *Mallotus philippinensis*. |
| *Importance to Wildlife:* | Floodplain provides suitable feeding habitat for aquatic birds such as *Ceryle rudis*, *Alcedo atthis*, *Egretta alba* and *Leptoptilos javanicus*. Eight species of wild fish have been recorded from this area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (50%), Grass Land (5%), Open Forest (5%), Pasture (10%), Dense Forest (10%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing, fuel source |
| *Conversion Practices:* | In-migration of hill people, conversion of floodplain to rice field and deforestation. |
| *Threats and Disturbances:* | Road construction, agricultural runoff, pollution |
| *Conservation Plan:* | x |
| *Human Population:* | Twenty eight VDC's from the districts of Dhanusha and Siraha are its users. Their population is 150,586 and household number is 27,924. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because less human intervention. |
| *References:* | x |

## 148. Balan Floodplain (बलान बाढ़क्षेत्र)

| | |
|---|---|
| *Situation:* | Lahan, Ward No. 3, Lahan Municipality, 3 km of Lahan, Siraha District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The wide floodplain created by the Balan River houses wealth of fauna and flora of the area. Many species of fish are found in the area. The floodplain is an ideal habitat for white necked stork and ibisbills. |
| *Location:* | Latitude: 26°40'17.9" N Longitude: 86°30'41.8" E Altitude: 231 m |
| *Area:* | 7,500 ha |
| *Wetland Type:* | 4, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The bank of the river is chiefly dominated by *Saccharum spontaneum* and *Imperata cylindrica*. The major trees of the area comprise of *Terminalia tomentosa, Sygygium cumini, Dalbergia sissoo and Mallotus philippinensis.* |
| *Importance to Wildlife:* | The important bird species occuring in this area are *Egretta alba, Ibidorhyncha struthersii, Bubo nipalensis, Alcedo atthis, Ciconia episcopus, Ficedula strophiata, Anas crecca* and *Sterna albifrons*. Serves as a ideal habitat for white necked stork, *Ciconia episcopus* and *ibisbill, Ibidorhyncha struthersii.* |
| *Special Features:* | |
| *Land Ownership:* | Government land surrounded by private land holdings. |
| *Land Use:* | Agriculture (50%), Pasture (20%), Dense Forest (30%) |
| *Uses:* | Irrigation, fishing, grazing, plant harvest, fuel source |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage |
| *Conservation Plan:* | No. |
| *Human Population:* | A total of eight VDCs with the population of 83,269 from 15,152 household are the users of the floodplain. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Because degration, deforestation and siltation. |
| *References:* | x |

## 149. Bhokari Daha (भोकारी दह)

| | |
|---|---|
| *Situation:* | Sambhunath Bazar, Ward No. 3, Sambhunath VDC, 2 km of Rupni, Saptari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Surrounded by cultivated lands near the Mahendra Highway is a pond full of lotus and aquatic fauna. Although it is near the highway, it has been less affected by human pressures. The pine bluff situated at the southern end is a vintage point to enjoy the scene of the area. |
| *Location:* | Latitude: 26°37'45.0" N Longitude: 86°41'40.1" E Altitude: 213 m. |
| *Area:* | 8 ha |
| *Wetland Type:* | 7, 12 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | Three-fourths of the Daha is covered by *Nelumbo nucifera*. The other floating aquatics include *Nymphoides cristata*, *Ludwigia adscendens* and *Ipomoea aquatica*. *Sccharum spontanium* and *Ipomoea fistulosa* are the major plants of the margin of the Daha. |
| *Importance to Wildlife:* | The wetland provides a feeding habitat for a small number of waterfowl population. Important recorded bird species are *Egretta alba*, *Ceryle rudis* *Anas acuta* and *Alcedo atthis*. Four species of fish have been recorded from this wetland. |
| *Special Features:* | |
| *Land Ownership:* | Government land surrounded by private land and ponds. |
| *Land Use:* | Agriculture (90%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Plant harvest, fishing, grazing, religious value |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | About 5,167 inhabitats of Sambhunath VDC use the resources of the lake. The VDC has a total of 933 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Pine bluff areas and private ponds. |
| *References:* | x |

## 150. Trijuga Floodplain (त्रिजुगा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Fatehpur Bazar, Ward No. 3, Fatehpur VDC, 14 km of Kanchapur, Saptari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Trijuga floodplain is connected with Koshi floodplain and has proved to be a good habitat for threatened Asiatic wild water buffalo, including many resident and migratory birds. |
| *Location:* | Latitude: 26°44'23.1"N Longitude: 86°55'51.1"E Altitude: 185 m |
| *Area:* | 1,750 ha |
| *Wetland Type:* | 2, 10, 11, 17 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major flora of the embankment of the river includes *Ipomoea fistulosa, Sida cordata, Croton sparsiflorus, Cassia tora, Cassia occidentalis, Cynodon dactylon, Saccharum spontaneum* and *Chrysopogon aciculatus.* |
| *Importance to Wildlife:* | Trijuga floodplain provides optimal feeding ground for large waders and other aquatic birds. The large waders recorded are *Leptoptilos javanicus* and *Ciconia episcopus*. The other important wetland dependent birds are *Ceryle rudis, Alcedo atthis, Halcyon smyrnensis, Ardeola grayii, Egretta alba, E. intermedia, Vanellus indicus, Hoplopterus malabaricus, Tadorna ferruginea, Nettapus coromandelianus, Anas crecca, Anser indicus, Amaromis phoeuicurus,Tringa ochropus* and *T. totanus*. About 14 species of reptilian fauna were recorded, of which *Varanus flavesns* and *Python molurus* are protected species of HMG Nepal. The floodplain also harbor a small population of *Lutrogale perspicillata*. About 11 species of wild fishes were reported from the Trijuga river. |
| *Special Features:* | Dam for Chandra Canal. |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Grass Land (5%), Open Forest (5%), Barren Land (5%), Dense Forest (10%), Settlement (5%). |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel source, fishing, grazing, fodder, religious use, transport, recreation. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | The total population from three VDC's is 14,503 with 2,664 households.. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Because of irrigation dam, KTWR and barrage administration. |
| *References:* | x |

## 151. Chandra Canal (चन्द्र नहर)

| | |
|---|---|
| *Situation:* | Fatehpur Bazar, Ward No. 3, Fatehpur VDC, 14 km of Kanchanpur, Saptari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The first canal built by Rana Prime Minister Chandra Shumsher in 1924 is an a-one class canal in Nepal. The headwater situated at Fatepur covers a gross area of 10,500 hectares of lands in Saptari District. The canal is in excellent condition. |
| *Location:* | Latitude: 26°44'23.1"N Longitude: 86°55'51.1"E Altitude: 185 m |
| *Area:* | 10,500 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major plants recorded in the embankments are *Croton sparsiflorus, Cassia tora, Cassia occidentalis, Chrysopogon aciculatus, Cynodon dactylon, Saccharum spontaneum* and *Oplismenus burmanii.* |
| *Importance to Wildlife:* | The seepage from the Chandra canal provides optimal feeding ground for large waders and other aquatic birds. The large waders recorded are *Leptoptilos javanicus, Ciconia episcopus.* The other important wetland dependent birds are *Ceryle rudis, Alcedo atthis, Halcyon smyrnensis, Ardeola grayii, Egretta alba. E. intermedia, Vanellus indicus, Hoplopterus malabaricus, Tadorna ferruginia, Nettapus coromandelianus, Anas crecca, Anser indicus, Amaurornis phoenicurus, Tringa ochropus* and *Tringa totanus.* About 14 species of reptilian fauna were recorded . *Varanus flavescens* and *Python molurus* are protected species found in this area. This canal also supports a small population of *Lutrogale perspicillata.* About 11 species of wild fishes are reported from the Chandra canal. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Pasture (5%), Barren Land (5%), Settlement (20%) |
| *Uses:* | Irrigation, domestic use, fishing, grazing, fodder, religious value. |
| *Conversion Practices:* | |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | There are some developm<br>nt plans by the canal office for the area. |
| *Human Population:* | The population and household of 28 VDC are 111,791 and 20,567 respectively. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Maintained and protected by the canal office. |
| *References:* | x |

## 152. Chatara Canal (चतरा नहर)

| | |
|---|---|
| *Situation:* | Baraha Chhetra, Ward No. 1, Baraha Chhetra VDC, 22 km of Jhumka, Sunsari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Chatara canal built by HMG irrigates rice fields of Morang and Sunsari districts. Under the jurisdiction of the Sunsari Morang Irrigation Project, the canal is 53 km long with six branches of sub-canals that covers a gross area of 105 thousand hectares of land. |
| *Location:* | Latitude: 26°50'03.1"N Longitude: 87°09'01.2"E Altitude: 202 m |
| *Area:* | 60,000 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The trees found in the jungle area are *Adina cordifolia, Shorea robusta* (Sal), *Acacia catechu* and *Anthocephalum cadamba*. The plain area also provides habitat for growing *Cassia occidentatis, Xanthium strumarium, Artemisia* sp., etc. |
| *Importance to Wildlife:* | The wetland is less suitable for waterfowl population. Some of the wetland dependent bird species recorded are *Ceryle rudis, Alcedo atthis, Egretta alba, E. intermedia, Ardeola grayii, Halcyon smyrnensis, Hoplopterus malabaricums, V. indicus, Ciconia episcopus, Leptoptilos javanicus, Tringa ochropus, Tringa totanus, Chararius dubius, Circus cyaneus* and *Coracias benghalensis*. |
| *Special Features:* | Pilgrimmage to Barah Chhetra. |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (80%), Open Forest (5%), Pasture (5%), Barren Land (5%), Settlement (5%). |
| *Uses:* | Irrigation, domestic use, fuel source, fishing, grazing, fodder |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Filling |
| *Conservation Plan:* | There are some development plans for the area by the Chatara Irrigation Canal. |
| *Human Population:* | It covers 58 VDCs from two districts, Sunsari and Morang. The population of these VDCs is 100,337 and household 552,772. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Protected and maintained by the Irrigation Project office. |
| *References:* | x |

## 153. Koshi Barrage (कोशी ब्यारेज)

| | |
|---|---|
| *Situation:* | Bhantabari, Ward No. 9, Haripur VDC, 1 km of Bhantabari, Sunsari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Koshi Barrage impounds water of the Koshi River to irrigate land in the state of Bihar in India. Two canals that goes east and west of the barrage has created water impoundment, suitable for the growth of cattail on its shoreland. The area is good for resident as well as migratory birds. |
| *Location:* | Latitude: 26°31'45.5"N Longitude: 86°56'45.5"E Altitude: 162 m |
| *Area:* | 3,500 ha |
| *Wetland Type:* | 12, 27 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The majority of the marshy lands of Koshi Barrage is covered by *Typha latifolia, Eichhornia crassipes* and *Monochoria vaginalis*. The major tree species are *Dalbergia sissoo* and *Acacia catechu*. The major grass species is *Saccharum spontaneum*. |
| *Importance to Wildlife:* | Koshi Barrage is internationally important wetland for waterfowl population. Particularly as a staging and wintering area for a variety of trans-Himalaya migrants, notably ducks includes *Anas penelope, A. strepera, A. platyrhynchos, A. querquedula, Netta rufina, A. baeri, A. fuligula, Tadorna ferruginea, Anas falcata. A. crecca, A. acuta, A. clypeata, Aythna ferina, A. nyroca*. Duck numbers buildup from late October and reach a peak between mid-February and mid-March.<br>About 114 species of waterfowls i.e. almost all the species known to occur in Nepal, have been recorded. For the detail description of avian fauna see Scott (1989).<br>The endangered gharial crocodile (*Gavials gangeticus*) and Gangetic dolphin (*Platanista gangetica*) have been recorded in the Koshi river. |
| *Special Features:* | x |
| *Land Ownership:* | The wetland is considered for protection. The area is given on lease to the Government of India. |
| *Land Use:* | Agriculture (50%), Grass Land (25%), Open Forest (25%) |
| *Uses:* | Irrigation, fishing, grazing, fodder, plant harvest |
| *Conversion Practices:* | Bantars are dependent on Typha. These people also cultivating the land near the dam. The barrange area is being silted and the area under waterbody is being enlarged. |
| *Threats and Disturbances:* | Road construction, agricultural runoff, dredging/draining, pollution. |
| *Conservation Plan:* | x |
| *Human Population:* | The total population of four adjoining VDC's is 19,353 with 3,599 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Protected by GOI and HMG. |
| *References:* | 1. Scott 1989. A Directory Asian Wetlands, Malaysia, Asian Wetland Bureau.<br>2. A Report on Biodiversity of Koshi Tappu Wildlife Reserve and Its Surrounding Areas by ADIBC in Nepal, 1993.<br>3. Bhandari. 1994. Wetland Biodiversity in Nepal: A Case Study of KTWR.<br>4. Wetland Vegetation and Its Management: A Case Study by J.P. Sah. 1993. an M.S. Thesis. |

## 154. Koshi Tappu Wildlife Reserve (कोशी टप्पु वन्यजन्तु आरक्ष)

| | |
|---|---|
| *Situation:* | Kusaha, Ward No. 3, Kusaha VDC, 16 km of Koshi Barrage, Sunsari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Koshi Tappu Wildlife Reserve is the ony Ramsar site of Nepal, managed and protected by the Dept. of National Parks and Wildlife Conservation. It is along the floodplain of the Koshi River and houses Asiatic wild water buffalo. Its southern borders is the inundated area of Koshi Barrage. |
| *Location:* | Latitude: 26°54'23.5"N Longitude: 86°31'33.5"E Altitude: 206 m |
| *Area:* | 149,000 |
| *Wetland Type:* | 2, 5, 8, 10 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This wetland is rich in plant biodiversity. The major trees are *Dalbergia sissoo, Bombax ceiba* and *Acacia catechu*. The water body comprises of *Hydrilla verticillata, Eichhornia crassipes, Nymphaea stallata* and *Nymphae nouchali* and *Potamogeton* spp. The marginal lands provide the habitat for *Ipomoea fistulosa, Typha latifolia* and *Phragmites karka*. |
| *Importance to Wildlife:* | The KTWR is the only protected important wetland site listed as the Ramsar site, internationally important for waterfowl conservation particularly as a staging and wintering area for a variety of trans-Himalaya migrants, notably ducks and shorebirds including *hendrocygna javanica, Anas penelope, A. strepera, A. platyrhynctos, A. querquedula, Netta rufina, Aythya baeri, A . fuligula, Tadorna ferruginea, Anas falcata, Anas crecca, A. acuta, A. ciypeata, Aythya ferina, A. nyroca.*<br><br>A total of 256 species of birds has been recorded, of which 176 breed in the reserve. Winter visitors and passage migrants recorded so far total 125 species and more are likely to be found. There are 18 breeding species which are at risk in Nepal, although the changeable hawk-eagle (*Spizaetus cirrhatus*) and dusky eagle owl (*Bubo coromandus*) (E), Francolin (*Francolinus gularis*) (V), red-necked falcon (*Falco chiquera*), Bengal Florican (*Houbaropsis bengalensis*)(E), brown fish owl (*Ketupa zeylonensis*, and striated marsh warbler (*Megalurus palustris*).<br><br>Koshi Tappu is the only protected area in Nepal where water cock (*Gallicrex cinerea*) and Abbott's babbler (*Trichastoma abbotti*) are known to occur (Inskipp, 1989). The detail description of oronithological fauna of KTWR are given by Scott (1989). The wildlife reserve provide important habitat for Nepal's last surviving population of wild buffalo (*Bubalus arnee*). The endangered gharial crocodile (*Gavialis gangeticus*) and Gangetic Dolphin (*Platanista gangetica*) have been recored in the Koshi river. |
| *Special Features:* | Many cultural heritage sites and birds viewing points. |
| *Land Ownership:* | Protected area. |
| *Land Use:* | Agriculture (50%), Open Forest (10%), Dense Forest (20%), Settlement (20%) |
| *Uses:* | Irrigation, fishing, grazing, religious value, domestic use, fodder, transport, plant harvest |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Siltation, deforestation at the periphery and in-migration of hill people, agricultural runoff, dredging/drainage, pollution. |
| *Conservation Plan:* | In Koshi Tappu Widlife Reserve, embankment work is carried out regularly. There are some development plans for the area. Management plan of the KTWR is underway. IUCN and The Mountain Institute have developed biodiversity database for the area. |
| *Human Population:* | A total population of 67,508 and 11,988 households from 11 VDC's use the resources from the Reserve. |

| | |
|---|---|
| *Research Works:* | Applied Integrated Biodiveresity Report and many research articles. |
| *Others:* | x |
| *Overall Ranking:* | High. It is protected and managed by DNPWC. |
| *References:* | 1. A Report on Biodiversity of Koshi Tappu Wildlife Reserve and Its Surrounding Areas by ADIBC in Nepal, 1993.<br>2. Wetland Biodiversity in Nepal: A Case Study of KTWR by B. Bhandari.<br>3. Wetland Vegetation and its Management: A Case Study of Koshi Tappu Region, Nepal, by J. Sah (1993).<br>4. KTWR: Conservation Issues and Management Measures by R.N. Suwal (1993). |

## 155. Koshi Floodplain (कोशी बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Baraha Chhetra, Ward No. 1, Baraha Chhetra VDC, 22 km of Jhumka, Sunsari District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The Koshi floodplain that begins from Baraha Chhetra, a sacred place for Hindus houses the Ramsar site of Nepal, dam for Chatara canal and Koshi Barrage. Although it is the meeting point of seven rivers that arise from the Himalaya, wide floodplain is seen only after Baraha Chhetra near Chatara. Due to embankment, it is now trained and its floodplain is an ideal place for Asiatic wild water buffalo. |
| *Location:* | Latitude: 26°50'03.1"N Longitude: 87°09'01.2"E Altitude: 202 m |
| *Area:* | 21,000 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outflow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The floodplain provides habitat for trees such as *Dalbergia sissoo, Acacia catechu and Bombax ceiba* and grasses such as *Saccharum spontaneum.* |
| *Importance to Wildlife:* | The oxbow lakes and seepage from Koshi is by far the most important area for large waders and many species of waterbirds. The important wader species which have been recorded in the floodplain includes *Anastomus ocitans, Ciconia ciconia, C. episcopus, C. nigra, Ephippiorhynchus asiaticus, Leptoptilos javanicus, L. dubius, Mycteria leucocephala, Pseudibis falcinallus, Pseudibis papillosa, Threskiornis melanocephalus, Platalea leucorodia.* The floodplain serves as a suitable habitat to support viable population of large waders. |
| *Special Features:* | Baraha Chhetra and many religious places along the river bank. |
| *Land Ownership:* | Government land. |
| *Land Use:* | Agriculture (50%), Grass Land (15%), Open Forest (10%), Pasture (10%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, fuel source, fishing, grazing, fodder, religious value, transport, recreation. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction, agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | There are some development plans for the area. Chatara Irrigation Canal, Koshi Tappu Wildlife Reserve and Koshi Barrage. |
| *Human Population:* | A total of 20,991 households from 20 VDCs from the districts of Sunsari and Saptari has a total population of 115,677. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Excellent. Large portion is protected by the Barrage and KTWR administration. |
| *References:* | x |

## 156. Bakra Floodplain (बकरा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Aaitbare, Ward No. 6, Urlabari VDC, 2 km of Urlabari, Morang District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Bakra floodplain passes through the Dense Forests and cultivated lands of Morang District. Its fertile flat land and forests are good santuary for resident as well as migratory birds. Siltation and deforestation are rapidly occuring in the river. |
| *Location:* | Latitude: 26°39'43.4"N Longitude: 87°37'03.1"E Altitude: 224 m |
| *Area:* | 9,625 |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The principal plants recorded in the floodplain include *Dalbergia sissoo, Acacia catechu, Bombax ceiba* and *Terminalia tomentosa*. The embankment is suitable for growing many grasses (including *Saccharum spontaneum* and *Imperata cylindrica*), herbs and shrubs including following species: *Calotropis gigantea, Cassia tora, Datura stramonium, Cassia occidentalis,* and *Vitex negundo*. |
| *Importance to Wildlife:* | Large waders mainly *Ciconia episcopus* and *Leptoptilos javanicus* were observed from the floodplain habitat. Other important birds observed are *Egretta alba, Ceryle rudis* and *Bubo nipalensis*. Reptilian fauna includes only one protected species of HMG, *Varanus flavscens*.About 10 species of wild fishes are recorded from the floodplain habitat. |
| *Special Features:* | x |
| *Land Ownership:* | Government land, surrounded by private land holdings. |
| *Land Use:* | Agriculture (70%), Open Forest (20%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, fodder, plant harvest, fuel source |
| *Conversion Practices:* | Grazing and fishing are common in the river. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/draining, filling |
| *Conservation Plan:* | x |
| *Human Population:* | Altogether 12 VDCs with a total population of 138,756 with 25,871 households use the resources of the area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Siltation and deforestation. |
| *References:* | x |

## 157. Ratuwa Floodplain (रतुवा बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Damak, Ward No. 1, Damak Municipality, 1 km of Damak, Jhapa District |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Situated near the Damak Municipality, the floodplain begins from Illam and enter into India after travelling many miles inside the district of Jhapa. The floodplain is good for rice cultivation and an ideal place for flora and fauna. |
| *Location:* | Latitude: 26°39'20.0"N Longitude: 87°42'00.8"E Altitude: 235 m |
| *Area:* | 7,125 m |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | *Terminalia tomentosa, Dalbergia sissoo, Bombax ceiba* and *Acacia catechu* are the principal trees growing in this floodplain. This floodplain also provides the habitat for *Saccharum spontaneum* and *Imperata cylindrica.* |
| *Importance to Wildlife:* | Floodplain provides suitable habitat for large waders e.g. *Ciconia episcopus, Leptoptilos dubius* and *Platalea leucorodia*. Other important wetland dependent bird species were *Egretta alba, Ceryle lugubris, Ketupa zeylonensis*. Only one species of wild fish i.e. *Amphipnous cuchia* is recorded from here. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Open Forest (10%), Barren Land (10%), Settlement (10%) |
| *Uses:* | Irrigation, fishing, grazing |
| *Conversion Practices:* | Fishing, livestock grazing and feed and fodder collection |
| *Threats and Disturbances:* | Agricultural runoff, pollution, filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total population of 147,551 from 26,934 households from Jhapa and Morang districts use resources. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Poor. Over exploitation of natural resources. |
| *References:* | x |

## 158. Gaura Daha (गौरा दह)

| | |
|---|---|
| *Situation:* | Gauradaha, Ward No. 9, Gauradaha VDC, 11 km south of Padajunge on the Mahendra Highway, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Gauradaha is a special pond situated in the middle of the settlement in Jhapa. The daha is owned by VDC and is on contract for fishing, the income from which goes to the VDC. The nearby ice cream factory provides water to the pond. |
| *Location:* | Latitude: 26°33'55.9"N Longitude: 87°43'02.5"E Altitude: 203 m |
| *Area:* | 6.5 ha |
| *Wetland Type:* | 7 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | In Gaura Daha, almost all the area is covered by *Nelumbo nucifera* followed by *Nymphoides cristata, Eichhornia crassipes* and *Azolla imbricata*. Marginal area of the Daha includes *Ipomoea fistulosa, Saccharum spontareum, Alternanthera sessilis, Cassia tora, Colocasia esculenta* and *Ludwigia hyssopifolia*. |
| *Importance to Wildlife:* | This wetland is used as a fish stocking pond. The observed birds are *Leptoptilos javanica, Ceryle rudis, Amaurornis phoenicurus, Phalacrocorax carbo* and *P. niger*. During the winter season large and small cormorants are seen in large number foraging in the pond. This pond is less suitable to waterfowl population. One of the protected reptile species of HMG, *Varanus flavescens* also occur in large number adjoining agricultural fields. Two species of wild fishes are recorded from the pond mainly *Labeo rohita* and *Puntius ticto*. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (30%), Settlement (70%) |
| *Uses:* | Domestic use, fishing, aquaculture, waste disposal |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Pollution, agricultural runoff |
| *Conservation Plan:* | x |
| *Human Population:* | Some 12,376 inhabitant of Gaura Daha use the resources of the pond.The VDC has a total of 2,299 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Managed by VDC. |
| *References:* | x |

## 159. Kankai Floodplain (कन्काई बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Maidhar, Ward No. 5, Duhagadhi VDC, 2 km of Surunga Bazar, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | Kankai floodplain is a wetland with a perrenial river in the distict of Jhapa. Its wide areas are good for growing rice. The sanctiсity of the area is enhanced by the shrine of goddess Kankai Mai near the Mahendra Highway. The area extends to Indian border. |
| *Location:* | Latitude: 26°40'34.8"N Longitude: 87°52'44.7"E Altitude: 220 m |
| *Area:* | 7,125 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permenent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The marginal area of the river is dominated by *Saccharum spontaneum* and *Imperata cylindrica*. The principal trees of the area are *Terminalia tomentosa*, *Bombax ceiba* and *Acacia catechu*. Aquatic vegetation is poor. |
| *Importance to Wildlife:* | Being a part of Mai Valley area, Kankai floodplain harbours small number of waterfowls. However it is rich in forest birds. Some of the wetland dependent birds observed were *Pelecanus philippensis*, *Egretta* sp., *Ketupa zeylonensis*, *Leptoptilos dubis* and *Ciconia episcopus*. About 10 species of freshwater wild fishes were recorded. |
| *Special Features:* | Pilgrms come to worship the goddess Kankai Mai. |
| *Land Ownership:* | Government land and privately owned lands. |
| *Land Use:* | Agriculture (80%), Open Forest (10%), Barren Land (5%), Settlement (5%) |
| *Uses:* | Irrigation, fishing grazing |
| *Conversion Practices:* | Irrigation, heritage site, livestock grazing and fuel collection. |
| *Threats and Disturbances:* | Road construction, agricultural runoff, pollution, filling |
| *Conservation Plan:* | x |
| *Human Population:* | A total population of 98,569 with 18,371 households are distributed in 10 VDCs of the area. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Less human pressure. |
| *References:* | x |

## 160. Biring Floodplain (बिरिङ्ग बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Laxmanpur, Ward No. 9, Ghailaduwa VDC, 1 km of Laxmanpur, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | This floodplain is a wide sandplain, with virtually no water in the river. On its both sides are surrounded by rice fields with some wide pasture area and open forest. |
| *Location:* | Latitude: 26°36'53.4"N Longitude: 87°56'52.2"E Altitude: 218 m |
| *Area:* | 5,875 ha |
| *Wetland Type:* | 2, 5 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major tree species observed consist of *Acacia catechu, Bombax ceiba, Dalbergia sissoo,* and *Terminalia tomentosa*. The principal grasses are *Sacchrum spontaneum* and *Imperata cylindrica*. |
| *Importance to Wildlife:* | The prennial river floodplain provide suitable habitat for large waders. The observed large waders are *Ciconia episcopus* and *Leptoptilus dubius*. Other important birds occuring in the area are *Egretta alba, Ceryle lungubris, Sterna albifrons, Anas poecilorhyncha* and *Anas crecca*. The river supports a few number of waterfowl populations. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Grass Land (10%), Open Forest (20%) |
| *Uses:* | Irrigation, fishing, grazing |
| *Conversion Practices:* | Animal grazing and fishing. |
| *Threats and Disturbances:* | Agricultural runoff, dredging/drainage, pollution, filling |
| *Conservation Plan:* | x |
| *Human Population:* | The population of 10 VDCs is 104,020 with 19,356 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Fair. Because of heavy siltation and deforestation. |
| *References:* | x |

## 161. Mechi Floodplain (मेची बाढक्षेत्र)

| | |
|---|---|
| *Situation:* | Bhadrapur, Ward No. 2, Bhadrapur Municipality, 0 km of Bhadrapur, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The Mechi river is the eastern border of Nepal with India. Its shore areas on either sides are covered with sand. Its flat and wide floodplains are good for birds and other fauna and flora. A bridge connects Jhapa district of Nepal and west Bengal State of India in Kankad Vitta. |
| *Location:* | Latitude: 26°33'23.5"N Longitude: 86°04'45.5"E Altitude: 184 m. |
| *Area:* | 16,250 ha |
| *Wetland Type:* | 2, 10, 18 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow and outflow. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The floodplain vegetation is poor. Some plants observed include *Cynodon dactylon* (Dubo), *Alternanthera sessilis, Ludwigia hyssopifolia, Hydrocotyle rotundifolia, Centipeda minima, Cyperus cuspidatus, Eihhornia crassipes, Polygonum hydropiper* and *Colocasia esculenta*. |
| *Importance to Wildlife:* | The floodplain supports a few waterfowl population. It provides foraging habitat for a number of species of wetland birds including *Phalacrocorax carbo, Ardea cinerea, Ardeola grayii, Butorides striatus, Egretta alba, E. garzetta, E. intermedia, Ciconia episcopus, C. ciconia, C. nigra, Ephippiorhynchus asiaticus, Leptoptilos javanicus, Tadorna ferruginea, Vanellus indicus, Hoplopterus malabaricus, Tringa totanus, T. erythropus, Sterna aurantia, Alcedo atthis* and *Pelargopsis capensis*.<br><br>The floodplain also harbours reptilian fauna e.g. *Varanus benghalensis* and *V. flavecens*.<br><br>Four species of fish have been reocrded from the floodplain area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (70%), Open Forest (10%), Pasture (5%), Barren Land (5%), Settlement (10%) |
| *Uses:* | Irrigation, domestic use, plant harvest, fuel sources, fishing, grazing, fodder, waste disposal, religious value, transport, recreation |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | x |
| *Conservation Plan:* | x |
| *Human Population:* | Six VDCs of Jhapa district that share their boundry with this floodplain has a total population of 63,017 with 12,198 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. Deforestation and siltation. |
| *References:* | x |

## 162. Kechana Kabal (कचन कवल)

| | |
|---|---|
| *Situation:* | Kechana, Ward No. 3, Kechana VDC, 25 km of Chandragadhi, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The natural pond of about 50-60 m. wide surrounds the land of about 40.5 hactares, of which some parts are leased out to fish contractors by the VDCs, which gives a good income to VDC. It is near the area, which is the lowest spot in Nepal. |
| *Location:* | Latitude: 26°33'23.5"N Longitude: 87°59'42.0"E Altitude: 178 m |
| *Area:* | 40.5 ha. |
| *Wetland Type:* | 7, 20 |
| *Climate:* | Tropical |
| *Hydrology:* | x |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | This wetland supports a number of aquatic and semiaquatic plants. Major floating plants comprises of *Nelumbo nucifera* (Kamal) and *Nymphaea stellata*. The water body consists of of *Utricularia aurea* (submerged), *Ludwigia adscendens* and *Eichhornia crassipes* (floating plants). *Eleocharis dulcis* and *Alternanthera sessilis* and *Colocasia esculenta* are emergent marginal plants. |
| *Importance to Wildlife:* | This wetland provides an important feeding habitat for *Leptoptilos dubius, Phalacrocorax niger, Amaurornis phoenicurus* and *Egretta alba*. The reptilian fauna includes two species of monitor lizards such as *Varanus flavescens* and *Varanus benghalensis*. Both species are found in large numbers *V. flave*scens are protected by the National Parks and Wildlife Act 1973. Three species of fishes have been recorded from this area. |
| *Special Features:* | x |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (75%), Barren Land (15%), Settlement (10%) |
| *Uses:* | Domestic use, plant harvest, fishing, aquaculture, grazing, fodder. |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Agricultural runoff. |
| *Conservation Plan:* | x |
| *Human Population:* | About 4,420 inhabitants of Kechana VDC use the resource of the lake. The VDC has a total of 964 households. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | High. It is maintained by the Kechana VDC. |
| *References:* | x |

## 163. Kankai Canal (कन्काई नहर)

| | |
|---|---|
| *Situation:* | Dhudge, Ward No. 8, Domukha VDC, 2 km of Kankai, Jhapa District. |
| *Development Region:* | Eastern |
| *Physiography:* | Terai |
| *Overview:* | The canal dammed at the gorge near the foothills of the Mahabharat Range irrigates aobut 8,000 hectares of land in Jhapa District, mostly on its west side. In a distance of 2 km is located the temple of Kankai Mai. The dam is about 2 km north of the highway. |
| *Location:* | Latitude: 26°41'09.7"N Longitude: 87°52'43.8"E Altitude: 254 m. |
| *Area:* | 8,000 ha |
| *Wetland Type:* | 22 |
| *Climate:* | Tropical |
| *Hydrology:* | It has permanent inflow, outlfow and dam. |
| *Biogeographical Realm:* | Indomalayan |
| *Morphometry:* | x |
| *Limnology:* | x |
| *Major Flora:* | The major trees are *Dalbergia sissoo* and *Delonex regia*. The empankment of the canal is covered by various types of herbs and shrubs. They comprises of *Achyranthes aspera, Calotropis gigantea, Eupatorium odoratum, Sporobolus diander, Cynodon dactylon, Cassia tora* and *Saccharum spontaneum*. Aquatic vegetation is poor. |
| *Importance to Wildlife:* | The important wetland dependent species observed are *Ardeola grayii, Egretta alba, Egretta garzetta, Ceryle rudis, Alcedo atthis, Anacoornis phoenicurus, Ciconia episcopus, Leptoptilos javanicus*. Five species of fish have been recorded from the area. |
| *Special Features:* | The dam area is a good picnic spots for local people |
| *Land Ownership:* | Government land |
| *Land Use:* | Agriculture (75%), Open Forest (10%), Pasture (5%), Barren Land (5%), Settlement (5%) |
| *Uses:* | x |
| *Conversion Practices:* | x |
| *Threats and Disturbances:* | Road construction siltation. |
| *Conservation Plan:* | x |
| *Human Population:* | The total population of the areas is 88,663 and househld number is 16,514. Eight VDCs are the areas adjoining it. |
| *Research Works:* | x |
| *Others:* | x |
| *Overall Ranking:* | Average. Under the jurisdiction of the District Irrigtion Office. |
| *References:* | x |

# Chapter Nine
# Conservation Efforts

## Wetland Legislation

Although Nepal does not have a unified wetland act, there are other acts which deal with water and water resources. These acts are:

1. Aquatic Life Protection Act, 1961
2. Soil and Watershed Conservation Act, 1982
3. Canal, Electricity and Related Water Resources Act, 1967
4. National Park and Wildlife Conservation Act, 1973 (NPWCA)

### *Aquatic Life Protection Act, 1961*

The *Aquatic Life Protection Act*, 1961, is one of Nepal's oldest pieces of legislation, indicating the early recognition of wetlands and aquatic life. It forbids the introduction of poisonous, noxious, or explosive materials into a water source, or destroying any dam, bridge or water system with intent to catch or kill aquatic life. The Act defines "private water" as a lake, pond, ditch, pool, or reservoir which is on land-use by a person who has been paying land tax to HMG.

### *Soil and Watershed Conservation Act, 1982*

The mismanagement of watersheds leads to degradation of valuable land, through floods, water-logging, salinity in irrigated areas, and acceleration of siltation in the storage reservoirs. In order to properly manage the watersheds, the *Soil and Watershed Conservation Act*, 1982 was enacted in 1982. According to this Act, the government is to construct and maintain dams, embankments, terrace improvements, diversion channels, and retaining walls, as well as protect vegetation in landslide-prone areas.

### *Water Resources Act, 2049 (1992)*

The *Water Resources Act, 2049* (1992) (erstwhile *Canal, Electricity and Related Water Resources Act*, 1967) is also related to the conservation of the environment. Its primary aim is to prevent soil erosion, landslides, floods, or adverse impacts on the environment while generating electricity, digging, canal and other works. According to this Act, water resources within Nepal shall be owned by the Kingdom. This Act is a public trust doctrine. The Act strives to prevent environmental damage to wetlands, lakes and rivers, through environmental impact assessment studies.

### *National Park and Wildlife Conservation Act, 1973*

The Act defines wildlife as any wild animals including birds, fish and reptiles. Schedule 1 of the Act provides a list of protected wild animals. Some waterfowls, such as sarus crane, black stork, and white stork are also included in the list. Nepal's fourteen National Parks and Protected Areas have contributed to the protection of waterfowl and their habitats. Section 3 (9) prohibits harming of birds inside national parks or

reserves. Similarly section 5 (j) prohibits blocking, diverting or placing hazardous or explosive materials in rivers, streams or any water fountain. This Act has proved an efficacious piece of legislation.

The Environmental Law Unit of IUCN Nepal is in the process of drafting a wetland law for the Kingdom of Nepal in consultation with relevant government and non-governmental agencies. As soon as it is complete, it will be forwarded to His Majesty's Government for their endorsement and enactment. Likewise the Fisheries Development Division of the Department of Agricultural Development has already revised the Act of 1961 to suit the changing needs of the country. It will forward to the ministry for its endorsement.

## Wetland Inventorying Activities

The inventorying of wetlands began in 1987, with a status paper on wetland conservation in Nepal. Since then many papers have been written, of which a brief annotated bibliography is presented below:

1. Shrestha, Rajendra Lal and H. S. Nepali (Kazi) 1987. ***Present Status of Wetland Distribution and its Preservation in Nepal.*** A Paper presented at the Conference on Wetlands and Waterfowl Conservation organized by IWRB and Interwader at Malacca, Malaysia, 23-28 February 1987.

   This is the first conference paper addressing wetlands and their resources in Nepal. The paper has recorded a total of 27 wetland sites, of which eight sites are from the mountain, and five sites are from mid hill. The rest are four river and ten lakes are from the Terai region.

2. Scott, Derek A. (Comp). 1989. ***A Directory of Asian Wetlands.*** Switzerland: World Wide Fund for Nature (WWF), IUCN–The World Conservation Union, International Council for Bird Conservation (ICBP) and International Waterfowl and Wetlands Research Bureau (IWRB).

   This Directory comprises wetlands from 24 Asian countries including those from Nepal. A total of 17 sites have been listed along with their detailed description. This is the beginning of a systematic wetland inventorying in Nepal. This provides a valuable information/guidelines on the conservation of wetlands and wetland resources.

3. Bhandari, B. 1992. ***The Current Status of Wetlands in Nepal.*** Country Report presented at the Asian Wetland Symposium organized by Ramsar Centre Japan. 14-20 Oct. Otsu-Kushiro, Japan.

   This paper has recorded a total of 295 wetland sites representing three ecological zones of high mountain, mid-hills and Terai, in which 82 sites are from high mountain, 95 from mid hills and 118 from Terai.

4. Shrestha, Tej Kumar. 1992. ***Wetlands and Their Importance.*** Proceedings of the Informal Meeting on Wetlands Management in Nepal edited by T. B. Shrestha and Bishnu Bhandari. Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal 26th May 1992.

   A total of 30 lakes and ponds have been identified in the paper. Three types of wetlands, such as river and lakes, forested wetlands, and marshy lands have been discussed. The paper also highlights the importance and values of wetlands in Nepal.

5. Maskey, Tirtha Man. 1992. ***Socio-Economic and Bio-Physical Pressure on Wetlands of Nepal.*** Proceedings of the Informal Meeting on Wetlands Management in Nepal edited by T. B. Shrestha and Bishnu Bhandari. Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal 26th May 1992.

   This is the first paper dealing with socio-economic and biophysical pressures on wetlands and their resources. A total of 87 wetland sites have been mentioned, in which 31 are inside the protected area. The remaining

56 are outside the protected area, in which 25 are floodplains and 31 are pond and lakes. The areas covered by these wetlands inside the protected area are also given in the paper.

6. Gurung, Tek Bahadur and Gagan B. Pradhan. 1992. ***Wetland Conservation and Productivity in Nepal***. Proceedings of the Informal Meeting on Wetlands Management in Nepal edited by T. B. Shrestha and Bishnu Bhandari Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal 26th May 1992.

   A total of 79 wetland sites from all over Nepal are mentioned in the paper, including their location and sources from which information has been extracted.

7. Shrestha, T. B. and Bishnu Bhandari. 1992. ***Proceedings of the Informal Meeting on Wetlands Management in Nepal***. Organized by IUCN Nepal and DNPWC. Katmandu, Nepal 26th May 1992.

   This is the first meeting held in Nepal on the conservation of wetlands and their resources. This meeting developed an operational definition of wetlands, criteria for assessing wetlands of national significance, and drafted techniques for rapid assessment of wetlands. The meeting also identified 43 wetland sites of national importance needing protection. Of these, 27 are lakes and the rest are ponds, reservoirs, floodplains, swamps and marshes.

8. Suwal, R. N. & Shrestha, M. K. 1992. ***Large Waters and Wetlands of Terai: a survey report***. US Fish & Wildlife Service and King Mahendra Trust for Nature Conservation.

   This survey has recorded the sightings of 12 large waters, and mentioned 35 wetlands of the Terai, in which 15 are less than 8 ha in size. The geographical coordinates of these wetland sites are also calibrated.

9. Heritage and Biodiversity Conservation Programme. 1993. ***Rapid Reconnaissance Survey***. IUCN Nepal.

   IUCN Nepal has developed a rapid reconnaissance survey technique for collecting data and information on wetlands and their resources. IUCN Nepal began the systematic collection of information on wetlands and wetland resources in 1993. By the end of 1993 over 70 sites from the Terai region were inventoried.

10. Bhandari, Bishnu. 1993. ***Floodplain Wetlands in Nepal***. Paper presented at the Workshop on the Conservation and Sustainable Use of Floodplain Wetlands organized by the British Council Division and the Asian Wetland Bureau held at Calcutta 4-6 December 1993.

    The paper has recorded 37 rivers, and 22 floodplain wetlands of the Terai region.

11. Heritage and Biodiversity Conservation Programme. 1994. ***National Wetland Database of Nepal***. IUCN Nepal

    IUCN Nepal established a database of 63 sites from Terai region of Nepal. The database contains physical, biological, limnological, hydrological, and socio-economic information, and population and demographic information.

12. Biodiversity Profiles Project (BPP). 1995. ***Biodiversity Assessment of Terai Wetlands***. Tech. Publication No. 1. His Majesty's Government, Kathmandu, Nepal.

    BPP systematically collected information on 51 sites, which were already identified by IUCN Nepal. It also identified 10 sites that merit immediate protection. Out of these ten sites three sites: Beesh Hazar Tal, Jagadishpur Reservoir, and lakes in Pahalmanpur Range Post (Ghodaghodi Tal and its clusters in Kailali District), have been recommended as sites that need to be given priority attention for conservation and management. The Report also presents the valuation of resources in terms of attributes, functions, and uses.

13. Bhandari, Bishnu. 1996. ***The Status of Nepal's Wetlands in the Terai***. Paper presented at the Salim Ali Centenary Seminar on the Conservation of Avifauna of Wetlands and Grasslands, Bombay Natural History Society 12-15 February 1996, Bombay, India.

On the basis of the rapid reconnaissance survey of Nepal's Terai wetlands, 126 wetland sites have been reported with a short synopsis of each site. The paper also presents a summary status of their use, threats, ranking and human population related to these sites.

14. Heritage and Biodiversity Conservation Programme. 1996. ***An Inventory of Nepal's Terai Wetlands*** *(draft)*. IUCN Nepal.

This draft report presents information on 73 wetland sites from the mid-western and far-western development regions of western Terai.

15. Heritage and Biodiversity Conservation Programme. 1995. ***Social and Cultural Importance of Wetland Sites in Nepal***. IUCN Nepal.

A total of 61 wetland sites from all over Nepal have been identified along with their religio-cultural values and importance. Observances of religious festivals, and rituals are also described.

## Institutions Involved in Wetlands Conservation

The *Constitution of Nepal* (1990) in its sub-clause 4 of Article 26 of Chapter Four states:

> *The Kingdom of Nepal will give priority to raising public awareness on environmental issues to mitigate the adverse effects of development work upon the environment and to promote the conservation of rare fauna and flora.*

Clause 64 of this chapter makes a provision for the formation of a committee on *Natural Resources and Environmental Conservation by the House of Representatives*. The new Constitution formally recognizes the need for protection of the environment and wise use of natural resources. The institutions that are directly involved in the conservation of wetland and wetland resources are briefly discussed below (Bhandari, 1994). This is not a complete list of institutions involved in the conservation and management of wetlands in Nepal. They are just some examples.

### *Government Agencies*

**Environment Protection Council**. The Environment Protection Council is an inter-ministerial body representing relevant government agencies, House of Representatives, and others under the chairmanship of the Prime Minister. Its primary goal is to provide policy guidelines in managing resource conservation and development (see Bhandari *et. al.*, 1994 for detail).

**Ministry of Population and Environment.** The Ministry was established in 1995 with a goal to balance development efforts with environmental conservation and to provide leadership on their judicious management in Nepal.

**Ministry of Water Resources**. The Ministry of Water Resources is involved in the creation and management of wetland such as irrigation canals, dams and river training through the Department of Hydrology and Meteorology (DHM), and Department of Irrigation (DOI).

**Ministry of Forest and Soil Conservation**. This Ministry is entrusted with the responsibility of providing leadership in the conservation and management of forest and wildlife conservation. It has fours organs to meet this objective. Department of National Parks and Wildlife Conservation (DNPWC), Department of Forests, Department of Plant Resources, Department of Soil Conservation and Watershed Management.

**National Planning Commission.** The National Planning Commission (NPC), is implementing the National Conservation Strategy Implementation Project to alleviate environmental degradation and deterioration in Nepal. The NPC has organized a national workshop on wise use of wetlands and wetland resources in collaboration with IUCN Nepal.

**Department of Agriculture Development.** The Department has been active in fisheries development. The responsible arm of the Department to look after wetland related activities is Fisheries Development Division. The Division creates and manages wetlands and conducts research works.

**Chemical, Food and Microbiology Laboratory.** The Laboratory, under the Bureau of Standards and Meteorology, determines pollution control parameters and quality control of industrial products. It also carries out water analysis.

**Ministry of Science and Technology.** The Ministry is responsible for planning and formulating national policies on science and technology. It is a recently formed ministry.

### *Autonomous Bodies*

**Water and Energy Commission (WEC).** Water and Energy Commission, an advisory body to His Majesty's Government coordinates water and energy resource development in country. Water and Energy Secretariat (WECS) executes its responsibilities.

**Nepal Agriculture Research Council (NARC).** NARC's Fisheries Research Section plans and coordinates research activities on fish, water, and aquatic plants. Its National Rice Research Development Programme and Crop Development Division coordinates research on the improvement of aquatic and wetland crops.

**Royal Nepal Academy of Science and Technology (RONAST).**RONAST is entrusted with the task of developing and promoting science and technology in Nepal. Its Environmental Research Laboratory conducts studies on bio-technology, indigenous plants for pest control, river water pollution, and river crossing technology.

**Tribhuvan University.** Tribhuvan University through its organizations such as Central Departments of Zoology, and Botany, Natural History Museum , Institute of Agriculture and Animal Science (IAAS) and Institute of Forestry conducts wetland research and producing qualified human resources.

**Kathmandu University.** Kathmandu University provides education and conducts research on biotechnology and environment management.

**Nepal Electricity Authority.** The Nepal Electricity Authority creates maintains, manages and repairs reservoirs throughout the country.

**Nepal Drinking Water Corporation:** The Corporation is managing several drinking water reservoirs in the country, principally the Sundarijal Reservoir.

### *Non-governmental Organizations*

**King Mahendra Trust for Nature Conservation (KMTNC).** The Trust is mandated to conserve the natural resources and cultural heritage of Nepal and improve the well-being of its people through *conservation for development practices.*

**Bird Conservation Nepal.** Erstwhile Nepal Bird Watching Club is dedicated to creating awareness of, and conserving, preserving and managing Nepal's avifauna.

**Save Bagmati Campaign.** The Save Bagmati Campaign is dedicated to the conservation of the Bagmati River and the cultural heritage along its banks, through awareness raising campaigns against illegal settlements and squatters along its floodplain.

**Save Phewa Lake.** The Save Phewa Lake intends to protect Phewa Tal in the Pokhara Valley by developing programmes to end sewage and solid waste dumping into the lake and to mitigate siltation of the lake through sapling plantation around the catchment area.

**Nepal Heritage Society.** The Nepal Heritage Society is a leading NGO in cultural and natural heritage conservation. The Society is engaged in raising public awareness for the preservation of Nepal's cultural and environmental heritage.

**Association For Protection of Environment and Culture (APEC).** APEC is engaged in protecting wetlands, wildlife, and avifauna in and around the Ramsar sire.

**Lumbini Development Trust** : The Trust, in collaboration with IUCN Nepal, is undertaking a wetland restoration project in Lumbini to restore the vegetation that existed at the time of Gautam Buddha.

**Ghodaghodi Tal Youth Club**: The Club is active in the conservation and protection of Ghodaghodi Tal and its resources in Kailali.

**Resources Nepal:** Resources Nepal has been doing various research works in wildlife conservation in Nepal. Currently, in collaboration with Department of National Parks and Wildlife Conservation, it is preparing a National Biodiversity Action Plan .

**NEFEJ (Nepal Environmental Forum for Environmental Journalists):** The Forum is active in raising environmental awareness and conservation of resources in Nepal.

### *Donor Agencies*

**FINNIDA.** FINNIDA has been assisting His Majesty's Government in Integrated Watershed Management Projects in Phewa Tal and Kulekhani watershed management project and has also prepared the forest management plan for Bara District.

**United Nations Development Programme (UNDP).** UNDP has been involved in soil conservation, watershed management. and park-people conflict management. Currently, a park-people project is being implemented in five protected areas of Nepal's Terai.

**Food and Agriculture Organization (FAO).** FAO is assisting His Majesty's Government in soil conservation, crop improvement and watershed management.

**Japan International Cooperation Agency (JICA).** JICA has assisted the Fisheries Development Division of the Department of Agriculture Development (DAD) in natural water hatchery, fingerling research, and extension services for the Natural Water Fisheries Project in Begnas Tal.

**Asian Development Bank (ADB).** ADB promotes protection and sustainable use of wetland resources. It has also assisted a joint Nepali-US project, the Phewa Tal Environmental Protection Study.

**USAID.** USAID is playing a vital role in the conservation of natural and cultural resources in Nepal. It is assisting the Government of Nepal in implementing the Environment and Forest Enterprise Activities (EFEA) in Mid-Western Development Region. In connection with this project it is also helping the DNPWC in the conservation of Shey-Phoksundo Lake in Dolpa District.

**Royal Danish Embassy**. With the general support from the Royal Dutch Embassy, the Mountain Institute and IUCN Nepal, in collaboration with DNPWC and ORNIS Consult of Denmark, have developed a database for Koshi Tappu Wildlife Reserve (KTWR).

**Keindanren Nature Conservation Fund (KNCF)**. Its major assistance include the preparation of management plan and conservation programmes for sarus cranes and restoration of wetland along the Harahawa River in Lumbini, the birthplace of Gautam Buddha.

**Ramsar Convention Bureau**. The Bureau has been assisting, through its Ramsar Small Grants Fund for Wetland Conservation and Wise Use, the Department of National Parks and Wildlife Conservation (DNPWC) in studies on cage fishery in Koshi Tappu Wildlife Reserve (KTWR).

### *International Non-governmental Organizations (INGOs)*

**IUCN Nepal**. IUCN Nepal has started its own Wetland Conservation Programme in Nepal. Its main goal is to help Nepal to conserve wetlands and their resources.

**Ramsar Centre Japan**. An NGO established in Japan is dedicated to advance the cause of wise use of wetlands and their resources in the Asia Ramsar Region. It is assisting IUCN Nepal to expand its wetland programme through training, education and collaborative works.

**The Mountain Institute**. The Mountain Institute, in collaboration with IUCN and DNPWC, developed a biodiversity database plan for Nepal's Ramsar site.

**CARE Nepal**. CARE Nepal, in collaboration with the Department of Soil Conservation and Watershed Management, has initiated the Begnas Tal/Rupa Tal (BTRT) Watershed Management Project in Pokhara to protect Begnas and Rupa Tal catchment areas.

**Wetlands International**. Earstwhile Asian Wetland Bureau, the Asia-Pacific division of Wetlands International, financed the Nepal Bird Watching Club to study the sarus crane, undertook bird conservation activities around Lumbini, and coordinated a mid-winter waterfowl census for Nepal.

**International Crane Foundation**. The International Crane Foundation, Wisconsin, is involved in Nepal to restore wetland habitats in the Lumbini Development Project Area.

**World Wide Fund for Nature (WWF)**. WWF protects wildlife and their habitats through collaboration with HMG and NGOs. It has done research works in Bardia district and Shey-phoksundo Tal (lake in Dolpa District).

### *Professional Organizations*

**Informal Wetlands Group**. The Informal Wetlands Group, formed under the aegis of IUCN, is an inter-disciplinary and multi-sectoral team of 25 members representing 11 different agencies. It assisted in developing wetlands reconnaissance techniques for the National Wetland Inventory and provides guidance and assistance to IUCN's Wetlands Programme.

**Institute of Biodiversity of Nepal (IBN)**. The IBN, affiliated with the Association of Research Institutes of Nepal (ARIN), undertakes studies on plant diversity, medicinal plants, conservation, biosystematics, ethnobotany and aerobiology. It has conducted biodiversity study of Parsa Wildlife Reserve.

**Nepal Botanical Society**. The Nepal Botanical Society, established in 1981, mobilize scientific knowledge and technologies in forestry, vegetation and environmental conservation at the grass roots level, promote international cooperation and research among professionals in plant science.

**Natural History Society of Nepal (NAHSON)**. NAHSON, was established in 1990 to help restore the natural environment and encourage the sustainable use of Nepal's natural resources through research and seminars.

**Cultural Green Club**. The Cultural Green Club, based in Chakra Ghatti, near the Ramsar Site, organizes conservation dramas and environmental awareness programmes in communities adjacent to the Koshi Tappu Wildlife Reserve.

**Nepal Zoological Society**. The Nepal Zoological Society's primary objective is to disseminate scientific knowledge in zoology and the conservation of natural habitats.

**Environment and Public Health Organization (ENPHO)**. ENPHO was established in 1990 to provide services in water analysis and sanitation. It has its own fully equipped laboratory. It runs health education, sanitation, community-based solid waste management and disposal programme including the protection of water springs in rural area.

**Ecological Society (ECOS)**. Founded in 1992, ECOS brings ecologists from neighbouring countries to identify environmental problems and their solution in South Asia. It has launched its bulletin Ecoreview in 1993 and Ecoprint: an International Journal of Ecology in 1994.

**Ecological Association**. The Association was established in 1992 to advance the causes of conservation ecology in Nepal through applied as well as basic research in ecology.

## IUCN Wetland Activities

### *Background*

IUCN Nepal started its wetlands programme five years ago in 1992. Its aim is to conserve wetlands and their resources. Its first action was the formation of a multidisciplinary National Wetlands Group representing 11 different agencies. With the help of this Group, IUCN Nepal has been advancing the cause of wetland conservation and raising people's awareness about the values and functions of wetlands. IUCN Nepal also developed a rapid reconnaissance methodology to collect data and information on wetlands and their resources. A reconnaissance survey of 163 wetland sites has already been completed in the Terai region.

### *Objectives and Approach*

The primary aim of wetlands programme in Nepal is the conservation, management and wise use of wetlands and their resources in an equitable way through community involvement and intersectoral collaboration. Its major objectives are as follows:

- **Publicity** — Public awareness of wetlands, values and their functions.
- **Participatory Planning** — Participatory planning to their improved management.
- **Protection** — Protecting wetland habitats.
- **Promotion** — Promoting their wise use.

The wetlands programme collaborates with relevant governmental, non-governmental and community-based organizations in the wise use of wetlands and their resources. The focus of the programme is the bioregional management of wetland habitats. The methodology it has adopted to achieve the above-mentioned objectives are broad and community- based in nature. The selected tools includes group awareness process, collaboration, holistic approach, demonstration project, participatory exercises, and community-based management plan preparation.

### *Partners*

The partners include the Department of National Parks and Wildlife Conservation, and other IUCN members, Department of Forests, Lumbini Development Trust, Tribhuvan University, Department of Agriculture Development, Nepal Agriculture Research Council (NARC) and other international non-governmental organizations.

### *Major Initiatives*

1. Bringing together of wetland scientists, managers, researchers and scholars
2. Formation of an umbrella National Wetlands Group
3. Development of a rapid reconnaissance methodology
4. Social Impact Analysis of Halkhoria Daha in Bara District
5. Preparation of a wetland inventory of Nepal's Terai
6. Establishment of a National Wetland Database
7. Running demonstration projects on wise use of wetland resources in Lumbini
8. Conducting action research
9. Assisting Nepal in capacity building
10. Preparing participatory management plan

### *Selected Publications*

1. Safeguarding Wetlands in Nepal
2. Limnological Survey of Devi Tal Wetland
3. Crocodile Conservation in Nepal
4. Aquatic Biodiversity in the Karnali and Narayani River Basins
5. Proceedings on the Planning Workshop on the Restoration of Wetlands in Lumbini
6. National Wetland Database
7. An Inventory of Nepal's Terai Wetlands
8. Numerous articles on wetlands and their resources

### *Future Plans*

IUCN's future plans for the wise use of wetlands and their resources in Nepal are briefly highlighted below:

- Help the government implement the Ramsar Strategic Plan (1997-2002) of the Ramsar Bureau.
- Develop a national wetland policy and draft appropriate legislation
- Provide education and awareness program

- Continue demonstration projects
- Conduct studies on people-wetland interface
- Prepare participatory management plan based on bioregional management concept
- Assist Nepal in promoting wise use concepts in wetland conservation
- Monitor the Ramsar site of Nepal
- Explore ecologically sustainable strategies for the judicious management of wetland resources.

# *Chapter Ten*
# *Policy Suggestions*

In the previous chapters, various conservation efforts undertaken for the wise use of wetlands and wetland resources were discussed including IUCN's initiatives in Nepal. In this chapter suggestions are made to promote the concepts of wise use so as to protect and safeguard wetland habitats. Initiatives inclue:

R–1. Adopt a **bioregional management** approach to manage wetlands and wetland resources. Human needs and activities should be reconciled with the maintenance of biodiversity, and protected areas must be integrated into natural and modified surroundings. These efforts must be tailored to both ecological processes and the needs and perceptions of local communities, thereby minimizing biodiversity loss.

R–2. Encourage local participation of user groups and community-based organizations (CBOs) for the collaborative management of the resource. Alternative or supplemental livelihood strategies should be developed for users who are directly affected by the changes in wetland management. Encourage local clubs, NGOs and professional groups to become involved in wetlands management.

R–3. Conduct research on wetland resources to provide scientific data and information. Action research would be more beneficial at the outset.

R–4. Carryout demonstration projects to apply and promote wise use of wetlands and their resources. They need to be done in collaboration with local communities or relevant agencies.

R–5. Undertake multi-tiered awareness-raising and training programmes on the importance, use, functions and management of wetlands and their resources. Target groups include policy-makers, decision-makers, managers, users and local communities. Inclusion of wetlands into the formal education and trainer's resource materials would be a benefit.

R–6. Encourage community-based eco-tourism planing at the wetland sites. Creation of a wetland reserve would be a good beginning. Consultation with technical organization such as IUCN will be required.

R–7. Develop national wetland strategies and action plans.

R–8. Identify critical wetland habitats and declare them protected/conservation areas.

R–9. Develop a unified national wetland policy and wetland legislation.

R–10. Generate more socio-economic information on wetland and people interactions, particularly participatory research on wetland-dependent people.

R–11. Protect the rights of wetland users by involving them in the planning and management process.

R–12. Identify an institution responsible to coordinate wise use and conservation, and work to resolve land-use conflicts. This is because the ownership of wetlands is a controversial issue.

R–13. Ensure that EIA (environmental impact assessment) studies are conducted for development projects affecting wetlands.

R–14. Expand the existing wetland directory and database to include information on wetland sites from mountain and mid-hill regions.

# *References*


Ali, S. & Ripley, S. D. 1987. *Compact Handbook of the Birds of India and Pakistan.* Second edition. Oxford University Press, Delhi. India.

Anonymous. 1992. *Global Biodiversity Strategy.* World Resources Institute (WRI), The World Conservation Union, and United Nations Environment Programme (UNEP).

Baral, H. S. 1992. *Ghodaghodi Lake: A National Treasure.* Nepal Bird Watching Club, Kathmandu.

Baral, H. S. 1993. "Status of Storks, Ibises and Spoonbills in Nepal". *SIS Newsletter* Vol. 6, No.1/2 SIS/IWRB/BirdLife International, USA.

Baral, H. S. 1995. *Status, Distribution and Habitat Preferences of Swamp Francolin Francolinus gularis in Nepal.* An M.S. thesis submitted the Department of Zoology. Tribhuvan University, Kathmandu.

Baral, H. S. 1996a. *An introduction to Shikari Tal.* Sukla Phanta Wildlife Reserve. *Bird Conservation Nepal Newsletter* Vol. 5 No. 2 June, Kathmandu.

Baral, H. S. 1996b. *Avifauna of Bees Hazari Tal, Chitwan.* A report to The World Conservation Union (IUCN), Nepal Office.

Baral, H. S.; Inskipp, C.; Inskipp, T.; & Regmi, U. R. 1996. *Threatened Birds of Nepal.* Bird Conservation Nepal and Department of National Parks and Wildlife Conservation; Kathmandu. Nepal.

Bell, D. J. 1986. *A Study of Hispid Hare (Caprolagus hispidus) in Royal Suklaphanta Wildlife Reserve, western Nepal: A Summary Report.* Dodo, Journal of the Jersey Wildlife Preservation Trust 23: 24-31.

Bhandari, B. 1992. *The Current Status of Wetlands in Nepal.* Country Report presented at the Asian Wetland Symposium organised by Ramsar Centre Japan. 14-20 Oct. Otsu-Kushiro, Japan.

Bhandari, B. 1993. *Floodplain Wetlands in Nepal.* Paper presented at the Workshop on the Conservation and Sustainable Use of Floodplain Wetlands organised by the British Council Division, Calcutta and the Asian Wetland Bureau held at Calcutta 4-6 December 1993, India.

Bhandari, B. 1994. "Institutions and Capability in Wetlands Management in Nepal". In Bhandari, B.; Shrestha, T. B. & McEachern, J. (Eds.) 1994, *Safeguarding Wetlands in Nepal.* Proceedings of the National Workshop on Wetlands Management in Nepal, 3-5 March 1993. IUCN Nepal. Kathmandu. PP 119-136.

Bhandari, B. 1996. *The Status of Nepal's Wetlands in Terai.* A paper present at the Salim Ali Centenary Seminar on the Conservation of Avifauna of Wetlands and Grasslands, Bombay Natural History Society, 12-15 February 1996, Bombay, India.

Bhandari, Bishnu, T.B. Shrestha and John McEachern (Eds.). 1994. *Safeguarding Wetlands in Nepal.* Proceedings of the National Workshop on Wetlands Management in Nepal, 3-5 March 1993. IUCN–The World Conservation Union. Kathmandu, Nepal.

Bhandari, Bishnu. 1996. *Importance of Wetlands in Nepal*. Proceeding of the Planning Workshop on the Restoration of Wetlands in Lumbini, 17-18 December 1995. Lumbini.

Biodiversity Profiles Project. 1995. *Biodiversity Assessment of Terai Wetlands*. Biodiversity Profiles Project. Publication No.1, His Majesty's Government, Kathmandu, Nepal.

Carson B. and Sharma B. 1992. *An Ecological Classification System for Planning in Nepal*. FAO.

Carson, Brain. 1981. *Erosion and Sedimentation Processes in the Nepalese Himalaya*. ICIMOD Occasional Paper 1, Kathmandu.

Central Bureau of Statistics. 1995. *Population Monograph of Nepal*. His Majesty's Government, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

Chaudhary, R.P., Tiwari, R.D., Sah, J.P., Singh, R.L., Budha, P. Chaudhary, B.P. and Dhami, M. 1995. *Biological and Cultural Diversity of Parsa Wildlife Reserve, Central Nepal*. A report submitted to National Geographic Society, Washington, DC.

Choudhary, H. 1996. *Bird Conservation Nepal Newsletter* Vol. 5, No. 2 June, Kathmandu.

Collar, N. J.; Crosby, M. J. & Stattersfield, A. J. 1994. *Birds to Watch: the World list of Threatened Birds*. BirdLife International, Cambridge. UK.

Davies, Jon and Goodon Ctaridge (Eds.). 1993. *Wetland Benefits: The Potential for Wetlands to Support and Maintain Development*. Asian Wetland Bureau Publication No. 87; IWRB Special Publication No. 27; Wetlands for the Americas Publication No. 11.

Dugan, Patrick J. (Ed.). 1990. *Wetland Conservation: A Review of Current Issues and Required Action*. IUCN–The World Conservation Union, Gland, Switzerland.

Edds, D. R. 1986. "The Fishes of Royal Chitwan National Park." *Journal of Natural History Museum* Vol. 10, Nos. 1-4. Tribhuvan University, Kathmandu. pp. 1-11.

Giri, T. and Choudhary, H. 1996. *BCN Newsletter* Vol. 5 No. 3 September. Kathmandu.

Gurung, K. K. 1983. *Heart of the Jungle*. Andre Deustch, London. UK.

Gurung, Tek Bahadur and Pradhan, Gagan B. 1992. *Wetland Conservation and Productivity in Nepal*. Proceedings of the Informal Meeting on Wetlands Management in Nepal, 26 May 1992, edited by T. B. Shrestha and Bishnu Bhandari Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal.

Halliday, J. B. 1982. *A Study of the Ecological Distribution of Resident and Migratory Birds Along the Rapti and Narayani Rivers in the Royal Chitwan National Park, November and December 1982*. A report to the Department of National Parks and Wildlife Conservation, Kathmandu, Nepal.

Hara, H. and Williams, L.H.J. (Eds.) 1979. *An Enumeration of the Flowering Plants of Nepal*, Vol. 2. Brit. Mus. (Nat. Hist.), London.

Hara, H.; Chater, A.O. and Williams, L.H.J. (Eds.) 1982. *An enumeration of the Flowering Plants of Nepal*, vol. 3. Brit. Mus. (Nat. Hist.), London.

Hara, H.; Stearn, W.T. and Williams, L.H.J. (Eds.) 1978. *An enumeration of the Flowering Plants of Nepal*, Vol. 1. Brit. Mus. (Nat. Hist.), London.

HMG, Nepal. 1975. *Master Plan for the Forestry Sector in Nepal*. HMG/ADB/FiINNIDA, Kathmandu, Nepal.

Howard, G.W. 1992. "Floodplain: Utilization and Need for Management." In *Wetlands Conservation Conference for Southern Africa*. Proceedings of the Southern African Development Coordination Conference (Eds: T. Matiza and H.N. Chabwela) held in Gaborone, Botswana, 3–5 June 1993. IUCN–The World Conservation Union, Gland, Switzerland.

Inskipp, C. 1988. *A Birdwatcher's Guide to Nepal*. Prion Ltd. Sandy, UK.

Inskipp, C. and Inskipp, T. 1991. *A guide to the Birds of Nepal*. Croom Helm, London.

Jha, Hari Bansha (Dr). 1993. *The Terai Community and National Integration in Nepal*. Centre for Economic and Technical Studies (CETS) in cooperation with Friedrich Ebert Stiftung (FES), Nepal.

K. C. Bal Kumar. 1989. "Physiography of Nepal." In *Nepal: Perspectives on Continuity and Change* (Eds.) Kamal P. Malla. Centre for Nepal and Asian Studies, Tribhuvan University, Kathmandu, Nepal.

Lal, N. 1996. *Grass Flora of Parsa District and Adjoining Areas*. A M.Sc. dissertation submitted to Central Department of Botany, Kirtipur, Nepal.

LRMP. 1986. *Land System/Land Utilization and Geological Reports*. Dept. of Survey, Kathmandu.

Majupuria, Trilok Chandra (editor). 1981-82. *Wild is Beautiful*. S. Devi, M.P., India.

Maskey, Tirtha Man. 1992. *Socio-Economic and Bio-Physical Pressure on Wetlands of Nepal*. Proceedings of the Informal Meeting on Wetlands Management in Nepal, 26 May 1992, edited by T. B. Shrestha and Bishnu Bhandari. Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal.

Nelson D. *et.al.* 1980. *A Reconnaissance Inventory of the Major Ecological Land Units and Their Watershed Condition of Nepal*. IWM Project, Dept. of Soil Conservation, Kathmandu.

NPC. 1994. *A Compendium on the Environmental Statistics of Nepal*. NPC Secretariat, CBS, Kathmandu.

Perennou, C.; Mundkur, T.; Scott, D. A.; Follestad, A. & Kvenild, L. 1994. *The Asian Waterfowl Census 1987-91: Distribution and Status of Asian Waterfowl*. AWB Publication No. 86. IWRB Publication No. 24. AWB, Kuala Lumpur, Malaysia and IWRB, Slimbridge, U.K.

Rajbanshi, K.G. and Gurung, T.B. 1994. "Wetlands and Fisheries: Prospects and Constraints." In : Bhandari B., Shrestha, T.B. and McEachern, J. (Eds.), *Safeguarding Wetlands in Nepal*. Proceedings of the National Workshop on Wetlands Management in Nepal, 3-5 March 1993. IUCN Nepal, Kathmandu.

Rajbhandary, T.K., Bista, M.S. and Gurung V.L. (Eds.) 1994. "Enumeration of the Vascular Plants of West Nepal." *Bull. Dept. Plant Resource* no. 12, His Majesty's Government of Nepal, Ministry of Forests and Soil Conservation.

Regmi, Mahesh Chandra. 1978. *Land Tenure and Taxation in Nepal*. Ratna Pustak Bhandar, Kathmandu, Nepal.

Regmi, P.P. 1979. *An Introduction to Nepalese Food Plants*. Royal Nepal Academy, Kathmandu.

Ripley, S. D. 1950. "Birds from Nepal 1947-1949." *Journal of the Bombay Natural History Society* Vol. 49, No. 3, December 1950.

Scott, Derek A. (Comp). 1989. *A Directory of Asian Wetlands*. World Wide Fund for Nature (WWF), IUCN–The World Conservation Union, International Council for Bird Conservation (ICBP) and International Waterfowl and Wetlands Research Bureau (IWRB), Switzerland.

Shah, Devika and T. B. Shrestha. 1996. *Biodiversity Database of Nepal*. IUCN Nepal, Kathmandu, Nepal.

Sharma C.K. 1990. *Geology of Nepal and Adjacent Countries*. S. Sharma, Bishal Nagar, Kathmandu.

Sharma, Chandra K. 1977. *River Systems of Nepal*. Mrs. Sangeetha Sharma, Bishal Nagar, Kathmandu.

Shrestha, Arjun P. 1991. *Hydropower in Nepal: Issues and Concepts of Development*. Resources Nepal, Kathmandu.

Shrestha, R. 1996. *Water Quality and Aquatic Plant Diversity in Rapti River at Sauraha, Chitwan*. A M.Sc. dissertation report submitted to Central Department of Botany, Kirtipur, Nepal.

Shrestha, Rajendra Lal and Nepali, H. S. (Kazi) 1987. *Present Status of Wetland Distribution and its Preservation in Nepal*. A Paper presented at the Conference on Wetlands and Waterfowl Conservation organized by IWRB and Interwader at Malacca, Malaysia, 23-28 February 1987.

Shrestha, T. B. and Bishnu Bhandari. 1992. *Proceedings of the Informal Meeting on Wetlands Management in Nepal*, 26 May 1992, organized by IUCN Nepal and DNPWC. Kathmandu, Nepal.

Shrestha, T.B. and Joshi, R.M. 1996. *Rare, Endemic and Endangered Plants of Nepal*. WWF Nepal Program, Kathmandu, Nepal.

Shrestha, Tej Kumar. 1992. *Wetlands and Their Importance*. Proceedings of the Informal Meeting on Wetlands Management in Nepal edited by T. B. Shrestha and Bishnu Bhandari. Organized by IUCN Nepal and DNPWC. Kathmandu, Nepal 26th May 1992.

Shrestha, Tirtha Bahadur. 1994. *Biodiversity Database for the Kingdom of Nepal: Background Study* (Draft). IUCN Nepal, Kathmandu.

Siwakoti, M. 1995. *Flora of Plain Region of Eastern Nepal*. A Ph D. thesis submitted to Bhagalpur University, India.

Siwakoti, M. and Jha, S. 1987. "Angiospermic Flora of Biratnagar." Jour. of Nat. Hist. Mus. 11(1-4): 99-118.

Subba, Suraj. 1992. *Botes - the Ferrymen of Tanahu*. Ashok Kumar Limbu, Mankamana Boarding School, Gorkha.

Suwal, R. N. and Shrestha, M. K. 1992. *Large Waders and Wetlands of Terai: A Survey Report*. US Fish & Wildlife Service and King Mahendra Trust for Nature Conservation.

Thapa N.B. & Thapa D.P. 1969. *Geography of Nepal*. Orient Long Man's LTD.

Udvardy, Miklos D. F, 1975. *A Classification of the Biogeographical Provinces of the World.* IUCN Occasional Paper No. 18. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.

Upreti, B. N. 1994. *Royal Bardia National Park.* NPC/IUCN, NCS Implementation Project, Kathmandu.

Voous, K. H. 1977. *List of Recent Holarctic Bird Species.* British Ornithologists' Union, UK.

WMI and IUCN Nepal. 1994. *Biodiversity of Koshi Tappu Wildlife Reserve and its Adjacent Areas.* Applied database for biodiversity conservation in Nepal, Kathmandu.

Zollinger F. 1979. *The Sapta Koshi Unsolved Problems of Flood Control in the Nepal.* IWM Project, Dept. of Soil Conservation, Kathmandu.

Zollinger F.-1980. *Analysis of River Problems and Strategy for Flood Control in the Nepalese Terai.* IWM Project, Dept. of Soil Conservation, Kathmandu.

# *Annex 1*
# *Members of the Informal Wetlands Group*

| NAME | CONTACT ADDRESS |
|---|---|
| BASKOTA, Mr. Gopal Pd. | Dept. of Forest, Babar Mahal, Kathmandu, Nepal. Tel: 217796 |
| BHANDARI, Dr. Bishnu | c/o Wetlands Management Section/ NHCP, IUCN. Jawalakhel, Lalitpur, Nepal. Tel: 522712 |
| BUDHATHOKI, Mr. K.P. | Department of Hydrology and Meteorology, Babar Mahal, Kathmandu, Nepal. P.O.Box 406 Tel: 213017, 226374 |
| DHUNGEL, Dr. Sanat K. | Ex–Director General, DNPWC, Babar Mahal, Kathmandu, Nepal |
| GURUNG, Mr. Tek Bahadur | Godavari Fisheries Research Center, Department of Agriculture Development, Godavari, Lalitpur, Nepal. Tel: 290563 |
| JOSHI, Ms. Sapna R. | KMTNC, Jawalakhel, Lalitpur, Nepal. Tel: 527042/526571 |
| MANANDHAR, Mr. Laxmi | DNPWC, Babar Mahal, Kathmandu, Nepal. Tel: 220912 |
| MASKEY, Dr. Tirtha Man | Convenor, Director General, DNPWC, Babar Mahal, Kathmandu, Nepal. Tel: 220912 |
| McEACHERN, Mr. John | c/o IUCN, Jawalakhel, Lalitpur, Nepal. Tel: 522712, 527391 |
| McEACHERN, Mr. Preston | c/o Wetlands Management Section/ NHCP, IUCN. Jawalakhel, Lalitpur, Nepal. Tel: 522712, 527391 |
| NEPALI, Mr. Hari Saran (Kazi) | Chhetrapati, Kathmandu, Nepal. Tel: 221604 |
| PRADHAN, Mr. Gagan B. | Fisheries Development Division, Department of Agriculture Development, Harihar Bhawan, Lalitpur, Nepal. Tel: 522121 |
| PRADHAN, Mr. Prajwal P. | River Training Project, DOI, Lazimpat, Kathmandu, Nepal. Tel: 413733, Res. 270324 |
| REGMI, Mr. Bhoj Raj | Nepal Electricity Authority, Thapathali, Kathmandu, Nepal. Tel: 225499, Res. 216873 |
| SHAKYA, Dr. P. R. | National Herbarium and Plant Laboratories, Godavari, Lalitpur, Nepal. Tel: 290547 |
| SHARMA POUDEL, Mr. K.P. | Department of Hydrology and Meteorology, P.O.Box 406, Babar Mahal, Kathmandu, Nepal. Tel: 213017, 226374 |
| SHRESTHA, Dr. Tirtha Bahadur | c/o NHCP, IUCN, Jawalakhel, Lalitpur, Nepal. Tel: 522712, 527391 |
| SHRESTHA, Dr. Gyan L. | Coordinator, Asia Network for Small Scale, Agril-Biotechnologies (ANSAB), Panipokhari, Kathmandu, Nepal. Tel: 411859 |
| SHRESTHA, Dr. Tej Kumar | Department of Zoology, TU, Kirtipur Campus, Kathmandu, Nepal. Tel: Res. 213748 |
| SHRESTHA, Mr. Purusottam B. | Patan Multiple Campus, Lalitpur, Nepal. Tel: 521394, Res. 225076 |

| | |
|---|---|
| SHRESTHA, Mr. Rajendra L. | Amrit Campus, Lainchour, Kathmandu, Nepal. Tel: 411639, 521062 |
| SHRESTHA, Ms. Puspa Keshari | Natural History Museum, Soyambhu, Kathmandu, Nepal. Tel: 271899, Res. 610125 |
| SINGH, Mr. Shashindra L. | Department of Soil Conservation, Babar Mahal, Kathmandu, Nepal. Tel: 220857 |
| SUWAL, Mr. Rajendra N. | Chhetrapati, Kathmandu, Nepal. Tel: 214245 |
| SWAR, Mr. Deep B. | Fisheries Development Division, Department of Agriculture Development, Harihar Bhawan, Lalitpur, Nepal. Tel: 522121 |

# *Annex 2*
# *Rapid Reconnaissance Survey*

## Objectives

1. Document and characterize Nepal's wetland sites and wetland resources;
2. Identify the most important wetlands in terms of biodiversity, human pressure and management priority;
3. Gather preliminary information for the preparation of a wetland action plan.

## Instruction Manual

Notes:

1. Prior to filling out the form, the compiler should read this instruction manual carefully.
2. Use the other sides of pages if spaces provided is not enough.
3. Mention any items not included in the form in the column under Item No. 19 Additional Comments.
4. Please use the other side of the third page for a sketch.
5. Instructions below explain how to fill out the form.
6. The compiler should have a map of the area.

1. **Site Name.** Write the name of the wetland site in English, followed by the Nepali name in Devanagari.
2. **Date.** Put the date of field visit by day, month and year.
3. **Geographical Features.** Locate the site on a map and determine the longitude, latitude, altitude in meters, nearest town, distance from that town in km, district, VDC ward and settlement. Describe the route (motorable road, trail, etc.) to the site from the nearest main road or airport.
4. **Habitat Type.** Choose the appropriate classifications that pertain to the site. More than one classification is possible. List type and relative percentage of wetland covered by the type in the box(es) according to wetland classification given below:

| | | | |
|---|---|---|---|
| Saline | Salt lake | | 1. Permanent and seasonal, brackish, saline or alkaline lakes, flats and marshes. |
| Freshwater | Riverine | Perennial | 2. Permanent rivers and streams, including waterfalls.<br>3. Inland deltas. |
| | | Temporary | 4. Seasonal and irregular rivers and streams.<br>5. Riverine floodplains, including river flats, flooded river basins, seasonally flooded grassland. |

| | | | |
|---|---|---|---|
| | Lacustrine | Permanent | 6. Permanent freshwater lakes (>8 ha area), or 2m depth including shores subject to seasonal or irregular inundation.<br>7. Permanent freshwater ponds (<8 ha area or <m depth). |
| | | Seasonal | 8. Large seasonal freshwater lakes (>8 ha area or 2m depth), including floodplain lakes.<br>9. Small seasonal freshwater ponds (<8 ha area or <2m depth). |
| | Palustrine | Emergent | 10. Permanent freshwater marshes and swamps on inorganic soils, with emergent vegetation whose bases lie below the water table for most of the growing season.<br>11. Permanent peat-forming freshwater swamps, including tropical upland valley swamps dominated by *Papyrus* or *Typha*.<br>12. Seasonal freshwater marshes on inorganic soil, including sloughs, potholes, seasonally flooded meadows, sedge marshes, and dambos.<br>13. Peatlands, including acidophilous, ombrogenous, or soligenous mires covered by moss, herbs or dwarf shrub vegetation, and fens of all types.<br>14. Alpine and polar wetlands, including seasonally flooded meadows moistened by temporary<br>15. Freshwater springs and oases with surrounding vegetation.<br>16. Volcanic fumaroles continually moistened by emerging and condensing water vapour. |
| | | Forest | 17. Shrub swamps, including shrub-dominated freshwater marsh, shrub carr and thickets, on inorganic soils.<br>18. Freshwater swamp forest, including seasonally flooded forest, wooded swamps on inorganic soils.<br>19. Forested peatlands including peat swamp forest. |
| Man-Made Wetlands | Agriculture/ Mariculture | | 20. Aquaculture ponds, including fish ponds and shrimp ponds. |
| | Agriculture | | 21. Ponds, including farm ponds, stock ponds, small tanks.<br>22. Irrigated land and irrigation channels, including rice fields, canals and ditches.<br>23. Seasonally flooded arable land. |
| | Salt Exploitation | | 24. Salt pans and salines. |
| | Urban/ Industrial | | 25. Excavations, including gravel pits, borrow pits and mining pools.<br>26. Wastewater treatment areas, including sewage farms, setting ponds and oxidation basins. |
| | Water-storage area | | 27. Reservoirs holding water for irrigation and/or human consumption with a pattern of gradual, seasonal, draw down of water level.<br>28. Hydro-dams with regular fluctuations in water level on a weekly or monthly basis. |

5. **Does the Wetland have a permanent flow.** Mark the appropriate box(es).

6. **Area.** The area of the waterbody and catchment area should be written in hectares. If the area mentioned is approximate, please mention in parenthesis as approximate. Depth should be measured in meters.

7. **Conditions.** Air temperature, water temperature and the temperature of water at inflows should be measured in Celsius, if possible. If limnological sample taken write ID #.

8. **Principal Flora.**
   - Write principal flora of the area and mention dominant plant for habitat: Submerged, emergent, sedge, grasses, and trees.
   - Write down their common English name, local names followed by scientific names under appropriate columns.
   - Mention their data or census, if available.
   - Write their uses under the column remarks.

9. **Principal Fauna.**
   - Write species of wildlife, fish, avifauna and vertebrates.
   - Write down their local name, common English name, and scientific name.
   - Mention if they are endemic or if their presence is unique at the site, or in the area.
   - Describe their special use, if any.

10. **Land-use.** Estimate percentage of land surrounding the site utilized. If the category is not one given, then use the box marked other and write the category.

11. **For what purpose is the wetland used?** Check the boxes that are appropriate for uses for the wetland. Be discriminative, that is, keep in mind how much it is used for those purposes, mark major uses only.

12. **Other Socio-Cultural Values.** Tick mark the appropriate box(es) and describe socio-cultural values with special emphasis on cultural, religious, and archeological importance. Describe wetland-dependent people (those that make their living from the wetlands existence) and the importance of the wetland to the local community.

13. **Use and Conversion Practices.** If the wetland is being converted to human purposes, comment on the use and conversion practice. For example, the permanent drainage of the wetland for irrigation and conversion to pasture or agricultural land should be mentioned.

14. **Describe ownership of the wetland and surrounding land?** Check the appropriate boxes for land ownership for the site and surrounding land. Since multiple boxes can be checked, describe the selected choices. Include information on tenure system if it exists. Describe the ownership patters of the surrounding land.

15. **Have any conservation measures been taken at site, are any planned?**
    1. Mention if there are any conservation measures being taken in the area,
       - Write the name and address of the organization.
       - Identify the management category and legal status of the area.
       - Describe management practices and management plans that exist.
    2. Describe any proposed management plan in preparation, officially proposed as protected areas, etc.
    3. Mention if any organization is considering the preparation of a management plan.

16. **Are there any development plans for the area:** Obtain information on proposed changes in land-use and development plans which might affect the ecological character of the wetlands.

17. **What are the obvious threats to the ecosystem and local community?**

    1. Identify existing or possible threats to the wetland, wildlife, or the catchment area as seen by yourself and local people.

    2. Major threats and disturbances may include i. excessive fishing, ii. drainage, iii. conversion to other uses such as agriculture, industry, etc., iv. human encroachment, v. eutrophication, vi. vegetation succession, vii. flooding, viii. siltation, ix. use of fertilizers, x. fish poisoning, xi. pollution, xii. quarry site for building materials (boulders, sand, gravel), and others.

18. **Are there any references or research pertaining to the site?** List references to published literature and unpublished reports relevant to the site. You may mention existing research work as well.

19. **Additional Comments:** Use this column for extra information not included in the form. Please be precise and to the point.

20. **Overall, how do you rate this wetland ?**

    1. On the basis of the information presented above, direct or indirect observation of the site, your personal judgment on its use, threats, disturbance and priority in relation to other wetland sites and vulnerability, please mark your rating on the continuum that ranges from **Excellent** to **Poor**.

    2. Give your reasons why you chose the above category.

    3. The expert committee will then categorize all the sites on the basis of their vulnerability and ecological importance.

# Rapid Reconnaissance Form



1. Site Name

2. Date

3. Geographical Features

| | | | | | |
|---|---|---|---|---|---|
| Longtitude | | Nearest Town | | VDC | |
| Latitude | | Distance to Town | | Ward No. | |
| Altitude | | District | | Settlement | |

Route:

4. Habitat Type Habitat types represented by this wetland (1-28)
Multiple types expected, list type and relative percent of wetland covered by that type

| | | | | | | |
|---|---|---|---|---|---|---|
| Type No. | | | | | | |
| % area | | | | | | |

Remarks

5. Does the wetland have a permanent ☐ Inflow ☐ Outflow ☐ Dam

6. Area

7. Conditions

| | | | | |
|---|---|---|---|---|
| Water Surf. (ha) | | Air Temp. (°C) | | Limnological data or water samples taken? |
| Watershed (ha) | | Water | | ID No. |
| Depth (m) | | Inflow Temp. | | |

8. Principal Flora Indicate dominant plant for habitats: Submerged, emergent, sedge/grasses, trees.

| Common Name | Local Name | Scientific Name | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

9. Principal Fauna

| Common Name | Local Name | Scientific Name | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Please return to: Heritage and Biodiversity Conservation Programme, IUCN Nepal, P.O. Box 3923, KTM, Nepal. Tel: 526391

- [ ] Does the wetland support a number of diverse vegetation
- [ ] Are endangered or threatened species of plants or animals found at the site?
- [ ] Is the wetland important for breeding, staging, or wintering?

## 10. Land

Estimate % of shoreline covered for each use.

| | | | | | |
|---|---|---|---|---|---|
| | Agriculture | | Open Forest | | Dense Forest |
| | Grassland | | Pasture | | Settelment |
| | Industrial Use | | Barren Land | | Other |

## 11. For what purposes is the wetland

- [ ] Irrigation
- [ ] Domestic Use
- [ ] Plant Harvest
- [ ] Fuel source
- [ ] Fishing
- [ ] Aquaculture
- [ ] Power production
- [ ] Grinding mill
- [ ] Grazing
- [ ] Fodder
- [ ] Land Fill
- [ ] Waste Disposal
- [ ] Religious Value
- [ ] Transport
- [ ] Recreation
- [ ] Other

## 12. Other Socio-Cultural

- [ ] Is the wetland visible from vantage points such as roads, public land, hotels?
- [ ] Does the public have direct access to the wetland?

Remarks

## 13. Use and conversion

Remarks

## 14. Discribe ownership of the wetland and surrounding

- [ ] Protected Area
- [ ] Privately titled/owned
- [ ] Considered for protection
- [ ] Other
- [ ] Government land

Describe ownership of surrounding land.

## 15. Have any conservation measures been taken at site, are any

◯ Yes ◯ No

Remarks

Please return to: Heritage and Biodiversity Conservation Programme, IUCN Nepal, P.O. Box 3923, KTM, Nepal. Tel: 526391

16. Are there any development plans for the

◯ Yes ◯ No

Remarks

17. What are the obvious threats to the ecosystem and local

- [ ] Road construction along a bank
- [ ] Building construction
- [ ] Trash and floating wastes
- [ ] Monospecific domination
- [ ] Pollution
- [ ] Agricultural runoff
- [ ] Dredging/ draining
- [ ] Filling

Remarks

18. Are there any references or research pertaining to the

19. Additional Comments

20. Overall, how do you rate this

☒ Excellent ☒ High ☒ Average ☒ Fair ☒ Poor

Reason

21. Sketch of Please use back of page

22. Compiler

Please return to: Heritage and Biodiversity ConservationProgramme, IUCN Nepal, P.O. Box 3923, KTM, Nepal. Tel: 526391

# *Annex 3*
# *Itinerary of Field Visits*

## Reconnaissance Member

1. Dr. Bishnu Bhandari (Sociology)
2. Preston McEachern(Limnology)
3. Tek Bahadur Gurung (Fisheries)
4. Paras Acharya (Ecology)
5. Upendra Lal Upadhya (Agriculture)
6. Shiva N. Upadhya (Fisheries)
7. Dharma Raj Dangol (Botany)

| WETLAND SITES | | 1ST VISIT | 2ND VISIT | TEAM MEMBERS | REMARKS |
|---|---|---|---|---|---|
| 1. | Titara Tal | 02.01.96 | — | 1,4,6 | |
| 2. | Padereni | 02.01.96 | — | 1,4,6 | |
| 3. | Banda Tal | 31.12.95 | — | 1,4,6 | |
| 4. | Sano Banda Tal | 30.12.95 | — | 1,4,6 | |
| 5. | Naini Tal | 30.12.95 | — | 1,4,6 | |
| 6. | Tarbaria Tal | 30.12.95 | — | 1,4,6 | |
| 7. | Bantaria Tal | 30.12.95 | — | 1,4,6 | |
| 8. | Piyari Tal | 30.12.95 | — | 1,4,6 | |
| 9. | Bichki Tal | 30.12.95 | — | 1,4,6 | |
| 10. | Aanp Tal | 31.12.95 | — | 1,4,6 | |
| 11. | Bedkot Tal | 30.12.95 | — | 1,4,6 | |
| 12. | Mahakali Floodplain | 28.12.95 | — | 1,4,6 | |
| 13. | Chaudhar River | 28.12.95 | — | 1,4,6 | |
| 14. | Banara River | 01.01.96 | — | 1,2,4 | |
| 15. | Donda River | 30.12.95 | — | 14,6 | |
| 16. | Mohana River | 30.12.95 | — | 1,4,6 | |
| 17. | Gusta Tal | 30.12.95 | — | 1,4,6 | |
| 18. | Shova Tal | 31.12.95 | — | 1,4,6 | |
| 19. | Rani Tal | 20.09.93 | 28.12.95 | 1,2,3,4 | |
| 20. | Bahunne Nala | 21.09.93 | 28.12.95 | 1,2,3,4 | |
| 21. | Shikari Tal | 21.09.93 | 28.12.95 | 1,2,3,4 | |
| 22. | Lalpani Tal | 21.09.93 | 30.12.95 | 1,2,3,4 | |
| 23. | Kalikitch Tal | 22.09.93 | 30.12.95 | 1,2,3,4 | |
| 24. | Tara Tal | 22.09.93 | 30.12.95 | 1,2,3,4 | |
| 25. | Peli Tal | 22.09.93 | 30.12.95 | 1,2,3,4 | |
| 26. | Nun Khaini Tal | 20.09.93 | 30.12.95 | 1,2,3,4 | |

| WETLAND SITES | | 1ST VISIT | 2ND VISIT | TEAM MEMBERS | REMARKS |
|---|---|---|---|---|---|
| 27. | Dhaderi Khola | 21.9.93 | 30.12.95 | 1,2,3,4 | |
| 28. | Ojhuwa Tal, Narayanpur | 30.1.96 | — | 1,2,5 | |
| 29. | Dhudhwa Tal | 01.01.96 | — | 1,2,5 | |
| 30. | Kusaiya Tal | 01.01.96 | — | 1,2,5 | |
| 31. | Piparawa Tal | 01.01.96 | — | 1,2,5 | |
| 32. | Sonia Tal | 01.01.96 | — | 1,2,5 | |
| 33. | Ghor Tal | 01.01.96 | — | 1,2,5 | |
| 34. | Badka Tal | 02.01.96 | — | 1,2,5 | |
| 35. | Louka Bhouka Tal | 01.01.96 | — | 1,2,5 | |
| 36. | Shahadev Tal | 32.12.95 | — | 1,2,5 | |
| 37. | Mahadev Tal | 01.01.96 | — | 1,2,5 | |
| 38. | Rupia Tal | 01.01.96 | — | 1,2,5 | |
| 39. | Koilia Tal | 30.12.95 | — | 1,2,5 | |
| 40. | Puraina Tal, Hasulia | 30.12.95 | — | 1,2,5 | |
| 41. | Sunhara Tal | 30.12.95 | — | 1,2,5 | |
| 42. | Jugeda Tal | 30.12.95 | — | 1,2,5 | |
| 43. | Larbarai | 31.12.95 | — | 1,4,6 | |
| 44. | Purnaina Tal , Laibhojhi | 01.01.96 | — | 1,4,6 | |
| 45. | Gadbhijala Tal | 03.01.96 | — | 1,4,5 | |
| 46. | Budi Nakharodi Tal | 01.01.96 | — | 1,2,3,4,5,6 | |
| 47. | Singrowa Tal | 02.02.95 | — | 1,2,3,4,5,6 | |
| 48. | Godavari River | 02.01.96 | — | 1,4 | |
| 49. | Khairena Khola | 31.12.95 | — | 1,4 | |
| 50. | Khutia Khola | 31.12.95 | — | 1,2,4,6 | |
| 51. | Shiva Ganga | 31.12.95 | 31.12.95 | 1,2,4,6 | |
| 52. | Chaumala Khola | 31.12.95 | — | 1,2,4,6 | |
| 53. | Gauri Ganga | 31.12.95 | 31.12.95 | 1,2,4,6 | |
| 54. | Lekma River | 31.12.95 | — | 1,2,4,6 | |
| 55. | Kandra River | 01.01.96 | — | 1,2,4,6 | |
| 56. | Patharaiya River | 02.01.96 | — | 1,2,4,6 | |
| 57. | Kanda River | 01.01.96 | — | 1,2,4,6 | |
| 58. | Ghodaghodi Tal | 09.09.93 | 02.02.95 | 1,2,3,4,7 | Visited many times. |
| 59. | Chiraiyo Tal | 19.09.93 | 02.02.95 | 1,2,3,4 | |
| 60. | Nakharodi Tal | 19.09.93 | 02.02.95 | 1,2,3,4 | |
| 61. | Ojhuwa Tal, Darakh | 19.09.93 | 02.02.95 | 1,2,3,4 | |
| 62. | Bainshawa Tal | 19.09.93 | 02.02.95 | 1,2,3,4 | |
| 63. | Tara Tal, Bardia | 03.01.96 | — | 1,4,5 | |
| 64. | Bhagairia Tal | 04.01.96 | — | 1,4,5 | |
| 65. | Kaurahi River | 03.01.96 | — | 1,4,5 | |
| 66. | Aurahi River | 03.01.96 | — | 1,4,5 | |
| 67. | Badhaiya | 23.02.94 | — | 1,2,4 | |

| WETLAND SITES | | 1ST VISIT | 2ND VISIT | TEAM MEMBERS | REMARKS |
|---|---|---|---|---|---|
| 68. | Karnali Floodplain | 23.2.93 | 02.02.95 | 1,2,4 | |
| 69. | Babai Floodplain | 23.2.93 | 02.02.95 | 1,2,4 | |
| 70. | Bathuwa | 23.2.94 | — | 1,4 | |
| 71. | Khasre Tal | 07.01.96 | — | 1,4 | |
| 72. | Man Khola | 03.01.96 | — | 1,2,4,7 | |
| 73. | Kanti Pokhari | 27.09.96 | — | 1,4,7 | |
| 74. | Rapti Floodplain | 24.02.93 | 02.02.95 | 1,2,3,4,7 | |
| 75. | Lohraula Tal | 16.09.96 | — | 1,4,7 | |
| 76. | Sakhunia Tal | 16.09.96 | — | 1,4,7 | |
| 77. | Buddhi Tal | 24.11.93 | 16.09.96 | 1,2,3,4,7 | |
| 78. | Ajingara Tal | 24.11.93 | — | 1,2 | |
| 79. | Lambu Sagar | 24.11.93 | 17.09.96 | 1,2,3,4,7 | |
| 80. | Jagadishpur Reservoir | 24.11.93 | 17.09.96 | 1,2,3,4,7 | |
| 81. | Banganga Floodplain | 17.9.96 | 17.09.96 | 1,2,3,4,7 | |
| 82. | Laxman Ghat Barrage | 24.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 83. | Niglihawa Tal Clusters | 24.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 84. | Bakulla Ghat | 22.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 85. | Matiyara Tal | 22.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 86. | Gajedi Tal | 23.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 87. | Lausa Tal | 24.11.93 | 16.09.96 | 1,2,3,4,7 | |
| 88. | Danda Khola | 22.11.93 | 16.09.96 | 1,2,3,4,7 | |
| 89. | Tinau Floodplain | 18.9.96 | — | 1,2,3,4,7 | |
| 90. | Dano Floodplain | 22.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 91. | Karbalaha Tal | 23.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 92. | Amlahawa Tal | 23.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 93. | Siktihawa Tal | 23.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 94. | Padarhawa Tal | 22.11.96 | 18.09.96 | 1,2,3,4,7 | |
| 95. | Gularia Tal | 22.11.96 | 18.09.96 | 1,2,3,4,7 | |
| 96. | Sagrahawa Tal | 22.11.96 | 18.09.96 | 1,2,3,4,7 | |
| 97. | Gaidahawa Tal | 22.11.96 | 04.01.97 | 1,2,3,4,7 | |
| 98. | Harahawa Floodplain | 17.9.96 | 04.01.97 | 1,4,7 | |
| 99. | Telar Floodplain | 22.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 100. | Khaireni Khola FP | 18.09.96 | — | 1,4,7 | |
| 101. | Nandan Ghol | 18.09.96 | — | 1,4,7 | |
| 102. | Hulasi Ghol | 18.09.96 | — | 1,4,7 | |
| 103. | Dhanewa Khola FP | 18.09.96 | — | 1,4,7 | |
| 104. | Gandak Barrage | 22.11.93 | 18.09.96 | 1,2,3,4,7 | |
| 105. | Narsahi Ghol | 18.09.96 | — | 1,2,3,4,7 | |
| 106. | Nepal Gandak Western Canal | 18.09.96 | — | 1,2,3,4,7 | |
| 107. | Bhumahi Khola | 19.09.96 | — | 1,2,3,4,7 | |
| 108. | Narayani Floodplain | 19.09.96 | — | 1,2,3,4,7 | |
| 109. | Rampur Ghol | 28.09.96 | — | 1,4,7 | |

| WETLAND SITES | 1ST VISIT | 2ND VISIT | TEAM MEMBERS | REMARKS |
|---|---|---|---|---|
| 110. Khageri Canal | 28.9.96 | — | 1,4,7 | |
| 111. Khageri Floodplain | 21.11.93 | 10.03.95 | 1,2,3,4,7 | |
| 112. Panchakanya Ghol | 21.11.93 | 10.03.95 | 1,2,3,4,7 | |
| 113. Budhi Rapti Floodplain | 19.9.96 | — | 1,2,3,4,7 | |
| 114. Chitwan Rapti FP | 21.11.93 | 10.03.95 | 1,2,3,4 | |
| 115. Beesh Hazar Tal | 20.11.93 | 10.03.95 | 1,2,3,4,5,6,7 | Visited many times |
| 116. Jaya Mangala Ghol | 20.11.93 | — | 1,2 | |
| 117. Devi Tal | 21.11.93 | — | 1,2 | |
| 118. Reu Floodplain | 20.09.96 | — | 1,2 | |
| 119. Tamar Tal | 20.09.96 | — | 1,2 | |
| 120. Lami Tal | 20.09.96 | — | 1,2 | |
| 121. Nandan Tal | 20.11.93 | — | 1,2 | |
| 122. Chamka Floodplain | 20.09.96 | — | 1,2 | |
| 123. Dhakre Tal | 20.09.96 | — | 1,2 | |
| 124. Kamal Tal | 20.09.96 | — | 1,2 | |
| 125. Munda Tal | 20.09.96 | — | 1,2 | |
| 126. Nanda-Bhauju Tal | 20.09.96 | — | 1,2 | |
| 127. Sapnawati Ghol | 20.09.96 | — | 1,2 | |
| 128. Simaron Ghol | 20.09.96 | — | 1,2 | |
| 129. Rani Pokhari | 20.09.96 | — | 1,4,7 | |
| 130. Gobreni Ghol | 20.09.96 | — | 1 | |
| 131. Kerunga Ghol | 20.09.96 | — | 1 | |
| 132. Pasaha Floodplain | 20.09.96 | — | 1,2,3,4,7 | |
| 133. Halkhoria Daha | 12.07.94 | 20.09.96 | 1,2 | |
| 134. Bakeya Floodplain | 12.07.94 | 20.09.96 | 1,2 | |
| 135. Gandak Nepal East Canal | 25.09.96 | — | 1,4,7 | |
| 136. Barahawa Tal | 25.09.96 | — | 1,4,7 | |
| 137. Chandi Floodplain | 19.09.93 | 21.09.96 | 1,2,4,7 | |
| 138. Kishauria Chour | 25.09.96 | — | 1,4,7 | |
| 139. Bagmati Floodplain | 21.03.94 | 22.09.96 | 1,2,4,7 | |
| 140. Bagmati Canal | 20.09.96 | — | 1,4,7 | |
| 141. Manusmara Floodplain | 15.02.94 | 22.09.96 | 1,2,4,7 | |
| 142. Hirapur Barrage | 20.09.96 | — | 1,4,7 | |
| 143. Manpur Barrage | 20.09.96 | — | 1,4,7 | |
| 144. Ratu Floodplain | 20.09.96 | 23.09.96 | 1,2,47 | |
| 145. Badhari Floodplain | 20.09.96 | 23.09.96 | 1,4,7 | |
| 146. Kamala Canal | 20.09.96 | — | 1,4,7 | |
| 147. Kamala Floodplain | 02.12.94 | 23.09.96 | 1,2,4,7 | |
| 148. Balan Floodplain | 02.12.94 | 24.09.96 | 1,2,4,7 | |
| 149. Bhokari Daha | 20.09.96 | — | 1,4,7 | |
| 150. Trijuga Floodplain | 21.09.96 | — | 1,4,7 | |

| WETLAND SITES | 1ST VISIT | 2ND VISIT | TEAM MEMBERS | REMARKS |
|---|---|---|---|---|
| 151. Chandra Canal | 21.09.96 | — | 1,2,4,7 | |
| 152. Chatara Canal | 21.09.96 | — | 1,4,7 | |
| 153. Koshi Barrage | 14.02.94 | 25.09.96 | 1,2,3,4,7 | |
| 154. Koshi Tappu Wildlife Reserve | 14.02.94 | 25.09.96 | 1,2,3,4,7 | Visited many times. |
| 155. Koshi Floodplain | 21.09.96 | — | 1,4,7 | |
| 156. Bakra Floodplain | 02.12.94 | 25.09.96 | 1,2,3,4,7 | |
| 157. Ratuwa Floodplain | 02.12.94 | 25.09.96 | 1,2,3,4,7 | |
| 158. Gaura Daha | 21.09.96 | — | 1,4,7 | |
| 159. Kankai Floodplain | 02.12.94 | 25.09.96 | 1,4,7 | |
| 160. Biring Floodplain | 13.02.94 | 25.09.96 | 1,2,3,7 | |
| 161. Mechi Floodplain | 22.09.96 | — | 1,4,7 | |
| 162. Kachan Kabal | 22.09.96 | — | 1,4,7 | |
| 163. Kankai Canal | 22.09.96 | — | 1,4,7 | |

# *Annex 4*

# *Locational Characteristics of Wetland Sites in Terai (N=163)*

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Titara Tal | Kanchanpur | Krishnapur | 2 | Bani | Attariya | 14 | 10 | 80°26'44.3"E 28°52'12.1"N | 210 | Far Western |
| 2. | Padereni | Kanchanpur | Krishnapur | 2 | Bani | Attariya | 11 | 15 | 80°25'32.1"E 28°51'08.8"N | 205 | Far Western |
| 3. | Banda Tal | Kanchanpur | Laxmipur | 6 | Janakbasti | IBRB Gaon | 3 | 45 | 80°25'02.4"E 28°39'43.9"N | 190 | Far Western |
| 4. | Sano Banda Tal | Kanchanpur | Tribhuwanbasti | 6 | Janakbasti | IBRB Gaon | 4 | 10 | 80°25'02.4"E 28°39'43.9"N | 188 | Far Western |
| 5. | Naini Tal | Kanchanpur | Kalika | 9 | Ganesh | Tribhuwanbasti | 14 | 5 | 80°24'30.0"E 28°42'58.0"N | 195 | Far Western |
| 6. | Tarbaria Tal | Kanchanpur | Shreepur | 2 | Maina Gaon | Bellore | 2 | 20 | 80°22'01.6"E 28°41'53.3"N | 215 | Far Western |
| 7. | Bantaria Tal | Kanchanpur | Shreepur | 2 | Maina Gaon | Bellore | 3 | 6 | 80°23'03.3"E 28°43'12.3"N | 230 | Far Western |
| 8. | Piyari Tal | Kanchanpur | Parasan | 7 | Bijpatta | Tribhuwanbasti | 16 | 24 | 80°30'59.4"E 28°33'39.4"N | 200 | Far Western |
| 9. | Bichki Tal | Kanchanpur | Tribhuwanbasti | 4 | Janakbasti | Tribhuwanbasti | 5 | 5 | 80°25'50.8"E 28°38'21.9"N | 196 | Far Western |
| 10. | Aanp Tal | Kanchanpur | Tribhuwanbasti | 5 | Janakbasti | Tribhuwanbasti | 7 | 7 | 80°25'33.8"E 28°38'17.5"N | 196 | Far Western |
| 11. | Bedkot Tal | Kanchanpur | Daiji | 5 | Chhela Bagon | Mahendranagar | 23 | 5 | 80°19'04.8"E 29°01'25.8"N | 407 | Far Western |
| 12. | Mahakali Floodplain | Kanchanpur | Mahendranagar Municipality | 9 | Brahmadeva | Mahendranagar | 15 | 8,750 | 80°07'45.0"E 29°04'02.9"N | 161 | Far Western |
| 13. | Chaudhar River FP | Kanchanpur | Daiji | - | - | Mahendranagar | 8 | 2,812 | 80°15'16.4"E 28°57'06.2"N | 145 | Far Western |
| 14. | Banara River FP | Kanchanpur | Krishnapur | 4 | - | Mahendranagar | 16 | 2,820 | 80°23'48.0"E 28°53'15.7"N | 162 | Far Western |
| 15. | Donda River FP | Kanchanpur | Krishnapur | 2 | Bani | Attariya | 9 | 2,500 | 80°26'07.6"E 28°51'07.1"N | 158 | Far Western |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16. | Mohana River FP | Kanchanpur | Krishnapur | 1 | Gulariya | Attariya | 6 | 13,500 | 80°30'56.0"E 28°49'26.5"N | 151 | Far Western |
| 17. | Gusta Tal | Kanchanpur | Rauteli Bichawa | 2 | Andaiya | Mahendranagar | 15 | 5 | 80°14'49.2"E 28°14'49.2"N | 149 | Far Western |
| 18. | Shova Tal | Kanchanpur | Shankarpur | 7 | Chhoti Palia | Bellore | 8 | 25 | 80°21'49.6"E 28°45'28.2"N | 230 | Far Western |
| 19. | Rani Tal | Kanchanpur | Royal Shukla Phanta Wildlife Reserve | - | - | Mahendranagar | 8 | 11 | 80°13'00.2"E 28°50'01.9"N | 140 | Far Western |
| 20. | Bahunne Nala | Kanchanpur | Royal Shukla Phanta Wildlife Reserve | - | - | Mahendranagar | 32 | 781 | 80°50'15.2"E 28°25'10.9"E | 138 | Far Western |
| 21. | Shikari Tal | Kanchanpur | Royal Shukla Phanta Wildlife Reserve | - | - | Mahendranagar | 40 | 5 | 80°10'53.3"E 28°48'18.3"N | 136 | Far Western |
| 22. | Lalpani Tal | Kanchanpur | Rauteli Bichawa | 3 | Lalpani | Mahnedranagar | 10 | 5 | 80°15'06.6"E 28°51'31.3"N | 150 | Far Western |
| 23. | Kalikitch Tal | Kanchanpur | Beldandi | 7 | Beldandi | Mahendranagar | 30 | 10 | 80°15'37.3"E 28°48'07.2"N | 145 | Far Western |
| 24. | Tara Tal | Kanchanpur | Pipaladi | 1 | Tarapur | Mahendranagar | 30 | 30 | 80°19'28.6"E 20°56'27.2"N | 175 | Far Western |
| 25. | Peli Tal | Kanchanpur | Daiji | 1 | - | Mahendranagar | 16 | 5 | 80°16'23.7"E 20°56'27.2"N | 145 | Far Western |
| 26. | Nun Khaini Tal | Kanchanpur | Krishapur | 2 | Krishnapur | Bani | 2 | 6 | 80°25'40.9"E 28°51'17.3"N | 190 | Far Western |
| 27. | Dhaderi Khola | Kanchanpur | Rauteli Bichawa | - | Chaupheri | Mahendranagar | 15 | 10 | 80°16'19.9"E 28°53'17.4"N | 160 | Far Western |
| 28. | Ojhuwa Tal, Narayanpur | Kailali | Narayanpur | 9 | Baidi Phanta | Tikapur | 15 | 9 | 81°01'24.9"E 28°27'91.8"N | 193 | Far Western |
| 29. | Dhudhwa Tal | Kailali | Lalbhojhi | 7 | Dhudhwa Phanta | Sukhad | 25 | 5 | 80°58'15.4"E 28°27'42.3"N | 208 | Far Western |
| 30. | Kusaiya Tal | Kailali | Lalbhojhi | 4 | Prithvinagar | Sukhad | 25 | 8 | 80°55'49.5"E 28°27'58.5"N | 206 | Far Western |
| 31. | Piparawa Tal | Kailali | Lalbhojhi | 3 | Piparawa | Sukhad | 30 | 40 | 80°58'27.9"E 28°26'27.0"N | 206 | Far Western |
| 32. | Sonia Tal | Kailali | Khailad | 8 | Dongpur | Sukhad | 19 | 40 | 80°54'44.5"E 28°34'10.5"N | 203 | Far Western |
| 33. | Ghor Tal | Kailali | Khailad | 9 | Himmatpur | Sukhad | 15 | 24 | 80°34'54.1"E 28°54'37.1"N | 200 | Far Western |
| 34. | Badka Tal | Kailali | Chaumala | 1 | Khurkhuria | Chaumala | 10 | 6 | 80°46'23.5"E 28°43'30.7"N | 215 | Far Western |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35. | Louka Bhouka Tal | Kailali | Khailad | 2 | Bijulia | Sukhad | 24 | 50 | 80°56'30.6"E 28°35'04.9"N | 210 | Far Western |
| 36. | Shahadev Tal | Kailali | Urma | 4 | Rampur | Chaumala | 6 | 8 | 80°43'38.0"E 28°44'03.7"N | 223 | Far Western |
| 37. | Mahadev Tal | Kailali | Urma | 4 | Rampur | Chaumala | 8 | 16 | 80°42'36.0"E 28°44'31.9"N | 223 | Far Western |
| 38. | Rupia Tal | Kailali | Khailad | 8 | Dongpur | Sukhad | 19 | 50 | 80°53'09.5"E 28°34'10.5"N | 202 | Far Western |
| 39. | Koilia Tal | Kailali | Gadariya | 8 | Koilia | Chaumala | 12 | 100 | 80°46'02.3E 25°41'03.7N | 200 | Far Western |
| 40. | Puraina Tal, Hasulia | Kailali | Hasulia | 2 | Bhadari | Hasuliya | 7 | 30 | 80°47'03.9"E 28°35'03.3"N | 210 | Far Western |
| 41. | Sunhara Tal | Kailali | Pawera | 3 | Chhoti Palia | Hasuliya | 3 | 5 | 80°47'51.1"E 28°32'03.3"N | 203 | Far Western |
| 42. | Jugeda Tal | Kailali | Dhangadhi Municipality | 2 | Durgabasti | Dhangadhi | 7 | 8 | 80°38'13.9"E 28°40'18.3"N | 215 | Far Western |
| 43. | Larbarai Tal | Kailali | Lalbhojhi | 3 | Prithvinagar | Sukhad | 25 | 6 | 80°56'41.3"N 28°28'05.6"E | 206 | Far Western |
| 44. | Puraina Tal, Lalbhojhi | Kailali | Lalbhojhi | 3 | Prithvinagar | Sukhad | 25 | 60 | 80°55'03.2"E 25°29'00.7"N | 206 | Far Western |
| 45. | Gadbhijala Tal | Kailali | Dhansinghpur | 1 | Batanpur | Tikapur | 14 | 300 | 81°03'34.8"E 28°40'18.3"N | 192 | Far Western |
| 46. | Budi Nakharodi Tal | Kailali | Sadepani | 8 | Dipnagar | Sukhad | 3 | 6 | 80°57'33.0"E 28°40'18.3"N | 213 | Far Western |
| 47. | Singrowa Tal | Kailali | Sadepani | 9 | Dipnagar | Sukhad | 2 | 5 | 80°58'35.0"E 28°40'44.0"N | 218 | Far Western |
| 48. | Godavari River FP | Kailali | Malakheti | 3 | Attariya | Attariya | 2 | 2,160 | 80°32'29.1"E 28°48'43.6"N | 215 | Far Western |
| 49. | Khairena Khola FP | Kailali | Shreepur | 4 | Attariya | Attariya | 4 | 850 | 80°34'57.5"E 28°48'46.5"N | 230 | Far Western |
| 50. | Khutia Khola FP | Kailali | Shreepur | 4 | Attariya | Attariya | 8 | 3,625 | 80°37'57.4"E 28°47'44.2"N | 238 | Far Western |
| 51. | Shiva Ganga FP | Kailali | Chaumala | 9 | Chaumala | Chaumala | 4 | 3,750 | 80°41'51.1"E 28°47'27.3"N | 228 | Far Western |
| 52. | Chaumala Khola FP | Kailali | Chaumala | 2 | Chaumala | Chaumala | 0 | 1,375 | 80°44'10.9"E 28°46'19.4"N | 220 | Far Western |
| 53. | Gauri Ganga FP | Kailali | Chaumala | 3 | Chaumala | Chaumala | 8 | 6,375 | 80°45'36.4"E 28°45'19.2"N | 216 | Far Western |
| 54. | Lekma River FP | Kailali | Masuriya | 3 | Badaipur | Chaumala | 7 | 4,313 | 80°29'20.0"E 28°43'46.9"N | 205 | Far Western |
| 55. | Kandra River FP | Kailali | Pahalmanpur | 9 | Pahalmanpur | Pahalmanpur | 4 | 8,500 | 80°45'14.0"E 28°41'54.7"N | 195 | Far Western |
| 56. | Patharaiya River FP | Kailali | Chuha | 4 | Gapka | Chuha | 3 | 5,625 | 81°04'21.1"E 28°39'00.4"N | 202 | Far Western |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 57. | Kanda River FP | Kailali | Dododhara | 4 | Muda | Muda | 0 | 5,250 | 81°01'28.8"E 28°39'35.9"N | 196 | Far Western |
| 58. | Ghodaghodi Tal | Kailali | Darakh | 5 | Sukhad | Sukhad | 1 | 138 | 80°56'44.0"E 28°41'06.0"N | 205 | Far Western |
| 59. | Chiraiyo Tal | Kailali | Darakh | 4 | Sukhad | Sukhad | 3 | 8 | 80°58'40.9"E 28°40'45.6"N | 209 | Far Western |
| 60. | Nakhrodi Tal | Kailali | Sadepani | 8 | Sukhad | Sukhad | 3 | 70 | 80°57'33.0"E 28°42'06.0"N | 205 | Far Western |
| 61. | Ojhuwa Tal, Darakh | Kailali | Darakh | 5 | Sukhad | Sukhad | 1 | 6 | 80°56'50.4"E 28°41'06.6"N | 193 | Far Western |
| 62. | Bainshawa Tal | Kailali | Darakh | 5 | Sukhad | Sukhad | 3 | 10 | 80°57'4.60"E 28°41'54.0"N | 203 | Far Western |
| 63. | Tara Tal, Bardia | Bardia | Tara Tal | 1 | Shukrabasti | Gulariya | 15 | 3 | 81°14'52.1"E 28°17'00.8"N | 219 | Mid-Western |
| 64. | Bhagairia Tal | Bardia | Dhodhari | 9 | Bhagairia | Kothiaghat | 2 | 12 | - | 190 | Mid-Western |
| 65. | Kaurahi River FP | Bardia | Royal Bardia National Park | - | - | Bhuri Gaon | 17 | 375 | - | 210 | Mid-Western |
| 66. | Aurahi River FP | Bardia | Shivapur | 2 | Ambasa | Bhuri Gaon | 6 | 2,188 | - | 217 | Mid-Western |
| 67. | Badhaiya Tal | Bardia | Sorhawa | 1 | Badhaiya | Bansgadhi | 5 | 105 | 81°30'34.9"E 28°12'08.2"N | 197 | Mid-Western |
| 68. | Karnali Floodplain | Bardia | Baliya | - | Chisapani | Chisapani | 0 | 15,625 | 81°16'20.9"E 28°37'58.9"N | 227 | Mid-Western |
| 69. | Babai Floodplain | Bardia | Bagnaha | - | Bhuri Gaon | Bhuri Gaon | 5 | 12,812 | 80°25'26.3"E 28°22'46.9"N | 235 | Mid-Western |
| 70. | Bathuwa Ghol | Bardia | Motipur | 2 | Bathuwa | Bansgadhi | 5 | 25 | - | 212 | Mid-Western |
| 71. | Khasre Tal | Banke | Khaskusma | 5 | Gyabar | Kusum | 14 | 7 | - | 260 | Mid-Western |
| 72. | Man Khola FP | Banke | Titihiriya | 7 | Godari | Kohtpur | 10 | 2,125 | - | 213 | Mid-Western |
| 73. | Kanti Pokhari | Banke | Puraini | 2 | Naharpur | Nepalgunj | 3 | 16 | 81°39'11.3" E 28°03'42.6"N | 212 | Mid Western |
| 74. | Rapti Floodplain | Dang | Lalmatiya | 4 | Bhalubang | Bhalubang | 0 | 37,500 | 82°45'57.7"E 27°50'21.2"N | 197 | Mid Western |
| 75. | Lohraula Tal | Kapilbastu | Bahadurganj | 7 | Lohraula | Chanauta | 10 | 5.5 | 82°52'08.4"E 27°34'03.2"N | 182 | Western |
| 76. | Sakhunia Tal | Kapilbastu | Manpur | 8 | Bhadaukhar | Chanauta | 7 | 50 | 82°55'52.0"E 27°36'55.0"N | 178 | Western |
| 77. | Buddhi Tal | Kapilbastu | Buddhi | 7 | Deuri | Gorusinghe | 4 | 50 | 83°60'35.3"E 27°38'34.7"N | 184 | Western |
| 78. | Ajingara Tal | Kapilbastu | Ajingara | 1 | Azingara | Bahadur Gunj | 4 | 25 | 82°52'22.9"E 27°31'05.8"N | 180 | Western |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 79. | Lambu Sagar | Kapilbastu | Niglihawa | 9 | Srinagar | Taulihawa | 10 | 10.5 | 83°05'24.8"E 27°36'67.1"N | 194 | Western |
| 80. | Jagadishpur Reservoir | Kapilbastu | Niglihawa | 1 | Jagadishpur | Taulihawa | 10 | 225 | 83°05'00.0"E 27°36'67.1"N | 197 | Western |
| 81. | Banganga FP | Kapilbastu | Gajehada | 7 | Darakhaso | Jitpur | 1.5 | 4,000 | 83°09'47.7"E 27°41'27.0"N | 171 | Western |
| 82. | Laxman Ghat Barrage | Kapilbastu | Niglihawa | 4 | Jagadishpur | Taulihawa | 15 | 20 | 83°05'40.5"E 27°36'56.8"N | 190 | Western |
| 83. | Niglihawa Tal Clusters | Kapilbastu | Niglihawa | 9 | Niglihawa | Taulihawa | 10 | 5 | 83°05'18.5"E 27°37'16.0"N | 197 | Western |
| 84. | Bakulla Ghat | Rupandehi | Gajedi | 2 | Bakulla Ghat | Bansgadhi | 7 | 5 | 83°17'53.2"E 27°39'02.4"N | 200 | Western |
| 85. | Matiyara Tal | Rupandehi | Gajedi | 7 | Materiya | Bansgadhi | 8 | 7 | 83°17'28.0"E 27°37'34.3"N | 207 | Western |
| 86. | Gajedi Tal | Rupandehi | Gajedi | 3 | Danopur | Bansgadhi | 8 | 15 | 83°16'34.4"E 27°39'39.2"N | 227 | Western |
| 87. | Lausa Tal | Rupandehi | Gajedi | 1 | Lausa | Bansgadhi | 2 | 7 | 83°17'12.5"E 27°40'40.5"N | 227 | Western |
| 88. | Danda Khola | Rupandehi | Siddhartha Nagar Municipality | 2 | Paklihawa | Bhairahawa | 5 | 900 | 83°26'34.9"E 27°28'11.1"N | 202 | Western |
| 89. | Tinau Floodplain | Rupandehi | Gonaha | 6 | Bethani Bazar | Bhairahawa | 6 | 2800 | 83°23'49.3"E 27°30'56.9"N | 210 | Western |
| 90. | Dano Floodplain | Rupandehi | Kamabariya | 4 | Gunda | Bhairahawa | 11 | 5,700 | 83°19'59.1"E 27°29'59.5"N | 203 | Western |
| 91. | Karbalaha Tal | Rupandehi | Khurda Bangar | 2 | Sun Barsi | Koilihawa | 2.5 | 5 | 83°18'46.7"E 27°30'50.2"N | 198 | Western |
| 92. | Amlahawa Tal | Rupandehi | Khurda Bangar | 9 | Lakadi Gadhi | Koilihawa | 3 | 8 | 83°18'46.7"E 27°30'50.2"N | 198 | Western |
| 93. | Siktihawa Tal | Rupandehi | Dhamauli | 8 | Ahirauli | Koilihawa | 6 | 22 | 83°19'21.6"E 27°31'43.4"N | 195 | Western |
| 94. | Padarhawa Tal | Rupandehi | Dhamauli | 8 | Dubihawa | Koilihawa | 7 | 10 | 83°19'21.6"E 27°31'41.0"N | 195 | Western |
| 95. | Gularia Tal | Rupandehi | Suryapura | 3 | Kanejawa | Koilihawa | 15 | 10 | 83°18'45.3"E 27°34'53.6"N | 200 | Western |
| 96. | Sagrahawa Tal | Rupandehi | Bisunpura | 9 | Sagrahawa | Lumbini | 8 | 3 | 83°17'55.7"E 27°33'34.7"N | 200 | Western |
| 97. | Gaidahawa Tal | Rupandehi | Suryapura | 6 | Gaidahawa | Lumbini | 14 | 50 | 83°16'53.2"E 27°35'39.0"N | 200 | Western |
| 98. | Harahawa FP | Rupandehi | Development Project | NA | Lumbini | Siddarth Nagar | 22 | 500 | 83°16'59.8"E 27°29'47.8"N | 152 | Western |
| 99. | Telar Floodplain | Rupandehi | Parsa | 6 | Parsa Bazar | Lumbini | 1 | 2,500 | 83°17'33.4"E 27°29'19.5"N | 155 | Western |
| 100. | Khaireni Khola FP | Rupandehi | Devadaha | 1 | Khaireni Bazar | Sunwal | 5 | 4,500 | 83°36'26.6"E 27°38'25.7"N | 235 | Western |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101. | Nandan Ghol | Nawalparasi | Hakui | 8 | Padari | Parasi | 8 | 267 | 83°37'21.8"E 27°29'08.2"N | 218 | Western |
| 102. | Hulasi Ghol | Nawalparasi | Badahara Dubauliya | 3 | Barsan | Parasi | 9 | . 270 | 83°42'48.3"E 27°28'08.9"N | 218 | Western |
| 103. | Dhanewa Khola FP | Nawalparasi | Rampur | 9 | Naudihawa | Parasi | 15 | 3,400 | 83°44'21.1"E 27°25'49.8"N | 218 | Western |
| 104. | Gandak Barrage | Nawalparasi | Tribeni-Susta | | Tribeni | Parasi | 25 | 500 | 83°54'40.7"E 27°26'40.5"N | 208 | Western |
| 105. | Narsahi Ghol | Nawalparasi | Narsahi | 9 | B-Colony | Parasi | 24 | 50 | 83°51'55.2"E 27°26'28.1"N | 214 | Western |
| 106. | Nepal Gandak Western Canal | Nawalparasi | Kusma | 3 | Belashpur | Parasi Bazar | 6 | 10,300 | 83°48'37.3"E 27°28'48.0"N | 208 | Western |
| 107. | Bhumahi Khola | Nawalparasi | Ramnagar | 1 | Bhumahi | Sunwal | 7 | 380 | 83°41'51.7"E 27°34'47.8"N | 215 | Western |
| 108. | Narayani FP | Nawalparasi | Gaidakot | 9 | Gaidakot | Gaidakot | 3 | 38,000 | 84°21'15.3"E 27°42'45.3"N | 263 | Western |
| 109. | Rampur Ghol | Chitwan | IAAS, Rampur | - | - | Narayanghat | 8 | 15 | 84°21'25.2"E 27°38'14.1"N | 257 | Central |
| 110. | Khageri Canal | Chitwan | Ratna Nagar | 9 | Kappar Khori | Ratna Nagar | 3 | 3,900 | 84°21'25.2"E 27°38'14.1"N | 280 | Central |
| 111. | Khageri FP | Chitwan | Ratna Nagar | 9 | Kappar Khori | Ratna Nagar | 3 | 4,700 | 84°29'25.1"E 27°38'03.1"N | 286 | Central |
| 112. | Panchakanya Ghol | Chitwan | Panchakanya | 7 | Tikauli Mangalpur | Ratna Nagar | 4 | 60 | 84°29'48.8"E 27°38'43.0"N | 282 | Central |
| 113. | Budhi Rapti FP | Chitwan | Khairhani | 7 | Parsa Bazar | Parsa Bazar | 1 | 5,470 | 84°33'34.6"E 27°36'50.2"N | 290 | Central |
| 114. | Chitwan Rapti FP | Chitwan | Bachhauli | 2 | Sauraha | Ratna Nagar | 8 | 16,875 | 84°45'57.7"E 27°50'21.2"N | 254 | Central |
| 115. | Beesh Hazar Tal | Chitwan | Gitanagar | 3 | Tikauli | Tikauli | 7 | 100 | 84°26'11.3"E 27°37'04.6"N | 286 | Central |
| 116. | Jaya Mangala Ghol | Chitwan | Padampur | 7 | Jayamangala | Samaha | 2 | 3 | 84°28'39.3"E 27°30'36.6"N | 214 | Central |
| 117. | Devi Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 51 | 12 | 84°07'00.0"E 27°32'00.0"N | 225 | Central |
| 118. | Reu FP | Chitwan | RCNP | N/A | N/A | Kasara HQ | 9 | 5,500 | - | - | Central |
| 119. | Tamar Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 5 | - | 84°21'09.0"E 27°31'59.0"N | - | Central |
| 120. | Lami Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 5 | - | - | - | Central |
| 121. | Nandan Tal | Chitwan | RCNP | N/A | N/A | Saurah | 4 | - | 84°28'17.8"E 27°32'26.5"N | - | Central |
| 122. | Chamka FP | Chitwan | RCNP | N/A | N/A | Kasara HQ | 31 | - | - | - | Central |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 123. | Dhakre Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 28 | - | - | - | Central |
| 124. | Kamal Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 10 | - | - | - | Central |
| 125. | Munda Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 35 | - | 84°21'38"E 27°33'17"N | - | Central |
| 126. | Nanda-Bhauju Tal | Chitwan | RCNP | N/A | N/A | Kasara HQ | 20 | - | - | - | Central |
| 127. | Sapnawati Ghol | Chitwan | RCNP | N/A | N/A | Kasara HQ | 8 | - | - | - | Central |
| 128. | Simaron Ghol | Chitwan | RCNP | N/A | N/A | Sauraha | 5 | - | - | - | Central |
| 129. | Rani Pokhari | Chitwan | Sharda Nagar | N/A | N/A | Bharatpur | 10 | - | - | - | Central |
| 130. | Gobreni Ghol | Chitwan | Gunj Nagar | 8 | Gobreni | Bharatpur | 10 | - | - | - | Central |
| 131. | Kerunga Ghol | Chitwan | Jagatpur | 4 | Jagatpur | Bharatpur | 10 | - | - | - | Central |
| 132. | Pasaha FP | Bara | Dumbarwana | 7 | Pathlaiya | Pathlaiya | 10 | 8,750 | 85°03'58.6"E 27°10'59.4"N | 240 | Central |
| 133. | Halkhoria Daha | Bara | Ratanpuri | 6 | Ratanpur | Pataliya | 12 | 50 | 85°04'52.6"E 27°12'08.5"N | 245 | Central |
| 134. | Bakeya FP | Bara | Tamagadhi | 8 | Tamagadhi | Nijgadh | 1.5 | 13,875 | 85°10'07.4"E 27°10'47.4"N | 251 | Central |
| 135. | Gandak Nepal East Canal | Bara | Bahuwari | 9 | Gandak Chok | Birgunj | 5 | 24,500 | 84°54'49.8"E 27°02'01.5"N | 221 | Central |
| 136. | Barahawa Tal | Rautahat | Gaur Municipality | 9 | Barhawa Bazar | Gaur | 0 | 10 | 85°16'53.5"E 26°45'51.2"N | 190 | Central |
| 137. | Chandi FP | Rautahat | Chandra Nigahapur | 1 | Nijgadh | Nijgadh | 1 | 5,062 | 85°22'06.3"E 27°06'44.3"N | 234 | Central |
| 138. | Kishauria Chour | Rautahat | Jhunkhunma | 7 | Jhunkhunma | Gaur | 7 | 30 | 85°17'06.2"E 26°49'28.9"N | 190 | Central |
| 139. | Bagmait FP | Sarlahi | Karmaihiya | 1 | Karmaihiya | Karmaihiya | 0 | 10,690 | 85°28'57.2"E 27°07'55.5"N | 239 | Central |
| 140. | Bagmati Canal | Sarlahi | Karmaihiya | 1 | Karmaihiya | Karmaihiya Bazar | 1 | 42,000 | 85°29'03.7E 27:07:59.0N | 238 | Central |
| 141. | Manusmara FP | Sarlahi | Laukat | 4 | Puraina | Naya Road | 18 | 9,180 | 85°27'51.3"E 26°57'41.0"N | 190 | Central |
| 142. | Hirapur Barrage | Sarlahi | Haripur | 5 | Haripur | Naya Road | 20 | 2,000 | 85°26'48.1"E 26°56'59.9"N | 190 | Central |
| 143. | Manpur Barrage | Sarlahi | Manpur | 9 | Manpur | Naya Road | 25 | 3,200 | 85°25'20.5"E 26°55'01.3"N | 182 | Central |
| 144. | Ratu FP | Mahottari | Bardibas | 7 | Bardibas | Bardibas | 1.5 | 9,750 | 85°54'37.4"E 26°59'12.2"N | 327 | Central |

| S.N. | NAME OF WETLAND | DISTRICT | VILLAGE DEVELOPMENT COMMITTEE | WARD | SETTLEMENT | NEAREST TOWN | DISTANCE (KM) | AREA (HA) | LATITUDE/ LONGITUDE | ALTITUDE | DEVELOPMENT REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 145. | Badhari FP | Dhanusha | Begadawar | 3 | Badhari | Lalgadh | 3 | 3,938 | 85°56'54.9"E 26°57'02.7"N | 398 | Central |
| 146. | Kamala Canal | Siraha | Badhara Mal | 2 | Bandipur | Bandipur | 2 | 24,000 | 86°08'27.9"E 26°53'15.0"N | 235 | Eastern |
| 147. | Kamala FP | Siraha | Badhara Mal | 2 | Bandipur | Bandipur | 2 | 7,875 | 86°08'12.4"E 26°52'39.0"N | 233 | Eastern |
| 148. | Balan FP | Siraha | Lahan Municipality | 3 | Lahan | Lahan | 3 | 7,500 | 86°30'41.8"E 26°40'17.9"N | 231 | Eastern |
| 149. | Bhokari Daha | Saptari | Sambunath | 3 | Sambunath Bazar | Rupni | 2 | 8 | 86°41'40.1"E 26°37'45.0"N | 213 | Eastern |
| 150. | Trijuga FP | Saptari | Fatepur | 3 | Fatepur Bazar | Kanchanpur | 14 | 1,750 | 86°55'51.1"E 26°44'23.1"N | 185 | Eastern |
| 151. | Chandra Canal | Saptari | Fatepur | 3 | Fatepur Bazar | Kanchanpur | 14 | 10,500 | 86°55'51.1"E 26°44'23.1"N | 185 | Eastern |
| 152. | Chatara Canal | Sunsari | Barahachhetra | 1 | Baraha chhetra | Jhumka | 22 | 60,000 | 87°09'01.2"E 26°50'03.1"N | 202 | Eastern |
| 153. | Koshi Barrage | Sunsari | Haripur | 9 | Bhantabari | Bhantabari | 1 | 3,500 | 86°56'45.5"E 26°31'45.5"N | 162 | Eastern |
| 154. | Koshi Tappu Wildlife Reserve | Sunsari | Kusaha | 3 | Kusaha | Koshi Barrage | 16 | 149000 | 86°31'33.5"E 26°54'23.5"N | 207 | Eastern |
| 155. | Koshi FP | Sunsari | Barahachhetra | 1 | Barahachhetra | Jhumka | 22 | 21,000 | 87°09'01.2"E 26°50'03.1"N | 202 | Eastern |
| 156. | Bakra FP | Morang | Urlabari | 6 | Aaitbare | Urlabari | 2 | 9,625 | 87°37'03.1"E 26°39'43.4"N | 224 | Eastern |
| 157. | Ratuwa FP | Jhapa | Damak Municipality | 1 | Damak | Damak | 1 | 7,125 | 87°42'00.8"E 26°39'20.0"N | 235 | Eastern |
| 158. | Gaura Daha | Jhapa | Gaurandaha | 9 | Gaurandaha | Padajunge | 11 | 6.5 | 87°43'02.5"E 26°33'55.9"N | 203 | Eastern |
| 159. | Kankai FP | Jhapa | Duhagadhi | 5 | Maidhar | Surunga Bazar | 2 | 7,125 | 87°52'44.7"E 26°40'34.8"N | 220 | Eastern |
| 160. | Biring FP | Jhapa | Ghailaduwa | 9 | Laxmanpur | Laxmanpur | 1 | 5,875 | 87°56'52.2"E 26°36'53.4"N | 218 | Eastern |
| 161. | Mechi FP | Jhapa | Bhadrapur Municipality | 2 | Bhadrapur | Bhadrapur | 0 | 16,250 | 86°04'45.5"E 26°33'23.5"N | 184 | Eastern |
| 162. | Kachan Kabal | Jhapa | Kechana | 3 | Kechana | Chandra Gadhi | 25 | 40.5 | 87°59'42.0"E 26°33'23.5"N | 178 | Eastern |
| 163. | Kankai Canal | Jhapa | Dhudge | 8 | Domukha | Kankai | 2 | 8,000 | 87°52'43.8"E 26°41'09.7"N | 254 | Eastern |

Note:
FP = Floodplain
HQ = Head Quarters
NA = Not applicable
– = Data not available
RCNP = Royal Chitwan National Park

*Annex 5*

# *Area, Use, Major Threats, Ranking and Population of Wetland Sites in Terai (N=163)*

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Titara Tal | Seasonal lake | 10 | Fishing, grazing | Dredging, draining, filling | Fair | – | |
| 2. | Padereni | Lake | 15 | Fishing, grazing, fodder | Dredging, draining, filling | Fair | 13,892 | |
| 3. | Banda Tal | Lake | 45 | Fishing, grazing, fodder | Monospecific domination, run-off, dredging, draining | Fair | 8,825 | |
| 4. | Sano Banda Tal | Lake | 10 | Fishing, grazing, domestic use | Monospecific domination, run-off, dredging, draining | Fair | 8,825 | |
| 5. | Naini Tal | Lake | 4 | Irrigation, fishing | Building, run-off, filling | Poor | 8,233 | |
| 6. | Tarbaria Tal | Lake | 20 | Irrigation, fishing, grazing | Pollution, run-off, dredging, filling | Average | 14,280 | |
| 7. | Bantaria Tal | Lake | 6 | Irrigation, fishing, grazing | Pollution, run-off, dredging, filling | Fair | 14,280 | |
| 8. | Piyari Tal | Oxbow | 24 | Fishing, domestic use, fuel harvest | Monospecific domination, run-off, filling | High | 9,796 | |
| 9. | Bichki Tal | Oxbow | 4 | Fishing, grazing, plant harvest | Dredging, draining, filling | Fair | 8,825 | |
| 10. | Aanp Tal | Oxbow | 7 | Fishing, grazing, plant harvest | Dredging, draining, filling | Fair | 8,825 | |
| 11. | Bedkot Tal | Pond | 5 | Plant harvest, grazing, fodder | Road, draining, filling | Excellent | 12,967 | Religious |
| 12. | Mahakali Floodplain | Floodplain | 8,750 | Fishing, grazing, plant harvest | Drainage | High | 87,864 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13. | Chaudhar River | Floodplain | 2,812 | Irrigation, fishing, fuelwood | Building, run-off, filling | Average | 94,683 | Dam Construction |
| 14. | Banara River | Floodplain | 2,820 | Irrigation, fishing, plant harvest | Road, pollution, filling | High | 97,337 | |
| 15. | Donda River | Floodplain | 2,500 | Irrigation, fishing, plant harvest | Road, pollution, filling, drainage | High | 22,196 | |
| 16. | Mohana River | Floodplain | 13,500 | Irrigation, fishing, plant harvest | Road, pollution, filling, drainage | High | 161,940 | Largest |
| 17. | Gusta Tal | Oxbow | 5 | Irrigation, fishing, plant harvest | Monospecific domination, pollution, run-off, filling | Fair | 11,841 | |
| 18. | Shova Tal | Lake | 25 | Fishing, grazing, fuel | Filling | Average | 4,730 | |
| 19. | Rani Tal | Lake | 11 | Recreation, plant harvest | Filling | High | – | Protected area |
| 20. | Bahunne Nala | Floodplain | 781 | Fodder, recreation | – | High | – | Protected area |
| 21. | Shikari Tal | Pond | 3 | Recreation, plant harvest | Monospecific domination, filling | High | – | Protected area |
| 22. | Lalpani Tal | Oxbow | 3 | Fishing, grazing | Pollution, filling , run-off | Average | 6,718 | Crocodile |
| 23. | Kalikitch Tal | Lake | 10 | Fishing, grazing | Filling digging ditch, run-off | Average | 9,301 | Crocodile |
| 24. | Tara Tal | Lake | 30 | Fishing, grazing | Filling, run-off | Average | 11,071 | Religious |
| 25. | Peli Tal | Pond | 3 | Irrigation, fishing | Monospecific domination, run-off, filling | Poor | 12,967 | Cultural |
| 26. | Nun Khaini Tal | Seasonal | 6 | Fishing, grazing, fuelwood | Filling, road, run-off | Average | 13,892 | |
| 27. | Dhaderi Khola | Floodplain | 10 | Fodder, fuel, fishing | Monospecific domination, building | Average | 6,718 | |
| 28. | Ojhuwa Tal, Narayanpur | Lake | 9 | Irrigation, fishing, domestic use | Run-off, filling | Average | 9,091 | |
| 29. | Dhudhwa Tal | Oxbow | 5 | Fishing, fodder, plant harvest | Run-off, dredging, draining, filling | Fair | 6,720 | |
| 30. | Kusaiya Tal | Lake | 8 | Irrigation, fishing | Monospecific domination, run-off, draining | Average | 6,720 | |
| 31. | Piparawa Tal | Oxbow | 40 | Irrigation, fishing, grazing | Monospecific domination, run-off, draining, filling | Average | 6,720 | |
| 32. | Sonia Tal | Lake | 40 | Fishing, fodder, plant harvest | Monospecific domination, filling | High | 5,734 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 33. | Ghor Tal | Lake | 24 | Irrigation, fishing, grazing | Monospecific domination, filling, draining | Poor | 5,734 | |
| 34. | Badka Tal | Pond | 6 | Fishing, fodder, fuelwood | Filling | Fair | 10,942 | |
| 35. | Louka Bhouka Tal | Lake | 30 | Irrigation, fishing | Drainage, filling | High | 5,734 | |
| 36. | Shahadev Tal | Lake | 8 | Irrigation, fishing | Monospecific domination, filling | High | 7,997 | |
| 37. | Mahadev Tal | Lake | 16 | Irrigation, fishing | Monospecific domination, run-off, filling | High | 7,997 | |
| 38. | Rupia Tal | Pond | 51 | Fishing, grazing | Monospecific domination, filling | Average | 5,734 | |
| 39. | Koilia Tal | Lake | 5 | Irrigation, grazing | Drainage, filling | Average | 7,355 | |
| 40. | Paraina Tal, Hasulia | Lake | 30 | Irrigation, grazing | Monospecific domination, draining, filling | Average | 10,638 | |
| 41. | Sunhara Tal | Oxbow | 5 | Fishing, domestic use | Pollution, draining, run-off | Average | 10,638 | |
| 42. | Jugeda Tal | Pond | 8 | Fishing | Building, run-off, filling | Fair | 44,753 | |
| 43. | Larbarai | Oxbow | 6 | Irrigation, fishing, grazing | Run-off, drainage, filling | Average | 6,720 | |
| 44. | Purnaina Tal, Lalbhojhi | Lake | 60 | Fishing | Run-off, drainage, filling | Poor | 6,720 | |
| 45. | Gadbhijala Tal | Marsh | 300 | Fishing, irrigation | Monospecific domination run-off, siltation | Average | 8,952 | |
| 46. | Budi Nakharodi Tal | Pond | 6 | Irrigation, fishing | Monospecific domination, run-off, filling | Average | 10,729 | |
| 47. | Singrowa Tal | Pond | 5 | Fishing, grazing | Run-off, drainage | Fair | 10,729 | |
| 48. | Godavari River | Floodplain | 2,160 | Irrigation, fishing, grazing | Run-off, filing | Fair | 16,866 | |
| 49. | Khairena Khola | Floodplain | 850 | Irrigation, fishing, grazing | Run-off, filing | Fair | 17,368 | |
| 50. | Khutia Khola | Floodplain | 3,625 | Irrigation, fishing, grazing | Run-off, filing | Average | 77,128 | |
| 51. | Shiva Ganga | Floodplain | 3,750 | Irrigation, fishing, grazing | Pollution, run-off, filling | Average | 32,375 | |
| 52. | Chaumala Khola | Floodplain | 1,375 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 18,939 | |
| 53. | Gauri Ganga | Floodplain | 6,375 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 48,224 | |
| 54. | Lekma River | Floodplain | 4,313 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 55,518 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 55. | Kandra River | Floodplain | 8,500 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 43,224 | |
| 56. | Patharaiya River | Floodplain | 5,625 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 132,369 | |
| 57. | Kanda River | Floodplain | 5,250 | Irrigation, fishing, grazing | Pollution, run-off, drainage, filling | Average | 79,505 | |
| 58. | Ghodaghodi Tal | Lake | 138 | Fishing, grazing, recreation | Drainage, monospecific domination | High | 7,054 | Religious, Crocodile |
| 59. | Chiraiyo Tal | Lake | 8 | Fishing, plant harvest | Monospecific domination | Fair | 7,054 | |
| 60. | Nakharodi Tal | Lake | 70 | Irrigation, fishing, grazing | Monospecific domination | Excellent | 10,729 | Sluice gate |
| 61. | Ojhuwa Tal, Darakh | Pond | 6 | Fishing, grazing, fodder | Drainage, Monospecific domination | High | 7,054 | |
| 62. | Bainshawa Tal | lake | 10 | Fishing, grazing, fuelwood | Monospecific domination | High | 7,054 | |
| 63. | Tara Tal, Bardia | Pond | 3 | Fishing | Filling | Average | 5,558 | Religious |
| 64. | Bhagairia Tal | Oxbow lake | 12 | Irrigation, fishing | Monospecific domination, run-off, filling | Average | 10,568 | |
| 65. | Kaurahi River | Floodplain | 375 | Irrigation, grazing | Dredging, drainage | Excellent | 20,461 | Protected area |
| 66. | Aurahi River | Floodplain | 2,188 | Irrigation, fishing, grazing | Run-off, drainage, filling | Average | 31,403 | |
| 67. | Badhaiya | Lake | 105 | Fishing, grazing, irrigation | Monospecific domination, overfishing | Fair | 15,771 | Commercial fishing |
| 68. | Karnali Floodplain | Floodplain | 15,625 | Irrigation, fishing, grazing | Road, building filling | High | | |
| 69. | Babai Floodplain | Floodplain | 12,812 | Irrigation, fishing, grazing | Run-off, filling | Average | | Canal |
| 70. | Bathuwa | Dried | - | Aquaculture | Run-off, filling | Poor | 14,760 | |
| 71. | Khasre Tal | Oxbow | 7 | Fishing, grazing | Drainage, filling | High | 3,839 | Crocodile |
| 72. | Man Khola | Floodplain | 2,125 | Irrigation, fishing | Run-off, drainage, filling | Average | 43,218 | |
| 73. | Kanti Pokhari | Lake | 16 | Fishing & aquaculture | Drainage, dredging, monospecific domination, filling | Average | 6,460 | |
| 74. | Rapti Floodplain | Floodplain | 37,500 | Irrigation, fishing, domestic use | Road, building, run-off, filling | Average | 79,496 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 75. | Lohraula Tal | Pond | 5.5 | Irrigation, fishing, grazing, domestic use | Dredging, drainage, monospecific domination, agricultural run-off | Fair | 8,210 | |
| 76. | Sakhunia Tal | Lake | 50 | Irrigation, fishing, grazing | Agricultural run-off, monospecific domination, filing | Fair | - | |
| 77. | Buddhi Tal | Lake | 50 | Irrigation, fishing grazing, domestic use, aquaculture, plant harvest | Agricultural run-off, dredging, drainage, pollution, filling | Fair | 5,871 | |
| 78. | Ajingara Tal | Lake | 25 | Irrigation, fishing, grazing, domestic use, plant harvest | Agricultural run-off, dredging, drainage, pollution, filling | Poor | 3,646 | |
| 79. | Lambu Sagar | Lake | 10 | Fishing, grazing | Dredging, drainage, filling, monospecific domination | Poor | 7,564 | |
| 80. | Jagadishpur Reservoir | Reservoir | 225 | Irrigation, fishing | Road construction, filling | Excellent | 7,564 | |
| 81. | Banganga FP | Floodplain | 4,000 | Irrigation, fishing, grazing, fodder | Road construction, pollution, agricultural run-off, dredging, drainage, filling | Average | 89,404 | |
| 82. | Laxman Ghat Barrage | Reservoir | 83.5 | Irrigation, religious value | Dredging, drainage, filling, monospecific domination | Poor | 7,564 | |
| 83. | Niglihawa Tal Clusters | Pond | 5 | Irrigation, fishing, plant harvest | Agricultural run-off, dredging, drainage, filling, monospecific domination | Poor | 7,564 | |
| 84. | Bakulla Ghat | Pond | 5 | Irrigation, fishing, domestic use, aquaculture | Agricultural run-off, dredging, drainage, filling | Poor | 7,751 | |
| 85. | Matiyara Tal | Pond | 7 | Irrigation, fishing, domestic use, plant harvest | Road construction, agricultural run-off | Fair | 7,751 | |
| 86. | Gajedi Tal | Lake | 15 | Irrigation, fishing, grazing, domestic use, plant harvest | Filling, monospecific domination | Fair | 7,751 | |
| 87. | Lausa Tal | Pond | 5 | Irrigation, fishing, grazing, domestic use | Agricultural run-off, dredging, drainage | Average | 7,751 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 88. | Danda Khola | Floodplain | 900 | Irrigation, fishing, grazing, religious values, domestic use | Agricultural run-off, dredging, drainage, pollution, monospecific domination | Average | 88,977 | |
| 89. | Tinau Floodplain | Floodplain | 2,800 | Irrigation, fishing, power production, recreation | Agricultural run-off, dredging, drainage, filling, monospecific domination | High | 155,456 | |
| 90. | Dano Floodplain | Floodplain | 5,700 | Irrigation, fishing | Agricultural run-off, pollution, filling | High | 135,470 | |
| 91. | Karbalaha Tal | Pond | 5 | Irrigation, fishing, aquaculture | Agricultural run-off, dredging, drainage, monospecific domination | Poor | 3,602 | |
| 92. | Amlahawa Tal | Lake | 8 | Fishing, religious value, domestic use, fodder, plant harvest | Agricultural run-off, dredging, drainage, pollution | Fair | 3,602 | |
| 93. | Siktihawa Tal | Lake | 22 | Irrigation, fishing, domestic use | Agricultural run-off, filling, monospecific domination | Average | 4,060 | |
| 94. | Padarhawa Tal | Lake | 10 | Irrigation, fishing, grazing, plant harvest | Agricultural run-off | Fair | 4,060 | |
| 95. | Gularia Tal | Lake | 10 | Irrigation, fishing, domestic use, plant harvest | Agricultural run-off, filling | Fair | 13,701 | |
| 96. | Sagrahawa Tal | Lake | 22 | Irrigation, fishing, aquaculture | Road, filling | Poor | 4,405 | |
| 97. | Gaidahawa Tal | Lake | 50 | Irrigation, fishing, domestic use, plant harvest | Dredging/drainage, monospecific domination, filling | Poor | 13,701 | |
| 98. | Harahawa Floodplain | Floodplain | 500 | Irrigation, fishing, grazing, religious value, domestic use, plant harvest, fuel source | Dredging, drainage | High | - | Inside the protected area. |
| 99. | Telar Floodplain | Floodplain | 2,500 | Irrigation, fishing, grazing, religious value | Building, dredging drainage, pollution, filling | High | 4,011 | |
| 100. | Khaireni Khola Floodplain | Floodplain | 4,300 | Irrigation, fishing, grazing, domestic use, plant harvest, fodder | Pollution, agricultural run-off, filling | Average | 94,075 | |
| 101. | Nandan Ghol | Marsh | 267 | Fishing, grazing, fodder | Agricultural run-off | Poor | 8,934 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 102. | Hulasi Ghol | Marsh | 70 | Fishing, grazing, irrigation, domestic use, fodder, plant harvest , fuel sources | Pollution, agricultural run-off, filling | Average | 5,255 | |
| 103. | Dhanewa Khola Floodplain | Floodplain | 3,400 | Irrigation, fishing, grazing, domestic use, fodder, plant harvest, fuel source | Pollution, agricultural run-off, filling | Average | 46,455 | |
| 104. | Gandak Barrage | Reservoir | 500 | Irrigation, fishing, grazing, recreation, religious, fuel use, transport, religious values | Pollution, agricultural run-off, filling | Excellent | 7,830 | |
| 105. | Narsahi Ghol | Marsh | 50 | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source | Pollution, agricultural run-off, filling | High | 4,639 | |
| 106. | Nepal Gandak Western Canal | Canal | 10,300 | Irrigation, fishing, grazing, plant harvest, fuel source | Pollution, agricultural run-off, filling | High | 29,156 | |
| 107. | Bhumahi Khola | Floodplain | 3,800 | Irrigation, fishing, grazing, plant harvest, fuel source | Pollution, agricultural run-off, filling | Average | 33,638 | |
| 108. | Narayani Floodplain | Floodplain | 38,000 | Irrigation, fishing, grazing, fodder, domestic use, fuel source | Pollution, filling | Excellent | 105,203 | |
| 109. | Rampur Ghol | Marsh | 15 | Irrigation, fishing, grazing, fodder, plant harvest | Agricultural run-off | High | 12,969 | |
| 110. | Khageri Canal | Canal | 3,900 | Irrigation, fishing, grazing, domestic use, plant harvest | Pollution, agricultural run-off | High | 66,648 | |
| 111. | Khageri Floodplain | Floodplain | 4,700 | Irrigation, fishing, grazing, domestic use, fodder | filling, encroachment, flooding, road construction | Average | 127,042 | |
| 112. | Panchakanya Ghol | Marsh | 60 | Irrigation, fishing, grazing, plant harvest | Agricultural run-off, dredging, drainage, monospecific domination | Fair | 47,946 | |
| 113. | Budhi Rapti Floodplain | Floodplain | 5,470 | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source | Agricultural run-off, filling | Average | 53,729 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 114. | Chitwan Rapti Floodplain | Floodplain | 16,875 | Irrigation, fishing, grazing, recreation, religious values, domestic use, transport, plant harvest | Filling, dredging, building construction | High | 186,234 | |
| 115. | Beesh Hazar Tal | Lake | 100 | Irrigation, fishing, grazing, domestic use, fodder, recreation, fuel source | Building construction, dredging, drainage, filling | Excellent | 11,173 | |
| 116. | Jaya Mangala Ghol | Marsh | 5 | Fishing, grazing, domestic use, fodder, plant harvest | Building construction, agricultural run-off, filling, monospecific domination | Average | 8,884 | |
| 117. | Devi Tal | Lake | 12 | Fishing, plant harvest | Road construction, building construction, filling, monospecific domination | High | - | RCNP |
| 118. | Reu Floodplain | Floodplain | 5,500 | Irrigation, fishing, grazing, plant harvest, fuel source | Filling | Excellent | 32,500 | |
| 119. | Tamar Tal | Pond | - | - | - | High | - | RCNP |
| 120. | Lami Tal | Pond | - | - | - | High | - | RCNP |
| 121. | Nandan Tal | Lake | 9 | Wildlife | Monospecific domination. pollution | High | - | RCNP |
| 122. | Chamka Floodplain | Floodplain | - | Wildlife | - | High | - | RCNP |
| 123. | Dhakre Tal | - | - | Wildlife | - | High | - | RCNP |
| 124. | Kamal Tal | - | - | Wildlife | - | High | - | RCNP |
| 125. | Munda Tal | - | - | Wildlife | - | High | - | RCNP |
| 126. | Nanda-Bhauju Tal | - | - | Wildlife | - | High | - | RCNP |
| 127. | Sapnawati Ghol | Marsh | - | Wildlife | - | High | - | RCNP |
| 128. | Simaron Ghol | - | - | Wildlife | - | High | - | RCNP |
| 129. | Rani Pokhari | Pond | 5 | Irrigation, fishing, grazing, domestic use, plant harvest, aquaculture | Pollution, agricultural run-off | Average | 7,133 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 130. | Gobreni Ghol | Marsh | - | Irrigation, fishing, grazing, domestic use, plant harvest | Agricultural run-off | Average | 11,076 | |
| 131. | Kerunga Ghol | Marsh | - | Irrigation, fishing, grazing, domestic use, plant harvest | Agricultural run-off | Average | 6,750 | |
| 132. | Pasaha Floodplain | Floodplain | 8,700 | Irrigation, fishing, grazing, fodder, plant harvest, fuel source | Road construction, agricultural run-off, dredging, drainage, monospecific domination, filling | High | 93,278 | |
| 133. | Halkhoria Daha | Lake | 50 | Fishing, grazing, religious value, domestic use, fuel source | Building construction, dredging, drainage, filling, monospecific domination | High | 6,463 | |
| 134. | Bakeya Floodplain | Floodplain | 13,875 | Irrigation, fishing, grazing, domestic use, fodder, fuel source | Agricultural run-off, pollution, filling | Fair | 102,114 | |
| 135. | Gandak Nepal East Canal | Canal | 24,500 | Irrigation, fishing, grazing, domestic use, fodder, plant harvest | Pollution, agricultural run-off, filling | High | 1,540,421 | |
| 136. | Barahawa Tal | Lake | 10 | Irrigation, fishing, grazing, domestic use, plant harvest | Pollution, agricultural run-off | Fair | 17,668 | |
| 137. | Chandi Floodplain | Floodplain | 5,062 | Irrigation, fishing, grazing, domestic use, plant harvest, fuel source | Building construction, agricultural run-off, monospecific domination | Poor | 45,179 | |
| 138. | Kishauria Chour | Marsh | 30 | Fishing, grazing, plant harvest, fuel source | Monospecific domination, agricultural run-off, filling | Average | 4,336 | |
| 139. | Bagmati Floodplain | Floodplain | 10,690 | Irrigation, fishing, grazing, religious value, domestic use, plant harvest, fuel source | Agricultural run-off, pollution | Fair | 182,518 | |
| 140. | Bagmati Canal | Canal | 42,600 | Irrigation, fishing, grazing, domestic use, fodder, plant harvest | Pollution, agricultural run-off, filling | Average | 39,816 | |
| 141. | Manusmara Floodplain | Floodplain | 9,180 | Irrigation, fishing, grazing | Agricultural run-off, dredging, drainage | Fair | 67,029 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 142. | Hirapur Barrage | Reservoir | 2,000 | Irrigation, fishing, grazing, domestic use | Pollution, agricultural run-off, filling | High | 38,316 | |
| 143. | Manpur Barrage | Reservoir | 3,200 | Irrigation, fishing, grazing, domestic use | Pollution, agricultural run-off, filling | High | 34,150 | |
| 144. | Ratu Floodplain | Floodplain | 9,750 | Irrigation, fishing, grazing, domestic use, fodder, plant harvest, fuel source | Road construction, trash and floating, pollution, agricultural run-off, filling | Average | 49,465 | |
| 145. | Badhari Floodplain | Floodplain | 3,938 | Irrigation, fishing, grazing, religious value, domestic use, fodder, plant harvest, fuel source | Pollution, filling | Average | 48,674 | |
| 146. | Kamala Canal | Canal | 24,000 | Irrigation, fishing, grazing | Pollution, agricultural run-off, dredging, drainage, filling | Average | 54,992 | |
| 147. | Kamala Floodplain | Floodplain | 7,875 | Irrigation, fishing, grazing, fuel source | Road construction, agricultural run-off, pollution | Fair | 150,586 | |
| 148. | Balan Floodplain | Floodplain | 7,500 | Irrigation, fishing, grazing, plant harvest, fuel source | Agricultural run-off, dredging, drainage | Poor | 83,269 | |
| 149. | Bhokari Daha | Lake | 8 | Fishing, religious values, plant harvest | Agricultural run-off | High | 5,167 | |
| 150. | Trijuga Floodplain | Floodplain | 1,750 | Irrigation, fishing, grazing, religious value, domestic use, plant harvest | Filling | High | 14,503 | |
| 151. | Chandra Canal | Canal | 10,500 | Irrigation, fishing, grazing, religious value, domestic use | Filling | High | 111,791 | |
| 152. | Chatara Canal | Canal | 60,000 | Irrigation, fishing, grazing, domestic use, fodder, fuel source | Filling | Average | 12,655 | |
| 153. | Koshi Barrage | Barrage | 3,500 | Irrigation, fishing, grazing, fodder, plant harvest | Road construction, agricultural run-off, dredging, drainage | High | 19,353 | |

| S.N. | NAME OF WETLAND | TYPE | AREA (HA) | USES | MAJOR THREATS | RANKING | HUMAN POPULATION | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 154. | Koshi Tappu Wildlife Reserve | Floodplain | 149,000 | Irrigation, fishing, grazing, transport, religious values, domestic use, fodder, plant harvest | Agricultural run-off, dredging, drainage, pollution | High | 67,508 | |
| 155. | Koshi Floodplain | Floodplain | 21,000 | Irrigation, fishing, grazing, religious values, plant harvest, fodder, transport, recreation, fuel source | Road construction, agricultural run-off, dredging, drainage, filling | Excellent | 115,677 | |
| 156. | Bakra Floodplain | Floodplain | 9,625 | Irrigation, fishing, fodder, plant harvest, fuel source | Agricultural run-off, dredging, drainage, filling | Poor | 13,756 | |
| 157. | Ratuwa Floodplain | Floodplain | 7,125 | Irrigation, fishing, grazing | Agricultural run-off, pollution, filling | Poor | 147,551 | |
| 158. | Gaura Daha | Pond | 6.5 | Fishing, domestic use, aquaculture, waste disposal | Pollution, agricultural run-off | Average | 12,376 | |
| 159. | Kankai Floodplain | Floodplain | 7,125 | Irrigation, fishing, grazing | Road construction, agricultural run-off, pollution, filling | Fair | 98,569 | |
| 160. | Biring Floodplain | Floodplain | 5,875 | Irrigation, fishing, grazing | Agricultural run-off, dredging, drainage, pollution, filling | Fair | 104,026 | |
| 161. | Mechi Floodplain | Floodplain | 16,250 | Irrigation, grazing, religious values, transport, domestic use, plant harvest, fuel source, recreation | Pollution, trash and floating waste, agricultural run-off, filling, dredging, drainage | Average | 63,017 | |
| 162. | Kachan Kabal | Lake | 40.5 | Fishing, grazing, aquaculture, fodder, domestic use, plant harvest | Road construction, monospecific domination, filling, agricultural run-off | Average | 4,420 | |
| 163. | Kankai Canal | Canal | 8,000 | Irrigation, fishing, grazing, domestic use, fodder | Road construction, filling | Average | 88,663 | |

# *Annex 6*
# *Floral Diversity in Terai*

Note:

Habit: H=Herb; S=Shrub; T=Tree; C=Climber

Habitat: CW=Crop land; FL=Fallow land; FP=Forest plant; GL=Grass land; SL=Slope (in parenthesis); WD=Wetland dependent

Regional Distribution: A = WN (West Nepal); B = CN(Central Nepal); C = EN (East Nepal)

Status:

D = CITES: Appendix I, II and III

E = IUCN: Ex = Extinct; E = Endangered; V = Vulnerable; R = Rare; CT = Commercially threatened; I = Indeterminate; K = Insufficiently Known

F = HMG: 1 = Ban for collection, use, sale distribution, transportation and export; 2 = Ban for export (outside the country); 3 = Ban for transportation, export and felling.

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *PTERIDOPHYTES* | | | | | | | | | |
| ASPIDIACEAE | | | | | | | | | |
| *Diplazium esculentum* (Retz.) Sw. ex Schrad. | Lamtusia | H(WD) | 250 | + | + | + | | | |
| MARSILIEACEAE | | | | | | | | | |
| *Marsilea crenata* Presl. | Charpate (Water cloves) | H(WD) | 100-1000 | + | + | + | | | |
| *M. quadrifolia* | | H(WD) | 100-1000 | + | + | + | | | |
| OPHIOGLOSSACEAE | | | | | | | | | |
| *Ophioglossum reticulatum* L. | Jibhiya saag | H(WD) | 250 | + | + | + | | | |
| POLYPODIACEAE | | | | | | | | | |
| *Adiantum philippense* L. | Ratjari | H(WD) | 250-2000 | + | + | + | | | |
| PTERIDACEAE | | | | | | | | | |
| *Cryptogramma crispa* (L.) R.Br. | | H(WD) | 100-800 | + | + | + | | | |
| SALVINACEAE | | | | | | | | | |
| *Azolla imbricate* (Roxb.) Nakai | Pani Unyu (Water fern) | H(WD) | 100-1500 | + | + | + | | | |
| ANGIOSPERMS - DICOTS | | | | | | | | | |
| ACANTHACEAE | | | | | | | | | |
| *Dicliptera bupleuroides* Nees | | H(WD) | 250-2500 | + | + | + | | | |
| *Echinacanthus attenuatus* (Wall. ex Nees) Nees | | | 200-1200 | - | + | + | | | |
| *Eranthemum pulchellum* Andrews | | | 200-1200 | + | + | + | | | |
| *E. splendens* (T. Anders.) Hort. ex Siebert &Voss | | H(WD) | 200-1000 | - | - | + | | | |
| *Hemigraphis hirta* (Vahl) T. Anders. | | H(FL) | 200-300 | + | - | + | | | |
| *Hygrophila auriculata* (Schumach.) | Gokhula-k- | H(WD) | 200-700 | + | + | + | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| Heine | kaant | | | | | | | | |
| *H. polysperma (Roxb.)* T. Anders. | | H(WD) | 200-1200 | + | - | + | | | |
| *Justicia adhatoda* L. | | Sh(FL) | 350-1600 | + | + | + | | | |
| *J. procumbens* L.var. *simplex* (D.Don) Yamazaki | | | 300-2500 | + | + | + | | | |
| *Lepidagathis incurva* Buch.-Ham. ex D. Don | | H(FP) | 200-1400 | + | + | + | | | |
| *Ruellia tuberosa* L. | | H(WD) | 200 | + | - | - | | | |
| *Rungia parviflora* (Retz.) Nees | | H(FL) | 300-2000 | + | + | + | | | |
| *Thunbergia fragrans* Roxb. | | Cl(FP) | 250-1800 | - | + | + | | | |
| AMARANTHACEAE | | | | | | | | | |
| *Achyranthes aspera* L. | Chirchiri | H(FL) | 100-2900 | + | + | + | | | |
| *Alternanthera sessilis* (L.) DC. | Saranchi | H(FL,WD) | 200-2000 | + | + | + | | | |
| *Amaranthus spinosus* L. | Kataiya | H(FL) | 150-1200 | + | + | + | | | |
| *A. viridis* L. | Jangalo Thariya ke Saag | H(FL) | 150-1200 | - | + | + | | | |
| *Celosia argentea* L. | | H(CW) | 150-1600 | + | + | + | | | |
| *Gomphrena celosoides* Mart. | | H(FP) | 200-400 | - | + | - | | | |
| ANACARDIACEAE | | | | | | | | | |
| *Buchanania latifolia* Roxb. | Piyari | T(FP) | 150-2000 | + | + | - | | | |
| *Lannea coromendelica* (Houtt.) Merr. | Hallude | T(FP) | 100-1400 | + | + | + | | | |
| *Rhus javanica* L. | Bhaki amilo | T(FP) | 700-2400 | + | + | + | | | |
| *Semecarpus anacardium* L.f. | Bhela | T(FP) | 150-1200 | + | + | + | | | |
| *Spondias pinnata* (L.f.) Kurz | Amar | T(FP) | 300-1400 | + | + | + | | | |
| ANNONACEAE | | | | | | | | | |
| *Annona reticulata* L. | Sarifa | T(FL) | 200-1000 | + | + | + | | | |
| *Miliusa velutina* (Dunal.) Hook.f. & Thomas. | | T(FP) | 150-450 | + | + | + | | | |
| APOCYNACEAE | | | | | | | | | |
| *Alstonia scholaris* (L.) R. Br. | Chhatoun | T(FP) | 100-300 | - | + | + | | R | |
| *Carissa carandas* L. | Karaona | S(FP) | 100-250 | + | + | - | | | |
| *Holarrhena pubescens* (Buch.-Ham.) Wall ex G. Don | Dudhkoria | T(FP) | 100-1500 | + | + | + | | | |
| *Ichnocarpus frutescens* (L.) R. Br. | Gahumani | C(FP) | 150-900 | + | + | + | | | |
| *Rauvolfia serpentina* (L.) Benth. ex Kurz | Jharbaruwa | S(FP) | 100-900 | - | + | + | II | V | 2 |
| *Trachelospermum lucidum* (D.Don) Schumann | Dudhlati | C(FP) | 250-2200 | + | + | + | | | |
| *Vallaris solanacea* (Roth) O. Kuntze | Dudhlati | C(FP) | 150-2000 | + | + | + | | | |
| *Wrightia arborea* (Dennst.) Mabberly | Dudhkhiri | T(FP) | 250-950 | - | + | + | | | |
| ASCLEPIADACEAE | | | | | | | | | |
| *Asclepias curassavica* L. | | H(FL) | 100-1500 | + | + | + | | | |
| *Calotropis gigantea* (L.) Dryand. | Akon | S(FL) | 100-1000 | + | + | + | | | |
| *C. procera* (Aiton) Dryand. | Akon | S(FL) | 170-600 | - | + | - | | | |
| *Cryptolepis buchanani*. Roem & Schult. | | C(FP) | 200-1500 | + | + | + | | | |
| ASTERACEAE | | | | | | | | | |
| *Ageratum conyzoides* L. | Rawune | H(FL,WD) | 200-2000 | + | + | + | | | |
| *A. houstonianum* Miller | Nilo gandhe | H(FL) | 300-1300 | + | + | - | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *Artemisia indica* Willd. | Titepati | H(FL) | 250-2400 | - | + | + | | | |
| *Breea arvensis* (L.) Less. | | H(FL) | 100-1100 | + | + | + | | | |
| *Blumea lacera* (Burm.f.)DC. | | H(FL) | 150-350 | - | + | + | | | |
| *Blumea laciniata* DC. | | H(CW) | 300-1100 | + | + | - | | | |
| *Caesulia axillaris* Roxb. | Thukaha | H(WD) | 150-1500 | + | + | + | | | |
| *Centipeds minima* (L.) A.Br.& Aschers. | | H(FL) | 200-1600 | + | + | + | | | |
| *Cirsium verutum* (D. Don) Spreng. | Gaide kada | H(FL) | 300-2200 | + | + | + | | | |
| *Conyza canadensis* (L.) Cronq. | | H(FP) | 350-2500 | + | + | + | | | |
| *C. leucantha* (D. Don) Ludlow & Raven | Bantori | H(FP) | 300-1200 | + | + | + | | | |
| *Eclipta prostrata* (L) L. | Vangrila | H(FP) | 200-1200 | + | + | + | | | |
| *Emilia sonchifolia* (L.) DC. | | H(FL) | 100-1700 | + | + | + | | | |
| *Elephantopus scaber* L. | Khotila khar, Sabsoria, Mulapatey | H(FP) | 200-1500 | + | + | + | | | |
| *Eupatorium odoratum* L. | Banmara | S(FL) | 300-1500 | - | + | + | | | |
| *Gnaphalium affine* D. Don | Kairo jhar | H(FL) | 100-3700 | + | + | + | | | |
| *G. polycaulon* Pers. | | H(FL) | 100-1400 | - | + | + | | | |
| *Ixeris polycephala* Cass. | | H(FL) | 100-1800 | + | + | + | | | |
| *Siegesbeckia orientalis* L. | Titiya | | | + | + | - | | | |
| *Sonchus asper* (L.) Hill. | | H(CW) | 100-1500 | - | + | + | | | |
| *Sonchus wightiana* DC. | | H(FP) | 200-2500 | + | + | + | | | |
| *Sphaeranthus indicus* L. | Bhukadam | H(FL) | 100-800 | + | + | + | | | |
| *Spilanthes calva* DC. | Pirpire | H(FP) | 300-2300 | - | + | + | | | |
| *? S. iabadensis* A. Moore | Tutiya | H(WD) | -1200 | - | - | + | | | |
| *S. paniculata* Wall.ex DC. | | H(FL) | 100-1100 | + | + | + | | | |
| *Taraxacum eriopodum* DC. | Dudhe jhar | | | + | + | + | | | |
| *Tridax procumbens* L. | | H(FL) | 100-1500 | + | + | + | | | |
| *Veronia cinerea* (L.) Less. | Mirchiya | H(FL) | 100-2300 | + | + | + | | | |
| *V. squarrosa* (D.Don) Less. | | H(FL) | 150-1600 | + | + | + | | | |
| *? Wedelia wallichii* Less | | H(WD) | -1200 | - | + | - | | | |
| *Youngia japonica* (L.) DC. | | H(FL) | 100-2900 | + | + | + | | | |
| *Xanthium strumarium* L. | Lapetuwa | S(FL,WD) | 100-2500 | + | + | + | | | |
| BASELLACEAE | | | | | | | | | |
| *Basella alba* L. | Poye ke saag | C(FL) | 200 | - | + | + | | | |
| BIGNONIACEAE | | | | | | | | | |
| *Oroxylum indicum* (L.) Kurz. | Patsan, Tatelo | T(FP) | 200-1400 | + | + | + | | V | |
| *Stereospermum chelonoides* (L. f.) DC. | | T(FP) | 150-2500 | + | + | + | | | |
| *S. personatum* (Hassk.) Chatterjee | Panrar | T(FP) | 100-1100 | - | + | + | | | |
| BOMBACACEAE | | | | | | | | | |
| *Bombax ceiba* L. | Simal, Simar | T(FP,WD) | 200-900 | + | + | + | | | |
| BORAGINACEAE | | | | | | | | | |
| *Bothriospermum tenellum* (Hornem.) Fisch. & Mey. | | H(FL) | 100-1000 | + | + | + | | | |
| *Cynoglossum lanceolatum* Forssk. | Kanike | H(FL) | 150-3200 | + | + | + | | | |
| *C. zeylanicum* (Vahl) Thunb. ex Lehm. | Kanine kurroo | H(FL) | 100-4100 | + | + | + | | | |
| *Heliotropium indicum* L. | Heathi-sur | H(FL) | 100 | - | + | + | | | |
| *H. strigosum* Willd. | Lapta | H(FL) | 100-1400 | + | + | + | | | |
| BRASSICACEAE | | | | | | | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *Nasturtium officinale* R.Br. | | H(WD) | 100- | | + | | | | |
| *Rorippa indica* (L.) Hiern | | H(FL,WD) | 100-200 | + | + | + | | | |
| BURSERACEAE | | | | | | | | | |
| *Garuga pinnata* Roxb. | Kenkar | T(FP) | 300-1200 | + | + | + | | | |
| CANNABACEAE | | | | | | | | | |
| *Cannabis sativa* L. | Bhangai, Ganja | H(FL) | 200-2700 | + | + | + | | | |
| CAPPARACEAE | | | | | | | | | |
| *Caparis spinosa* L. | Kabara | S(FL) | 100-2400 | + | + | + | | | |
| *Cleome gynandra* L. | | H(FL) | 200-300 | + | + | - | | | |
| *C. speciosa* Rafin. | | H(FL) | 200-1800 | - | + | + | | | |
| *C. viscosa* L. | Hurhur | H(FL) | 200-750 | - | + | + | | | |
| *Crateva unilocularis* Buch.-Ham. | | H(FL) | 100-1800 | - | + | + | | R | |
| CARYOPHYLLACEAE | | | | | | | | | |
| *Drymaria diandra* Blume | | H(FL) | 100-2000 | + | + | + | | | |
| *Stellaria media* (L.) Vill. | | H(FL) | 100-2700 | + | + | + | | | |
| CELASTRACEAE | | | | | | | | | |
| *Celastrus paniculatus* Willd. | Pilaphal | T(FP) | 150-300 | - | + | + | | | |
| *Reissantia arborea* (Roxb.) Hara | Chatpatia | C(FP) | 200-700 | - | + | + | | | |
| CERATOPHYLLACEAE | | | | | | | | | |
| *Ceratophyllum demersum* L. | | H(WD) | 100- | | + | | | | + |
| CHENOPODIACEAE | | | | | | | | | |
| *Chenopodium album* L. | Bathuwa | H(FL) | 180-2200 | + | + | + | + | + | + |
| *C. ambrosioides* L. | Gahuana khar | H(FL) | 150-600 | - | + | + | | | |
| COMBRETACEAE | | | | | | | | | |
| *Anogeissus latifolius* (Roxb. ex DC.) Bedd. | Banjhi | T(FP,WD) | 250-1200 | + | + | + | + | + | + |
| *Combretum roxburghii* Spreng. | | C(FL,WD) | 200-600 | + | + | + | | | |
| *Terminalia alata* Heyne ex Roth. | Asna, Saj | T(FP,WD) | 200-1400 | + | + | + | + | + | + |
| *T. bellirica* (Gaertn.) Roxb. | Baheri, Barro | T(FP,WD) | 300-1100 | + | + | + | + | + | + |
| *T. chebula* Retz. | Harre, Harro | T(FP,WD) | 150-1100 | + | + | + | + | + | + |
| CONVOLVULACEAE | | | | | | | | | |
| *Argyreia argentea* (Roxb.) Choisy | | C(FP) | 340-2400 | + | + | - | | | |
| *A. hookeri* C.B. Clarke | | C(FP) | 200-2300 | - | + | + | | | + |
| *Evolvulus alsinoides* (L.) L. | | H(FL) | 100-1100 | + | + | + | | | |
| *Ipomoea aquatica* Forssk. | Karmi ke saag | C(WD) | 200-800 | + | - | + | | | + |
| *I. cairica* (L.) Sweet | | C (FL) | 100-200 | - | - | + | | | |
| *I. carnea* Jacq. | Behaya, Besharam, Dudhiya | C(WD) | 100-400 | + | + | + | + | + | + |
| *I. murikata* (L.) Jacq. | Gidhawar | C(FP) | 250-1400 | + | + | - | | | |
| *Merremia emarginata* (Burm f.) Halberf | Mamarkhi | H(FL) | 200 | - | - | + | | | |
| *M. hederacea* (Burm f.) Hallier f. | | C(FP) | 200-350 | - | - | + | | | |
| *Porana paniculata* Roxb. | | C(FP) | 180-1990 | + | + | + | | | |
| CORDIACEAE | | | | | | | | | |
| *Ehretia laevis* Roxb. | | T(FP) | 150-1100 | + | + | + | + | + | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| CUCURBITACEAE | | | | | | | | | |
| *Citrullus lanatus* (Thunb.) Matsumura & Nakai | Gurmi | C(FL,WD) | 250 | - | + | - | | | |
| *Coccinea grandis* (L.) Voigt | Tilkor | C(FL) | 200-900 | + | + | + | + | | |
| *Cucumis prophetarum* L. | | | 250 | - | + | - | | | |
| *Diplocyclos palmatus* (L.) C. Jeffrey | | C(FL) | 100-1500 | + | + | + | | | + |
| *Momordica balsamina* L. | Chathel | C(FL) | 200-600 | + | + | - | | | |
| *Mukia maderaspatana* (L.) Roem. | | C(FL) | 200-1200 | - | + | + | | | + |
| CUSCUTACEAE | | | | | | | | | |
| *Cuscuta reflexa* Roxb. | Akashlati, Paheli lahara | C(FP) | 100-3100 | + | + | + | + | + | + |
| DILLENIACEAE | | | | | | | | | |
| *Dillenia pentagyna* Roxb. | Dhori, Tatar | T(FP) | 150-1500 | - | + | + | | | + |
| DIPTEROCARPACEAE | | | | | | | | | |
| *Shorea robusta* Gaertn. | Sakhuya, Sal | T(FP,WD) | 150-1500 | + | + | + | + | + | + |
| EUPHORBIACEAE | | | | | | | | | |
| *Arachne cordifolia* (Decne.) Hurusawa | | S(FP) | 200-2100 | + | + | + | | | |
| *Antidesma acidum* Retz. | Banmushri | T(FP) | 150-1200 | - | + | + | | | |
| *Bridelia retusa* (L.) Spreng. | Gayo | S(FP) | 150-1200 | + | + | + | + | + | + |
| *B. stipularis* (L.) Blume | Kajhi, Banangur | S(FP) | 150-300 | + | + | + | + | + | + |
| *Croton bonplandianus* Baill. | Mirchaira | H(FP) | 100-400 | - | + | + | | | |
| *C. roxburghii* Balkrishnan | Mahson | T(FP) | 250-760 | - | + | + | | | + |
| *Euphorbia haterophylla* | | H(FL) | 100-1100 | + | + | + | + | + | + |
| *E. hirta* L. | Dudhiya | H(FP) | 150-1500 | + | + | + | + | + | + |
| *E. prostrata* Ait. | Dudhiya | H(FP) | 200-1400 | + | + | - | + | + | + |
| *E. thymifolia* L. | | H(FL) | 100-1100 | - | + | + | | | + |
| *Jatropha gossypifolia* | Bangrera | S(FL) | 200-600 | - | + | + | | | |
| *J. curcas* L. | Bangrera | S(FL) | 500-1200 | + | + | + | | | + |
| *Macaranga denticulata* (Blume) Muell.-Arg. | Marar | T(FP) | 200-1400 | - | + | + | | | + |
| *Mallotus philippensis* (Lam.) Muell.-Arg. | Roena, Sindure | T(WD,FP) | 150-1800 | + | + | + | + | + | + |
| *Phyllanthus amarus* Schumachar & Thornn. | | H(FP) | 200-900 | - | + | + | | | + |
| *P. emblica* L. | Aura, Amla | T(FP) | 150-1400 | + | + | + | + | + | + |
| *P. reticulatus* Poir. | Sikat | S(FL) | 250-760 | - | + | + | | | + |
| *P.urinaria* L. | | H(FL) | 100-1700 | + | + | + | | | + |
| *Ricinus communis* L. | Ledi, Arari | T(FL) | 150-2400 | + | + | + | + | + | + |
| *Trewia nudiflora* L. | Bhilor | T(FP) | 150-1800 | + | + | + | + | + | + |
| FABACEAE | | | | | | | | | |
| *Abrus precatorius* L. | Karjani, Sakhine | C(FL) | 300-1000 | + | + | + | + | + | + |
| *A. pulchellus* Wall.ex Thwaites | | C(FL) | 200-1300 | + | + | + | | | |
| *Acacia catechu* (L.f.) Willd. | Khair, Katha | T(FP,WD) | 200-1400 | + | + | + | + | + | + |
| *A. rugata* (Lam.) Voigt | Shikakai | T(FP) | 250-800 | + | + | - | + | | + |
| *Aeschynomene indica* L. | | H(FL,WD) | 200-1300 | + | + | + | + | + | + |
| *Aeschynomone aspera* L. | | H(WD) | | | + | | | | |
| *Albizia gamblei* Prain | Siris | T(FP) | 250-700 | - | + | + | | | + |
| *A. lucidior* (Steud.) I. Nielson ex Hara | | T(FP) | 200-1000 | - | + | + | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *A. procera* (Roxb.) Benth. | Siris | T(FP) | 250-1000 | - | + | + | | | + |
| *Alysicarpus vaginalis* (L.) DC. | | H(FP) | 200-1200 | - | + | - | | | |
| *Atylosia scarabaeoides* (L.) Benth. | | C(FP) | 300-1200 | + | + | + | | | + |
| *A. volubilis* (Blanco) Gamble | Jangali sem | C(FL) | 200-1000 | + | + | - | | | |
| *Bauhinia malabarica* Roxb. | Amilo, Mahuli | T(FP) | 200-650 | + | + | + | + | + | + |
| *B. purpurea* L. | Koilar | T(FP) | 300-1600 | + | + | + | + | + | + |
| *B. vahlii* Wight & Arn. | Malhan, Bhorla | C(FP,WD) | 200-1300 | + | + | + | + | + | + |
| *Butea monosperma* (Lam.) Kuntze | Paras | T(FP) | 150-1200 | + | + | + | + | + | + |
| *Caesalpinia bonduc* (L.) Roxb. | Tairi | S(FL) | 250-500 | - | + | + | | | + |
| *C. cucullata* Roxb. | | S(FP) | 150-1800 | + | + | + | | | |
| *C. decapitala* (Roth) Alston | | S(FP) | 300-2200 | + | + | + | + | + | + |
| *Cassia fistula* L. | Rajbriksha, Amaltash | T(FP) | 150-1400 | + | + | + | + | + | + |
| *C. occidentalis* L. | Chakor | S(FL) | 200-1400 | + | + | + | + | + | + |
| *C.tora* L. | Chakor | S(FL,WD) | 300-1300 | + | + | + | + | + | + |
| *Crotalaria alata* Buch.-Ham. ex D. Don | Jhunjhuna | H(WD) | 200-1400 | + | + | + | + | | |
| *C. albida* Heyne ex Roth | | H(FP) | 325-2200 | + | + | + | + | | + |
| *C. calycina* Schrank | | H(FP) | 200-1200 | - | + | + | | | |
| *C. pallida* Ait. | | H(FP) | 200-1370 | - | + | + | | | + |
| *C. prostrata* Rottb. ex Willd. | Jhunjhuna | H(WD) | 200-2000 | + | + | + | + | + | + |
| *C.quinquefolia* L. | | H(FL) | 200 | - | - | + | | | |
| *C. spectabilis* Roth | | H(FP) | 200-300 | - | + | + | | | |
| *C. tetragona* Andrews | Sanethi | S(FL) | 200-1700 | + | + | + | | | |
| *Dalbergia latifolia* Roxb. | Satishal | T(FP) | 300-1000 | + | + | + | + | + | + |
| *D. sissoo* Roxb. ex DC. | Sisso | T(WD) | 200-1400 | + | + | + | + | + | + |
| *D. volubilis* Roxb. | | S(FP) | 250-350 | - | + | - | | | + |
| *Desmodium heterocarpon* (L.) DC. | | H(FP) | 200-1700 | + | + | + | | | |
| *D. laxiflorum* (Willd.) DC. | Kuro | H(FP) | 575-1000 | + | + | + | | | |
| *D. oojeinense* (Roxb.) Ohashi | Panna | H(FP) | 300-1300 | - | + | - | | | + |
| *D. triflorum* (L.) DC. | | H(FP) | 200-2300 | + | + | + | + | + | + |
| *D. velutinum* (Willd.) DC. | | H(FP) | 250-1500 | - | + | - | | | |
| *Erythrina stricta* Roxb. | | T(FP) | 300-1600 | + | + | + | + | + | + |
| *Flemengia macrophylla* (Willd.) Merr. | | S(FP) | 250-1700 | + | + | + | + | + | + |
| *F. strobilifera* (L.) Ait. | | H(FP) | 300-2300 | + | + | + | + | | + |
| *Indigofera hirsuta* L. | | S(FP) | 250-1400 | - | + | - | | | |
| *I. linifolia* (L. f.) Retz. | | H(FL) | 300-1300 | + | + | + | | | |
| *I. pulchella* Roxb. | | S(FP) | 200-1700 | + | + | - | | | + |
| *Lathyrus aphaca* L. | | H(CW) | 200-1200 | + | + | + | + | + | + |
| *Medicago lupulina* L. | | H(CW) | 100-1400 | + | + | + | + | + | + |
| *Melilotus alba* Medic. ex Desr. | | H(FL) | 100-1000 | + | + | + | + | + | + |
| *Milletia extensa* (Benth.) Baker | Bhanbhaniya | S(FP) | 200-1000 | - | + | + | | | |
| *M. fruticosa* (DC.) Benth. ex Baker | | S(FP,WD) | 200-1000 | - | + | + | | | |
| *Mimosa pudica* L. | Lajaunia jhar | S(FL,WD) | 200-1200 | - | + | + | | | + |
| *M. rubicaulis* Lam. | Arar | S(FP) | 250-800 | + | + | - | + | + | + |
| *Mucuna pruriens* (L.) DC. | Kabachhua | C(FL) | 150-200 | + | + | + | + | | + |
| *Phyllodium pulchellum* (L.) Desv. | Kanani | S(FP) | 200-500 | + | + | + | + | + | + |
| *Pongamia glabra* Vent. | Karuyaini | T(FP) | 200 | - | + | - | | | |
| *Saraca asoca* (Roxb.) De Wilde | Ashok | T(FP) | 150-1000 | - | + | + | | | |
| *Sesbania bispinosa* (Jack.) W. F. Wight | | H(FL,WD) | 150-700 | + | + | + | + | | + |
| *Smithia sensitiva* Ait. | | H(CW) | 200-1200 | + | + | + | + | + | + |
| *Tamarindus indica* L. | Imli | T(FP) | 200-400 | - | + | + | | + | |
| *Uraria lagapodioides* (L.) Desv. | | H(FP) | 150-1400 | + | + | + | + | + | + |
| *U. lagopus* DC. | | H(FP) | 300-2400 | + | + | + | | | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *Vicia angustifolia* L. | Akta misia | H(CW) | 200-4000 | + | + | + | + | + | + |
| *V. hirsuta* (L.) S. F. Gray | | H(FL) | 200-2700 | + | + | + | + | + | + |
| FLACOURTIACEAE | | | | | | | | | |
| *Casearia elliptica* Willd. | | T(FP) | 200-500 | + | + | + | + | | + |
| *C. graveolens* Dalz. | | T(FP) | 300-2000 | + | + | + | + | | + |
| GENTIANACEAE | | | | | | | | | |
| *Nymphoides hydrophyllum* (Lour.) O. Kuntze | | H(WD) | 100-600 | - | + | + | | | |
| *Swertia angustifolia* Buch.-Ham. ex G. Don | Chirayita | H(FP) | 300-2600 | + | + | + | | | + |
| LAMIACEAE (LABIATAE) | | | | | | | | | |
| *Anisomeles indica* (L.) Kuntze | Ratochrapate | H(WL) | 100-2400 | + | + | + | + | + | + |
| *Colebrookia oppositifolia* Sm. | Dhurselo, Goithiya khar | S(FP, FL) | 250-1700 | + | + | + | + | + | + |
| *Hyptis suaveolens* (L.) Poit | Ban tulsi | H(FP, FL) | 150-1000 | - | + | + | | | + |
| *Leonotis nepetaefolia* (L.) Aiton | | H(FP) | 150-1300 | + | + | + | + | + | + |
| *Leonurus japonicus* Houtt. | Guma | S(FP) | 100-2000 | - | + | + | | | + |
| *Leucas cephalotes* (Roth.) Spreng | Guma | H(FL) | 150-2400 | + | + | + | + | | + |
| *L. indica* (L.) R. Br. ex Vatke | Dulphi jhar | H(FL) | 100-1000 | - | + | + | | | + |
| *Mentha spicata* L. | Pudina | H(WD) | 100-2700 | + | + | + | + | + | + |
| *Ocimum basilicum* L. | Babari phool | H(FL) | 100-1500 | - | + | + | | | |
| *O. gratissimum* L. | Ram tulsi | S(FL) | 100-1200 | + | + | + | | | |
| *Pogostemon benghalensis* (Burm. f.) Kuntze | Bokwa, Utjar, Rijilo | S(FL) | 150-1300 | + | + | + | + | + | + |
| *Salvia plebei* R. Br. | | H(WL) | 100-1100 | + | + | + | | | + |
| LECITHYDACEAE | | | | | | | | | |
| *Careya arborea* Roxb. | Kumhi | T(FP) | 200-600 | - | + | + | | | + |
| LEEACEAE | | | | | | | | | |
| *Leea compactiflora* Kurz | Rajbans | S(FP,WD) | 300 | - | + | + | | | + |
| *L.crispa* Van Royan ex L. | | S(FP) | 300-900 | + | + | + | | | |
| *L. macrophylla* Roxb. ex Hornem. | Dainiya khar | S(FP) | 200-1700 | _ | + | + | | | + |
| LENTIBULARIACEAE | | | | | | | | | |
| *Utricularia aurea* Lour. | (Bladder wort) | H(WD) | 200-1400 | - | + | + | | | + |
| LORANTHACEAE | | | | | | | | | |
| *Dendropthoe falcata* (L.f.) Etting. | Banjhi | T(FP) | 150-900 | + | + | + | + | + | + |
| *Taxillus vestitus* (Wall.) Danser | | T(FP) | 150-1500 | + | + | + | | | |
| LYTHRACEAE | | | | | | | | | |
| *Lagerstroemia parviflora* Roxb. | Sidh, Bot dahngreo | T(FP) | 200-800 | + | + | + | + | + | + |
| *Rotala rotundifolia* (Roxb.) Koehne | | H(FL) | 200-2300 | + | + | + | + | + | + |
| *Woodfordia fructicosa* (L.) Kurz | Burghairo | S(FP) | 200-1800 | + | + | + | + | + | + |
| MALVACEAE | | | | | | | | | |
| *Abelmoschus manihot* (L.) Medikus | | H(FL) | 200-2400 | + | + | + | | | + |
| *Abutilon indicus* (L.) Sweet var. pungens (Roxb.) Hochr. | | S(FP,FL) | 200-1100 | - | + | + | | | + |
| *Kydia calycina* Roxb. | Patar | T(FP) | 150-900 | + | + | + | + | + | + |
| *Sida acuta* Burm. f. | Bariyar | H(FL) | 250-2700 | - | + | + | | | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *S. cordata* (Burm. f.) Borss. | Bariyar | H(FL) | 300-1800 | + | + | + | + | + | + |
| *S. rhombifolia* L. | Bariyar | H(FL) | 100-1000 | - | + | + | + | + | + |
| *Thespesia lampus* (Cav.) Dalz. & Gibson | | H(FP) | 200-1500 | + | + | - | | | + |
| *Urena lobata* L. | Lapta, Thulo ballu | H(FL) | 200-1300 | + | + | + | + | + | + |
| MELASTOMATACEAE | | | | | | | | | |
| *Osbeckia nepalensis* Hook. | Seto chulesi | S(FP) | 450-2300 | - | + | + | | | + |
| *Oxyspora paniculata* (D.Don) DC. | Paanisar | S(FP) | 425-2000 | - | + | + | | | + |
| MELIACEAE | | | | | | | | | |
| *Azadirachta indica* Juss. | Neem | T(FL) | 250-900 | + | + | + | + | + | + |
| *Dysoxylum gobara* (Buch.-Ham.) Merr. | Dhamina | T(FP) | 300-1700 | - | + | + | | | |
| MENISPERMACEAE | | | | | | | | | |
| *Cissampelos pariera* L. | | C(FP) | 150-2200 | + | + | + | + | + | + |
| *C. pariera* L. *var. hirsuta* (Buch.-Ham. ex DC) Forman | | C(FP) | 150-2200 | + | + | + | + | + | + |
| *Pericampylus glaucus* (Lour) Merr | | C(FP) | 300-400 | - | + | + | | | + |
| *Tinospora sinensis* (Lour) Merr | Gurguj | C(FP) | 250-500 | - | + | + | | | + |
| MORACEAE | | | | | | | | | |
| *Ficus benghalensis* L. | Bargaj | T(FL) | 100-1400 | + | + | + | + | + | + |
| *F. hispida* L.f. | Kothedumar | T(FL) | 250-1100 | + | + | + | + | + | + |
| *F. racemosa* L. | Gular | T(FP) | 250-300 | + | + | - | + | | + |
| *F. religiosa* L. | | T(FL) | 150-1500 | + | + | + | + | + | + |
| *F. semicordata* Buch.-Ham. ex Sm. | Khnayo | T(FP,WD) | 200-1700 | + | + | + | + | + | + |
| *Ficus* sp. | Khurhur | T(WD) | 150-325 | - | + | + | | | + |
| *Streblus asper* Lour. | Sihora | T(FP,WD) | 100-500 | - | + | + | | | + |
| MYRSINACEAE | | | | | | | | | |
| *Ardisia solanacea* Roxb. | | S(FP) | 200-1100 | + | + | + | + | + | + |
| MYRTACEAE | | | | | | | | | |
| *Eugenia kurzii* Duthie | | T(FP,WD) | 300-500 | - | + | + | | | |
| *Syzygium cumini* (L.) Skeels | Jamun | T(FP,WD) | 200-1200 | + | + | + | + | + | + |
| NYMPHAEACEAE | | | | | | | | | |
| *Nelumbo nucifera* Gaertn. | Rato kamal | H(WD) | 100-800 | + | + | + | + | + | + |
| *Nymphaea nauchali* Burm. | Seto kamal | H(WD) | | + | + | + | + | + | + |
| *Nymphaea stellata* Willd. | Neel kamal | H(WD) | | + | + | + | + | + | + |
| NYCTAGINACEAE | | | | | | | | | |
| *Boerhavia diffusa* L. | Punarnawa | H(FL) | 250-1200 | + | + | + | + | + | + |
| OLEACEAE | | | | | | | | | |
| *Nyctanthes arbor-tristis* L. | Harshingar | T(FP) | 200-1200 | + | + | + | | | + |
| ONAGRACEAE | | | | | | | | | |
| *Ludwigia adescendens* (L.) Hara | | H(WD) | 200-600 | + | + | + | + | + | + |
| *Ludwigia hyssopifolia* (G. Don) Exell. | Loyange jhar | H(WD) | 200-500 | - | + | + | | | + |
| *L. octovalvis* (Jacq.) Raven | | H(WD) | 200-900 | + | + | + | + | | + |
| *L. perennis* L. | | H(WD) | 100-1400 | + | + | + | + | + | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| OROBANCHACEAE | | | | | | | | | |
| *Aeginetia indica* L. | | H(FP) | 200-1700 | + | + | + | | | |
| *Orobalche aegytiaca* Pers. | Thokara | H(CW) | 150-3100 | + | + | - | | | + |
| OXALIDACEAE | | | | | | | | | |
| *Biophytum sensitivum* (L.) DC. | | H(FL) | 100-900 | - | + | + | | | |
| *Oxalis corniculata* L. | Amta | H(WD) | 100-2900 | + | + | + | + | + | + |
| PAPAVERACEAE | | | | | | | | | |
| *Argemone mexicana* L. | Kataiya | H(FL,WD) | 150-1400 | + | + | + | + | + | + |
| *Fumaria indica* (Haussk.) Pugsley | | H(CW, WD) | 100-2400 | + | + | + | | | |
| PIPERACEAE | | | | | | | | | |
| *Peperomia pellucida* (L.) Kunth | | H(FL | 100-2000 | - | + | + | + | + | + |
| *Piper longum* L. | Pipla | C(FP) | 200-800 | + | + | + | + | + | + |
| POLYGALACEAE | | | | | | | | | |
| *Polygala* sp. | | | | | | | | | + |
| POLYGONACEAE | | | | | | | | | |
| *Persicaria barbata* (L.) Hara | Bisnar | H(WD) | 100-1100 | + | + | + | + | + | + |
| *P. hydropiper* (L.) Spach | | H(WD) | 1002300 | + | + | + | + | + | + |
| *P. lapathifolia* (L.) S.F. Gray | Mirmiriya | H(WD) | 350-3500 | - | + | - | | | + |
| *Polygonum plebeium* R. Br. | | H(WD) | 100-1400 | + | + | + | + | + | + |
| *Rumex nepalensis* Spreng. | | H(WD) | 100-4200 | + | + | + | + | + | + |
| PORTULACACEAE | | | | | | | | | |
| *Portulaca oleracea* L. | Nuniya ke saag | H(FL) | 300-1500 | - | + | + | | | |
| RANUNCULACEAE | | | | | | | | | |
| *Ranunculus scleratus* L. | | H(WD) | 100-1700 | + | + | + | | + | + |
| RHAMNACEAE | | | | | | | | | |
| *Zizyphus mauritiana* Lam. | Bayar | S(FL) | 200-1200 | + | + | + | + | + | + |
| RUBIACEAE | | | | | | | | | |
| *Adina cordifolia (Willd. ex Roxb.)* Benth. & Hook. f. ex Brandis | Karma | T(FP,WD) | 150-800 | + | + | + | + | + | + |
| *Anthocephalus chinensis* (Lam.) A. Rich. ex Walp. | Kadam | T(FL,WD) | 150-800 | - | + | + | | | + |
| *Borreria alata* (Aubl.) DC. | | H(FP,WD) | 200-2000 | - | + | + | | | + |
| *Gardenia campanulata* Roxb. | Pyara | S(FP) | | + | | | | | |
| *G. turgida* Roxb. | Katkutey | S(FP) | | + | | | | | |
| *Hedyotis corymbosa* (L.) Lam. | | H(CW,WD) | 100-2400 | + | + | + | + | | + |
| *Hymenodictyon excelsum* (Roxb.) Wall. | Bhurkurt | T(FP,WD) | 150-300 | - | + | + | | | + |
| *Mitragyna parvifolia* (Roxb.) Korth. | Tikul | T(FP,WD) | 150-300 | + | + | + | + | + | + |
| *Pavetta tomentosa* Roxb. ex Smith | | T(FP,WD) | 200-400 | - | + | + | + | + | |
| *Uncaria sessilifructus* Roxb. | | S(FP,WD) | 200-900 | - | + | + | | | |
| *Xeromphis spinosa* (Thunb.) Keay | Manphar | T(FP,WD) | 100-1200 | + | + | + | + | + | + |
| *X. uliginosa* (Retz.) Maheshwari | Pirar | T(FP,WD) | 250 | + | + | - | | + | + |
| RUTACEAE | | | | | | | | | |
| *Aegle marmelos* (L.) Correa | Bel | T(FP) | 200-1100 | + | + | + | | | + |
| *Murraya koenigi* (L.) Spreng. | Mitha neem | S(FP) | 150-1450 | + | + | + | + | + | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| SAPINDACEAE | | | | | | | | | |
| *Cardiospermum halicacabum* L. | Tilbor | C(FP) | 250-1500 | + | + | + | | | |
| *Schleichera oleosa* (Lour.) Oken | Athiyar | T(FP) | 200-300 | + | + | + | + | + | + |
| SAPOTACEAE | | | | | | | | | |
| *Madhuca longifolia* (Koenig) Macbride | Ban mahuwa | T(FP) | 150-200 | + | + | - | + | + | + |
| SCROPHULARIACEAE | | | | | | | | | |
| *Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth. | | H(WD) | 200-1200 | - | + | + | | | |
| *Limnophila repens* (Benth.) Benth. | | H(WD) | 200 | - | - | + | | | |
| *Lindernia anagallis* (Burm.f.) Pennell | | | | | | | + | + | + |
| | | H(FP) | 250-1400 | + | + | + | | | |
| *L. antipoda* (L.) Alston | | H(CW) | 100-2300 | + | + | + | + | + | + |
| *L. ciliata* (Colsm.) Pennell | | H(WD) | 100-1500 | + | + | + | + | + | + |
| *L. crustacea* (L.) F. Muell. | | H(FP,WD) | 250-1800 | + | + | + | | | |
| *L. oppositifolia* (L.) Mukerjee | | H(WD,WD) | 100-1400 | - | - | + | | | |
| *L. ruelloides* (Colsm.) Pennell | | H(FP,WD) | 200-1500 | - | + | + | | | |
| *Mazus pumilus* (Burm. f.) van Steenis | | H(WD) | 100-1600 | - | + | + | | | |
| *Scoparia dulcis* L. | Mithuwa khar | H(FP,WD) | 100-1200 | + | + | + | + | + | + |
| *Torenia asiatica* L. | | H(WD) | 100-1800 | - | + | + | | | |
| *Veronica anagallis-aquatica* L. | | H(WD) | 100-4700 | + | + | + | + | + | + |
| SOLANACEAE | | | | | | | | | |
| *Datura metel* L. | Dhatur | S(FL) | 200-1400 | + | + | + | + | + | + |
| *D. stramonium* L. | Dhatur | S(FL) | 100-2200 | + | + | + | | | + |
| *Physalis divaricata* D. Don | | H(FL) | 150-600 | + | + | + | + | + | + |
| *Solanum aculeatissimum* Jacq. | Kantakari | H(FL) | 100-1600 | + | + | + | + | + | + |
| *S. nigrum* L. | Bhatkaiya | H(FL) | 200-2900 | + | + | + | + | + | + |
| *S. surattense* Burm.f. | Rengani | H(FL) | 300-900 | + | + | + | + | + | + |
| *S. torvum* Swartz | Banbhanta | S(FL) | 200-750 | + | + | + | + | + | + |
| SONNERATIACEAE | | | | | | | | | |
| *Duabanga grandiflora* (Roxb. ex DC.) walp. | | T(FP) | 250-1100 | + | + | + | | | + |
| STAPHYLEACEAE | | | | | | | | | |
| *Bischofia javanica* Blume | Kaijal | T(FP) | 150-1200 | + | + | + | | | |
| STERCULIACEAE | | | | | | | | | |
| *Sterculia hamiltonii* (Kuntze) Adelb. | Chop | T(FP) | 250-1100 | - | + | + | | | |
| *S. villosa* Roxb. | | T(FP) | 300-600 | + | + | + | + | | + |
| TAMARICACEAE | | | | | | | | | |
| *Tamarix dioica* Roxb. | | S(WD) | 100-400 | + | + | + | | | + |
| THEACEAE | | | | | | | | | |
| *Schima wallichii* (DC.) Korth. | Chilaune | T(FP) | 700-2100 | - | + | + | | | + |
| TILIACEAE | | | | | | | | | |
| *Grewia disperma* Rottb. | Phorsa | T(FP) | 200-1100 | + | + | + | + | + | + |
| *G. helicterifolia* Wall. ex G. Don | | S(FP) | 150-1500 | + | + | - | + | + | + |
| *G. sclerophylla* Roxb. ex G. Don | Harsa | S(FP) | 200-1100 | - | + | - | | | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *G. subinaqualis* DC. | Glaphar | S(FP) | 250-1500 | + | + | - | | | + |
| *Trewia nodiflora* L. | Pithari | T(WD) | 150-1800 | + | + | + | + | + | + |
| *Triumfetta rhomboides* Jacq. | | H(FL) | 250-1400 | + | + | + | + | + | + |
| TRAPACEAE | | | | | | | | | |
| *Trapa quadrispinosa* Roxb. | Singara(Water chest-nut) | H(WD) | 100-800 | - | + | + | | | + |
| ULMACEAE | | | | | | | | | |
| *Celtis tetrandra* Roxb. | Jingara | T(FP) | 200-2800 | + | + | + | + | + | + |
| VERBENACEAE | | | | | | | | | |
| *Callicarpa arborea* Roxb. | | S(FL) | 250-2000 | + | + | + | + | + | + |
| *C. macrophylla* Vahl. | Budhiyadai ke lawa, Goyalo | S(FL) | 300-1500 | + | + | + | + | + | + |
| *Caryopteris odorata* (D. Don) B.L. Robinson | | S(FP) | 100-1500 | + | + | + | + | + | + |
| *Clerodendrum indicum* (L.) Kuntze | Babhnaithi | H(FL, FP) | 200-1400 | + | + | + | + | + | + |
| *C. viscosum* Vent. | Bhat | H(FL, FP) | 100-1500 | + | + | + | + | + | + |
| *Gmelina arborea* Roxb. | Ghamar | T(FP) | 200-1100 | + | + | + | + | + | + |
| *Lantana camera* L. | Phulajhar | S(FL) | 200-1300 | + | + | + | + | + | + |
| *Lippia nodiflora* (L.) Rich. | | H(FL,WD) | 100-1400 | + | + | + | + | + | + |
| *Premna longifolia* Roxb. | | S(FP) | 200-600 | + | + | - | | | + |
| *Vitex negundo* L. | Senuwar | T(FP) | 100-1200 | + | + | + | | | + |
| VITACEAE | | | | | | | | | |
| *Ampelocissus latifolia* (Roxb.) Planch | | C(FP) | 200-1600 | - | + | + | | | |
| *Cayrantia trifolia* (L.) Domin | Panlati | C(FP,WD) | 200-300 | - | + | + | | | |
| *Cissus javanica* DC. | | C(FP) | 200-1200 | - | + | + | | | + |
| ANGIOSPERMS- MONOCOTS | | | | | | | | | |
| ALISMATACEAE | | | | | | | | | |
| *Alisma plantago-aquatica* L. | | H(WD) | 100-1000 | + | + | + | | | |
| ARACEAE | | | | | | | | | |
| *Acorus calamus* L. | Bojo (Sweet flag) | H(WD) | 100-2300 | + | + | + | | | + |
| *Amorphophallus bulbifer* (Schott) Blume | Oal | H(FL) | 300-900 | - | + | + | | | |
| *Arisaema tortuosum* (Wall.) Schott | Sarpa ko makai | H(FP) | 700-2900 | + | + | + | | | |
| *Colocasia esculenta* (L.) Schott | Arikonch | H(WD) | 100-1200 | - | + | + | | | |
| *C. fallax* Schott. | | H(WD) | 100-2000 | - | + | - | | | |
| *Lassia spinosa* (L) Thwaites. | | H(WD) | 100-300 | - | - | + | | | + |
| *Pistia stratiotes* L. | | H(WD) | 200-1,000 | + | + | + | + | + | + |
| *Remusatia vivipara* (Roxb.) Schott | Kachu | H(WD) | 200-1200 | + | + | + | + | + | + |
| *Rhaphidophora glauca* (Wall.) Schott | | C(FP) | 330-1800 | + | + | + | + | | |
| ARECACEAE (PALMAE) | | | | | | | | | |
| *Calamus acanthospathus* Griff. | Bet | S(WD) | 150-1500 | + | + | + | + | + | + |
| *C. latifolius* Roxb. | Bet | S(WD) | 600 | + | - | - | | | |
| *C. leptospadix* Griff. | Bet | S(WD) | 100- | - | - | + | | | |
| *Phoenix humilis* Royle | Khajur | T(FP) | 150-900 | + | + | + | | | + |
| *P. sylvestris* Roxb. | Khajur | T(FP) | 150-1500 | + | + | - | | | + |
| *Wallichia densiflora* Mart. | | T(FP) | 200-1400 | + | + | - | | | |
| COMMELINACEAE | | | | | | | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *Amischophacelus axillaris* (L.) Rao & Kallathy | | H(WD) | 100-200 | - | + | + | | | |
| *Commelina paludosa* Blume | | H(WD) | 100-2500 | + | + | + | | | + |
| *Dictyospermum scaberrimum* (Blume) Hara | | H(WD) | 100-2100 | - | + | + | | | |
| *Floscopa scandens* Lour. | Simkane ghans | H(WD) | 100-1800 | - | + | + | | | |
| *Murdania nudiflora* (L.) Brenam | | H(WD) | 200-1500 | + | + | + | | | + |
| CYPERACEAE | | | | | | | | | |
| *Cyperus.. difformis* L. | | H(WD) | 100-2700 | + | + | + | + | + | + |
| *C. diffusus* Vahl. | | H(WD) | 200-900 | - | - | + | | | + |
| *C. digitatus* Roxb. | | H(WD) | 425-1100 | + | + | - | | | + |
| *C. distans* L.f. | | H(WD) | 350-1100 | + | + | + | | | + |
| *Elaeocharis dulcis* Burm.f. Trin. wx Henschel | | H(WD) | 200 | - | + | + | | | + |
| *Fimbristylis dichotoma* (L.) Vahl | | H(WD) | 100-1800 | - | + | + | | | + |
| *F. miliacea* (L.) Vahl | | H(WD) | 100-2000 | - | + | + | | | + |
| *F. ovata* (Burm. f.) Kern | | H(CW) | 100-850 | - | + | + | | | + |
| *Kyllinga brevifolia* Rottb. | | H(WD) | 100-2300 | + | + | + | + | + | + |
| *K. nemoralis* (J. R. &G.Forster) Dandy ex Hutch. & Dalziel | | H(WD) | 200-1200 | + | + | + | + | + | + |
| *Schoenoplectus juncoides* (Roxb.) | | H(WD) | 100-2700 | + | + | + | | | + |
| *Scleria parvula* Steudel | Jaren | H(WD) | 200-420 | - | + | - | | | + |
| DIOSCOREACEAE | | | | | | | | | |
| *Dioscorea bulbifera* L. | Githa,Panglung | C(FL) | 150-2100 | + | + | + | + | + | + |
| *D. deltoidea* Wall. | Ban tarul | C(FP) | 200-3100 | + | + | + | + | + | + |
| *D. pentaphylla* L. | | C(FP) | 600-1500 | - | + | + | | | |
| HYDROCHARITACEAE | | | | | | | | | |
| *Hydrilla verticillata* (L..f.) Royle | | H(WD) | 100-1600 | + | + | + | | | + |
| *Ottelia alismoides* (L.) Pers. | | H(WD) | 100-270 | - | + | - | | | |
| *Vallisneria natans* (Lour.) Hara | | H(WD) | 100-300 | + | - | - | | | + |
| HYPOXIDACEAE | | | | | | | | | |
| *Curculigo orchioides* Gaertn. | | H(FP) | 150-500 | - | + | + | | | + |
| LEMNACEAE | | | | | | | | | |
| *Lemna perpussila* Torrey | | H(WD) | 100-2300 | + | + | + | + | + | + |
| *Spirodela polyrhiza* (L.) Schleiden | | H(WD) | 100-1300 | - | + | + | | | + |
| LILIACEAE | | | | | | | | | |
| *Asparagus racemosus* Willd. | Santawar, Kurilo | S(FP) | 150-400 | + | + | - | + | + | + |
| *Chlorophytum arundinaceum* Baker | | H(FP) | 200-1200 | - | + | + | | | + |
| *C. nepalense* (Lindl.) Baker | Dalchini | H(FP) | 200-2500 | + | + | + | | | + |
| *Smilax ovalifolia* Roxb. ex D. Don | Ram datiwan | C(FP) | 200-1000 | + | + | + | + | + | + |
| *Urginea indica* (Roxb.) Kunth | Ban piyaz | H(FP) | 425-2400 | + | + | - | | | + |
| MUSCACEAE | | | | | | | | | |
| *Musa* sp. | Ban kera | H(FP) | 300 | - | + | - | | | + |
| NAJADACEAE | | | | | | | | | |
| *Najas graminea* Delile | | H(WD) | 100-2300 | + | + | - | + | | + |
| *N. minor* All. | | H(WD) | 100-700 | + | + | + | | | |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| ORCHIDACEAE | | | | | | | | | |
| *Aerides multifera* Roxb. | | H(FP) | 200-1100 | - | + | + | | | + |
| *A. odorata* Lour. | | H(FP) | 200-1200 | - | + | + | | | + |
| *Arachnis cathcartii* (Lindl.) J.J. Smith | | H(FP) | 300 | - | + | + | | | + |
| *Peristylis goodyeroides* (D.Don) Lindl. | | H(FP) | 200-1500 | - | + | + | | | + |
| *Zeuxine strateumatica* (L.) Schlechter | | H(WD) | 200-1200 | - | + | - | | | + |
| PANDANACEAE | | | | | | | | | |
| *Pandanus nepalensis* St. John. | Kewara (Screw pine) | S(WD) | 100-1000 | - | + | - | | | |
| POACEAE (GRAMINEAE) | | | | | | | | | |
| *Arundinella nepalensis* Trin. | | H(FL,WD) | 100-2500 | + | + | + | + | + | + |
| *Arundo donax* L. | | H(FL,WD) | 200-2,440 | + | + | + | + | + | + |
| *Bothriochloa intermedia* (R. Br.) A. Camus | | H(FL,WD) | 100-2600 | - | + | + | | | + |
| *Brachiaria ramosa* (L.) Stapf. | | H(FL,WD) | 200-1800 | - | + | + | | | + |
| *Chrysopogon aciculatus* (Retz.) Trins. | Kuro | H(FL,WD) | 100-1700 | - | + | + | | | + |
| *C. gryllus* (L.) Trin. | | H(FL,WD) | 325-2900 | + | + | + | + | + | + |
| *Coix lachryma-jobi* L. | | H(FL,WD) | 300-2100 | + | + | + | + | + | + |
| *Cymbopogon jwarancusa* (Jones) Schultes | | H(FP,WD) | 200-2000 | + | + | - | + | + | + |
| *C. martinii* (Roxb.) W.Watson | | H(GL,WD) | 200-2,000 | + | - | - | | | + |
| *C. stracheyi* (Hook. f.) Raizada & Jain | | H(FP,WD) | 200-3300 | + | + | + | | | + |
| *Cynodon dactylon* (L.) Pers. | Dubh | H(FL,WD) | 100-3000 | + | + | + | + | + | + |
| *Dactyloctenium aegypticum* (L.) Beauvois | | H(FL,WD) | 200-900 | - | + | + | | | + |
| *Desmostachya bipinnata* (L.) Stapf. | | H(FL,WD) | 100-200 | - | + | - | | | + |
| *Dendrocalamus strictus* Nees | Bas | H(FP,WD) | 100-500 | + | + | + | | | + |
| *Digitaria abludens* (Roemer & Schultes) Veldkamp | | H(GL,WD) | 200-2000 | + | + | - | | | + |
| *D. ciliaris* (Retz.) Koeler | | H(GL,WD) | 200-1500 | + | + | + | + | + | + |
| *D. violascens* Link | | H(GL,WD) | 200 | + | + | - | + | + | + |
| *Echinochloa colona* (L.) Link | | H(GL,WD) | 200-2400 | + | + | + | + | + | + |
| *Eleusine indica* (L.) Gaertn. | | H(FL,WD) | 100-2600 | + | + | + | | | + |
| *Eragrostis ciliaris* Link | | H(GL,WD) | 200 | - | + | - | | | + |
| *E. nigra* Nees ex Steudel | | H(GL,WD) | 200-3000 | + | + | + | + | | + |
| *E. tremula* (Lam.) Hochst. ex Steudel | | H(GL,WD) | 200-900 | - | + | + | | | + |
| *E. unioloides* (Retz.) Nees ex Steudel | | H(GL,WD) | 200-2200 | + | + | + | | | + |
| *Eulaliopsis binata* (Retz.) C.E. Hubbard | Sabo | H(SL,WD) | 150-2600 | + | + | + | + | + | + |
| *Erianthus longesetosus* Anderss. | | H(WD) | 100-2100 | + | + | + | | | + |
| *Erianthus ravennae (L.).* Beauvois | | H(WD) | 100-1500 | - | - | + | | | + |
| *Hemarthria compressa* (L.f.) R. Br. | | H(WD) | 100-900 | - | + | + | | | + |
| *Heteropogon contortus* (L.) Beauvois ex Roemer and Shultes | | H(GL,WD) | 200-2600 | + | + | + | | | + |
| *Imperata cylindrica* (L.) Beuvois | Siroo | H(GL,WD,WD) | 700-2,400 | + | + | + | + | + | + |
| *Ischaemum rugosum* Salisb. | | H(WD) | 100-800 | + | + | + | | | + |
| *Iseilema laxum* Hack. | Suarakhar | H(GL,WD) | 300 | - | + | - | | | + |
| *Oplismenus Burmannii* (Retz.) Beauvois | | H(WD) | 100-1800 | - | + | + | | | + |
| *Oryza minuta* J.S.Presl.ex C.B. Presl. | | H(WD) | 200 | - | + | - | | | |
| *Oryza rufipogon* Griff. | | H(WD) | 200-600 | + | - | - | | | |
| *Panicum notatum* Retz. | Urila | H(GL,WD) | 300-1200 | - | + | + | | | + |
| *Paspalidium flavidum* (Retz.) A. Camus | | H(GL,WD) | 100-900 | - | + | - | | | + |
| *Paspalum distichum* L. | | H(WD) | 100-2000 | + | + | + | + | + | + |

| Taxon /FAMILY & *Scientific Name* | Vernacular Name | Habit (Habitat) | Altitude (m) | Regional Distribution | | | Status | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| *P. scrobiculatum* L. | | H(WD) | 100-2200 | - | + | + | | | + |
| *Perotis hordeiformis* Nees ex Hook. & Arn. | | H(GL,WD) | 300-1000 | + | + | + | | | + |
| *Phalaris minor* Retz. | | H(WD) | 200-1100 | + | - | - | + | | + |
| *Phragmites karka* (Retz.) Trin. ex Steudel | Narkat | H(FL,WD) | 150-2000 | + | + | + | + | + | + |
| *Pogonatherum crinitum* (Thunb.) Kunth | | H(FL,WD) | 100-1700 | - | + | + | | | + |
| *Rottboellia exaltata* (L.) L.f. | | H(WD) | 90-150 | + | - | - | | | + |
| *Saccharum arundinaceum* Retz. | | H(FL,WD) | 100-400 | - | + | + | | | + |
| *S. bengalense* Ham. | Munj | H(WD) | 250 | - | + | - | | | + |
| *S. spontaneum* L. | Kharahi | H(GL,WD) | 200-1,700 | + | + | + | + | + | + |
| *Setaria glauca* (L.) Beauvois | | H(FL,WD) | 100-2300 | + | + | + | + | + | + |
| *S. pallidefusca* (Schumach.) Stapf. & C. E. Hubbard | | H(GL,WD) | 100-2100 | + | + | + | + | | + |
| *S. tomentosa* (Roxb.) Kunth | Ghode-banso | H(WD) | 100-1800 | + | + | + | + | | + |
| *Sporobolus diander* (Retz.) Beauvois | | H(GL,WD) | 100-1400 | - | + | + | + | | + |
| *Themeda arundinacea (Roxb.) Ridley* | | H(FL,WD) | 200-1,700 | + | + | + | + | | + |
| *Thysanolaena maxima* (Roxb.) Kuntze | Amriso, Kucho | H(SL,WD) | 100-2000 | - | + | + | + | + | + |
| *Vetiveria lawsonii* (Hook.f.) Blatter & McCann | Kush | H(SL,WD) | 200 | - | + | + | | + | + |
| PONTEDERIACEAE | | | | | | | | | |
| *Eichhornia crassipes* (Mart.) Solms. | Jalkumhi | H(WD) | 100-1500 | + | - | + | + | | + |
| *Monochoria hastata* (L.) Solm. | | H(WD) | 150 | + | + | + | | | + |
| *Monochoria vaginalis* (Burm. f.) C. Presl | | H(WD) | 200-1800 | + | + | + | + | | + |
| POTAMOGETONACEAE | | | | | | | | | |
| *Potamogeton crispus* L.. | | H(WD) | 100-2000 | + | + | + | | | + |
| *P. nodosus* Poir | | H(WD) | 100-3000 | + | + | + | + | + | + |
| TYPHACEAE | | | | | | | | | |
| *Typha angustifolia* L. | Pater | H(WD) | 75-200 | + | - | + | | | + |
| ZANNICHELLIACEAE | | | | | | | | | |
| *Zannichellia palustris* L. | | H(WD) | 100-600 | + | + | + | | | |
| ZINGIBERACEAE | | | | | | | | | |
| *Alpina allughas* (Retz.) Roscoe | | H(WD) | 200-600 | - | + | - | | | |
| *Costus speciosus* (Koenig) Smith | | H(FP) | 200-700 | + | + | + | + | + | + |
| *Curcuma angustifolia* Roxb. | Ban adi | H(FP) | 340-1500 | + | + | - | + | | + |
| *C. leucorhiza* Roxb. | Kachur | H(FP) | 250 | - | + | - | | | + |
| *Globba clarkei* Baker | Devisaro | H(WD) | 100-1900 | - | + | + | | | + |
| *Hedychium coccineum* Buch.-Ham. ex Smith | | H(FP) | 150-1400 | - | + | + | | | + |
| *H. stenopetalum* Lodd. | Bareri | H(FP) | 325 | - | + | - | | | |

*Source: Choudhary, R. P. and Ram Lal Choudhary. 1996. Flora of the Terai Region of Nepal. A report submitted to IUCN Nepal.*

# *Annex 7*
# *Avifauna Found in Terai*

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| GREBES, **Podicipediae** | | | | |
| Little grebe | *Tachybaptus ruficollis* | A | resident | |
| Great crested grebe | *Podiceps cristatus* | E, C, | winter | |
| Black-necked grebe | *Podiceps nigricollis* | E | ir. winter | |
| CORMORANTS, **Phalacrocoracidae** | | | | |
| Great cormorant | *Phalacrocorax carbo* | A | winter | |
| Little cormorant | *Phalacrocorax niger* | A | resident | |
| ANHINGAS, **Anhingidae** | | | | |
| +*Oriental darter | *Anhinga melanogaster* | E, C, MW, FW | resident | |
| PELICANS, **Pelecanidae** | | | | |
| Great White pelican | *Pelecanus onocrotalus* | E | vagrant | |
| #*Spot-billed pelican | *Pelecanus philippensis* | E | non-breed. visitor | |
| HERONS & BITTERNS, **Ardeidae** | | | | |
| *Great bittern | *Botaurus stellaris* | E, C, W | winter, p. migrant | |
| *Yellow bittern | *Ixobrychus sinensis* | E, C | summer | |
| Cinnamon bittern | *Ixobrychus cinnamomeus* | A | summer | |
| *Black bittern | *Dupetor flavicollis* | E, C, FW | resident | |
| Malay night heron | *Gorsachius melanolophus* | E | vagrant | |
| Black-crowned night heron | *Nycticorax nycticorax* | A | resident | |
| Striated heron | *Butorides striatus* | A | resident | |
| Indian pond heron | *Ardeola grayii* | A | resident | |
| Cattle egret | *Bubulcus ibis* | A | resident | III |
| Little egret | *Egretta garzetta* | A | resident | III |
| Intermediate egret | *Egretta intermedia* | A | resident | |
| Great egret | *Egretta alba* | A | resident | III |
| Grey heron | *Ardea cinerea* | A | winter | |
| #*Imperial heron | *Ardea imperialis* | E, C | extinct | |
| Purple heron | *Ardea purpurea* | A | resident | |
| STORKS, Ciconiidae | | | | |
| +*Painted stork | *Mycteria leucocephala* | A | summer | |
| +Asian openbill stork | *Anastomas oscitans* | A | resident | |
| *Black stork | *Ciconia nigra* | A | winter | II |
| Woolly-necked stork | *Ciconia episcopus* | A | resident | |
| White stork | *Ciconia ciconia* | E, C | winter | |

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| *Black-necked stork | *Ephippiorrhynchus asiaticus* | E, C, MW, FW | resident | |
| #*Greater adjutant stork | *Leptoptilos dubius* | E, C | non-breed summer | |
| #*Lesser adjutant stork | *Leptoptilos javanicus* | A | resident | |
| IBISES & SPOONBILLS, **Threskiornithidae** | | | | |
| Glossy ibis | *Plegadis falcinellus* | E, C | p. migrant | |
| +Red-naped ibis | *Pseudibis papillosa* | A | resident | |
| +*Black-headed ibis | *Threskiornis melanocephalus* | E, C | resident | III |
| *Eurasian spoonbill | *Platalea leucorodia* | E, W, MW, FW | p. migrant, winter | |
| FLAMINGOS, **Phoenicopteridae** | | | | |
| Greater flamingo | *Phoenicopterus roseus* | E | vagrant | |
| SWANS, GEESE & DUCKS, **Anatidae** | | | | |
| Fulvous whistling duck | *Dendrocygna bicolor* | E | irr. visitor | III |
| Lesser whistling duck | *Dendrocygna javanica* | A | resident | |
| Tundra swan | *Cygnus columbianus* | C | vagrant | |
| Bean goose | *Anser fabalis* | C | vagrant | |
| Greylag goose | *Anser anser* | E, C, MW | p. migrant, winter | |
| Bar-headed goose | *Anser indicus* | A | p. migrant, winter | |
| Ruddy shelduck | *Tadorna ferruginea* | A | winter | |
| Common shelduck | *Tadorna tadorna* | E, C | irr. visitor | |
| *Comb duck | *Sarkidiornis melanotos* | A | resident | II |
| Cotton pygmy goose | *Nettapus coromandelianus* | A | resident | |
| Mandarin duck | *Aix galericulata* | E | vagrant | |
| Eurasian wigeon | *Anas penelope* | E, C, FW | p. migrant, winter | III |
| Falcated duck | *Anas falcata* | E, C, FW | winter | |
| Gadwall | *Anas strepera* | E, C, MW, FW | p. migrant, winter | |
| Baikal teal | *Anas formosa* | E, C | vagrant | |
| Common teal | *Anas crecca* | A | p. migrant, winter | III |
| Mallard | *Anas platyrhynchos* | A | p. migrant, winter | |
| Spot-billed duck | *Anas poecilorhyncha* | E, C, FW | winter | |
| Northern pintail | *Anas acuta* | A | p. migrant, winter | III |
| Garganey | *Anas querquedula* | E, C, W, FW | p. migrant, winter | III |
| Northern shoveler | *Anas clypeata* | E, C, MW | p. migrant, winter | III |
| #*Pink-headed duck | *Rhodonessa caryophyllacea* | E, C | Extinct | I |
| Red-crested pochard | *Netta rufina* | A | p. migrant, winter | |
| Common pochard | *Aythya ferina* | A | p. migrant, winter | |
| #*Baer's Pochard | *Aythya baeri* | E | p. migrant, winter | |
| #*Ferruginous duck | *Aythya nyroca* | E, C, W, FW | p. migrant, winter | III |
| Tufted duck | *Aythya fuligula* | A | p. migrant, winter | |
| Greater scaup | *Aythya marila* | E | vagrant | |

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| Long-tailed duck | *Clangula hyemalis* | E | vagrant | |
| Common goldeneye | *Bucephala clangula* | E, C | irr. visitor | |
| Smew | *Mergus albellus* | E, C, FW | p. migrant | |
| Red-breasted merganser | *Mergus serrator* | E | vagrant | |
| Goosander | *Mergus merganser* | A | winter | |
| HAWKS & EAGLES, **Accipitridae** | | | | |
| Brahminy kite | *Haliastur indus* | A | resident | |
| #*Ring-tailed fishing eagle | *Haliaeetus leucoryphus* | A | winter, p. migrant | |
| +*White-tailed eagle | *Haliaeetus albicilla* | E, C, MW | winter | I |
| +*Lesser fishing eagle | *Ichthyophaga nana* | A | resident | |
| +*Grey-headed fishing eagle | *Ichthyophaga ichthyaetus* | E, C, W, FW | resident | |
| #*Imperial eagle | *Aquila heliaca* | E, C | p. migrant, winter | I |
| OSPREY, Pandionidae | | | | |
| Osprey | *Pandion haliaetus* | A | winter | |
| PARTRIDGES, Phasianidae | | | | |
| #*Swamp francolin | *Francolinus gularis* | E, MW ?, FW | resident | |
| RAILS, COOTS & GALLINULES, **Rallidae** | | | | |
| Slaty-legged crake | *Rallina eunizonoides* | C | vagrant | |
| *Water rail | *Rallus aquaticus* | E, C, FW | p. migrant, winter | |
| Slaty-breasted rail | *Rallus striatus* | C | vagrant | |
| Spotted crake | *Porzana porzana* | E | vagrant | |
| *Baillon's crake | *Porzana pusilla* | E, C | p. migrant, winter | |
| Ruddy-breasted crake | *Porzana fusca* | E, C, FW | resident | |
| Brown crake | *Amaurornis akool* | E, C | resident | |
| White-breasted waterhen | *Amaurornis phoenicurus* | A | resident | |
| Common moorhen | *Gallinula chloropus* | A | winter, resident | |
| Purple swamphen | *Porphyrio porphyrio* | A | winter, p. migrant | |
| *Watercock | *Gallicrex cinerea* | E, C | monsoon visitor | |
| Eurasian coot | *Fulica atra* | A | winter, p. migrant | |
| CRANES, **Gruidae** | | | | |
| Common crane | *Grus grus* | E, C, MW | p. migrant | II |
| +*Sarus crane | *Grus antigone* | C, W, MW, FW | resident | II |
| Demoiselle crane | *Anthropoides virgo* | A | p. migrant | II |
| JACANAS, Jacanidae | | | | |
| Pheasant-tailed jacana | *Hydrophasianus chirurgus* | A | summer, resident | |
| Bronze-winged jacana | *Metopidius indicus* | A | resident | |
| PAINTED SNIPES, **Rostratulidae** | | | | |
| Greater paintedsnipe | *Rostratula benghalensis* | A | resident | |
| AVOCETS & STILTS, **Recurvirostridae** | | | | |

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| Ibisbill | *Ibidorhyncha struthersii* | E, C, W, MW | winter | |
| Black-winged stilt | *Himantopus himantopus* | A | p. migrant | |
| Pied avocet | *Recurvirostra avosetta* | E, C | p. migrant | |
| THICK-KNEES & STONE-PLOVERS, **Burhinidae** | | | | |
| Eurasian thick-knee | *Burhinus oedicnemus* | A | resident | |
| *Great stone-plover | *Esacus recurvirostris* | E, C, MW | resident, winter | |
| COURSERS & PRATINCOLES, **Glareolidae** | | | | |
| *Indian courser | *Cursorius coromandelianus* | E, MW | resident ? | |
| Oriental pratincole | *Glareola maldivarum* | A | p. migrant | |
| Little pratincole | *Glareola lactea* | A | resident | |
| PLOVERS AND LAPWINGS, **Charadriidae** | | | | |
| Little ringed plover | *Charadrius dubius* | A | resident, winter | |
| *Long-billed plover | *Charadrius placidus* | E, FW | winter, p. migrant | |
| Kentish plover | *Charadrius alexandrinus* | E, C, MW | winter, p. migrant migrant | |
| Lesser sand plover | *Charadrius mongolus* | E, C, W, MW | winter, p. migrant | |
| Greater sand plover | *Charadrius leschenaultii* | E | vagrant | |
| Pacific golden plover | *Pluvialis fulva* | E, C | winter, p. migrant | |
| Grey plover | *Pluvialis squatarola* | E, C | vagrant | |
| River lapwing | *Hoplopterus duvaucelii* | A | resident | |
| Yellow-wattled lapwing | *Hoplopterus malabaricus* | A | winter | |
| +*Grey-headed lapwing | *Hoplopterus cinereus* | E, C | winter | |
| Red-wattled lapwing | *Hoplopterus indicus* | A | resident | |
| White-tailed lapwing | *Chettusia leucura* | MW, FW | winter | |
| Northern lapwing | *Vanellus vanellus* | A | winter, p. migrant | |
| SANDPIPERS, **Scolopacidae** | | | | |
| Sanderling | *Calidris alba* | E | vagrant | |
| Little stint | *Calidris minuta* | E, C, MW | winter, p. migrantt | |
| Temminck's stint | *Calidris temminckii* | A | winter, p. migrant | |
| Long-toed stint | *Calidris subminuta* | FW | p. migrant | |
| Curlew sandpiper | *Calidris ferruginea* | E, C | p. migrant | |
| Dunlin | *Calidris alpina* | E, C | winter, p. migrant | |
| Ruff | *Philomachus pugnax* | E, C, FW | p. migrant | |
| Jack snipe | *Lymnocryptes minimus* | E, C, W | winter, p. migrant | |
| Common snipe | *Gallinago gallinago* | E, C, FW | winter, p. migrant | |
| Pintail snipe | *Gallinago stenura* | E, C, W, MW | winter, p. migrant | |
| Swinhoe's snipe | *Gallinago megala* | E | vagrant | |
| Eurasian woodcock | *Scolopax rusticola* | C | winter | |
| Black-tailed godwit | *Limosa limosa* | E, C | p. migrant | |
| Whimbrel | *Numenius phaeopus* | E, C | p. migrant | |

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| Eurasian curlew | *Numenius arquata* | E, C | winter, passage | |
| Spotted redshank | *Tringa erythropus* | A | p. migrant, winter | |
| Common redshank | *Tringa totanus* | E, C, W, MW | p. migrant, winter | |
| Marsh sandpiper | *Tringa stagnatilis* | A | p. migrant | |
| Common greenshank | *Tringa nebularia* | A | winter, p. migrant | |
| Green sandpiper | *Tringa ochropus* | A | p. migrant, winter | |
| Wood sandpiper | *Tringa glareola* | A | p. migrant, winter | |
| Terek sandpiper | *Tringa cinereus* | E, C | vagrant | |
| Common sandpiper | *Actitis hypoleucos* | A | winter | |
| GULLS, TERNS & SKIMMERS, **Laridae** | | | | |
| Great black-headed gull | *Larus ichthyaetus* | E, C, MW | p. migrant, winter | |
| Common black-headed gull | *Larus ridibundus* | E, C, MW | p. migrant, winter | |
| Brown-headed gull | *Larus brunnicephalus* | E, C, W, MW | p. migrant, winter | |
| Slender-billed gull | *Larus genei* | E | p. migrant, irr. winter | |
| Mew gull | *Larus canus* | E | vagrant | |
| Lesser black-backed gull | *Larus fuscus* | E, C | vagrant | |
| Yellow-legged gull | *Larus cachinnans* | E, C | p. migrant | |
| Gull-billed tern | *Gelochelidon nilotica* | E, C, MW | p. migrant, winter | |
| Caspian tern | *Sterna caspia* | E, C, MW | p. migrant, winter | |
| River tern | *Sterna aurantia* | A | resident | |
| Common tern | *Sterna hirundo* | E, C | irr. winter | |
| #*Black-bellied tern | *Sterna acuticauda* | A | resident | |
| Little tern | *Sterna albifrons* | E, C, W, MW | summer | |
| Whiskered tern | *Chlidonias hybridus* | E, C | p. migrant, irr. winter | |
| White-winged tern | *Chlidonias leucopterus* | E, C | p. migrant | |
| #*Indian skimmer | *Rynchops albicollis* | E, C, MW | irr. spring visitor | |
| OWLS, Strigidae | | | | |
| *Dusky eagle owl | *Bubo coromandus* | E, C | resident | |
| Brown fish owl | *Ketupa zeylonensis* | A | resident | |
| +*Tawny fish owl | *Ketupa flavipes* | C | resident | |
| KINGFISHERS, **Alcedinidae** | | | | |
| *Ruddy kingfisher | *Halcyon coromanda* | C | resident | |
| White-throated kingfisher | *Halcyon smyrnensis* | A | resident | |
| Black-capped kingfisher | *Halcyon pileata* | E, C, MW, FW | irr. visitor | |
| Stork-billed kingfisher | *Pelargopsis capensis* | A | resident | |
| #*Blyth's kingfisher | *Alcedo hercules* | E | resident ? | |
| Eurasian kingfisher | *Alcedo atthis* | A | resident | |
| *Blue-eared kingfisher | *Alcedo meninting* | E, C, FW | resident | |
| Pied kingfisher | *Ceryle rudis* | A | resident | |
| Crested kingfisher | *Ceryle lugubris* | A | resident | |

| COMMON NAME | LATIN NAME | DISTRIBUTION | STATUS | CITES |
|---|---|---|---|---|
| BEE-EATERS, **Meropidae** | | | | |
| Blue-tailed bee-eater | *Merops philippinus* | A | summer | |
| PIPITS & WAGTAILS, **Motacillidae** | | | | |
| Red-throated pipit | *Anthus cervinus* | E, C | winter, p. migrant | |
| Rosy Pipit | *Anthus roseatus* | A | resident | |
| Water pipit | *Anthus spinoletta* | E | winter ? | |
| Buff-bellied pipit | *Anthus rubescens* | C, W | winter, p. migrant | |
| Yellow wagtail | *Motacilla flava* | A | winter, p. migrant | |
| Citrine wagtail | *Motacilla citreola* | A | winter, p. migrant | |
| Grey wagtail | *Motacilla cinerea* | A | winter | |
| Pied / White wagtail | *Motacilla alba* | A | winter | |
| White-browed wagtail | *Motacilla maderaspatensis* | A | resident | |
| THRUSHES, **Turdidae** | | | | |
| Brown dipper | *Cinclus pallasii* | A | winter | |
| Bluethroat | *Luscinia svecica* | A | winter, p. migrant | |
| Plumbeous redstart | *Rhyacornis fuliginosus* | A | winter | |
| White-capped redstart | *Chaimarrornis leucocephalus* | A | winter | |
| Blue whistling thrush | *Myiophoneus caeruleus* | A | winter, resident | |
| Black-backed forktail | *Enicurus immaculatus* | A | resident | |
| Slaty-backed forktail | *Enicurus schistaceus* | A | winter | |
| Spotted forktail | *Enicurus maculatus* | A | winter | |
| WARBLERS, **Sylviidae** | | | | |
| Smoky warbler | *Phylloscopus fuligiventer* | E, C, W, FW | winter | |

Key: Threats:
* Nationally Threatened
# Globally Threatened (BirdLife 1994 and IUCN 1993)
+ listed as Near-threatened by BirdLife (1994)

Please note that all Nepalese birds listed by IUCN (Groombridge 1993) are considered threatened by BirdLife (Collar *et al.* 1994) but not vice-versa. BirdLife International's Birds to Watch 2 is the official source for birds for the IUCN Red List, so the list of threatened birds it contains replaces the list in Groombridge 1993 (Collar *et al.* 1994). For this reason we have followed BirdLife's Birds to Watch 2.

Distribution: Records of Wetland Birds According to Development Regions
*A*: recorded in lowlands of all development regions
*E*: recorded in lowlands of eastern development region
*C*: recorded in lowlands of central development region
*W*: recorded in lowlands of western development region
*MW*: recorded in lowlands of mid-western development region
*FW*: recorded in lowlands of far-western development region

Status winter: winter visitor
summer: summer visitor
resident: recorded all months of a year
p. migrant: passage migrant
vagrant: normally not occurring
breed.: breeding
non-breed.: non-breeding
irr.: irregularly occurrence

(References : Birds of Nepal, Inskipps and BCN Newsletters)

*Source: Baral, Hem Sagar. 1996. Fauna of Terai Wetlands. A report submitted to IUCN–The World Conservation Union.*

# *Annex 8*
# *Insect fauna of Beesh Hazar Tal*

| ORDER | FAMILY | GENUS/SPECIES |
|---|---|---|
| Odonata | Libellulidae | Tramea sp. |
| | | Anax sp. |
| | Coenagrionidae | Agrioecnemis sp. |
| | | Ischnura asiatica (Dec.) |
| Orthoptera | Mantidae | Mantis religiosa (L.) |
| | Tettigoniidae | Conocephalus sp. |
| | Acrididae | Acr/da tumta |
| Isoptera | Termitidae | Odontotermes sp. |
| Dermaptera | Labiduridae | Labidura sp. |
| | Forficulidae | Forjicula sp. |
| Hemiptera | Corixidae | Corixa apparens (Annan.) |
| | Gerridae | Gems manticola (Annan.) |
| | Nepidae | Laccolrephus sp. |
| | Hydrometridae | Hydrometra vitata (Stal.) |
| | Gelastocoridae | Gelastocoms sp. |
| Coleoptera | Carabidae | Chlaenius sp. |
| | | Morton sp. |
| | Dytiscidae | Dytiscus sp. |
| | Hydrophilidae | Hydrophilus sp. |
| | | S ternolophus sp. |
| | Staphylimdae | Paederus sp. |
| | Coccinellidae | Coccinella septumpunctata (L.) |
| | | Menochilus sp. |
| Neuroptera | Chrysopidae. | Chrysopes sp. |
| Diptera | Tipulidae | Pachyrrhina sp. |
| | Culicidae | Anopheles sp. |
| | | Culex sp. |
| | Syrphidae | Episyrphus sp. |
| | Chironomiidae | Chironomus sp. |
| | Tachimdae | Winthemia sp. |
| Hymenoptera | Pompilidae | Hemipepsis sp. |
| | Formicidae | Formica spp. |
| | Vespidae | Vesps sp. |
| | Apidae | Apis spp. |
| Ephemeroptera | Ephemeridae | Ephimera sp. |
| Plecoptera | Perlidae | Perla sp. |
| CoLlembolla | — | Isotomodes sl |

*Source : Thapa, R. B.1996. Preliminary Survey of Insect Fauna. A report submitted to IUCN Nepal.*

Continued from page 45

Anthropogenic impacts in the form of fertilizers and human and animal waste increases ion concentration in Nepal's lakes (Jones *et al.* 1989) and results in $Cl^-$ : $Na^+$ ratios approaching one. Two lakes, Siktihawa Tal in the Terai and Tau Daha in the Midhills, showed $Cl^-$ : $Na^+$ ratios indicative of heavy human use (0.6 and 0.9 respectively). Contrary to some claims, human waste was not a factor contributing to cultural eutrophication in the other sampled lakes, many of which were afforded some protection within forest reserves. Human waste is often cited as a source of eutrophication among management reports for Phewa Tal, Begnas Tal, and Indra Sarobar (Kulakhani Reservoir). Low $Cl^-$ : $Na^+$ ratios do not support this contention. We believe that the riverine nature of these lakes and the low retention time during monsoon acts to reduce human impacts.

Suspended solids are important for management considerations as they effect the ability of a lake to sustain submerged macrophyte communities. Shallow lakes can often be categorized as either having clear waters with macrophytes dominating primary production or having turbid waters with few macrophytes. In the latter case the food chain may be supported by algal primary production and decomposition of organic detritus. This pattern was observed among Terai lakes and occurred seasonally within lakes. Oxbow lakes, such as those on the Sapta Koshi floodplain were dominated by macrophytes through most of the dry season but when monsoon connected them with associated rivers turbidity increased and macrophyte communities were reduced. Human disturbance was detrimental to macrophyte communities by causing increased turbidity. The annual burning of grasslands in RCNP caused high turbidity in Tamor Tal. Submerged macrophytes dominate this lake throughout the year but were not observed in a transect perpendicular to the shore during the turbid period. Turbidity was elevated in some lakes, such as Halkoria Daha, by wallowing buffalo and cattle with the same loss of macrophyte communities observed. While in oxbow lakes the annual cycle of turbidity is natural, human induced turbidity should be limited in lakes selected for conservation. For example, fish kills and the inability for Tamor Tal to support a crocodile population (T. M. Maskey pers comm.) may be related to the loss of macrophytes and a higher water temperature in Tamor Tal than the proximate Lami Tal and Bees Hazaar Tal. Increased temperature in Tamor Tal was attributed to the absorption of solar energy by the black ash suspended in the lake after grass fires.

Secchi depth corresponded to a mean 16% of surface illumination (median= 14%, n=26). Extreme high and low Secchi transparency caused 5 extreme values, three at depths greater than 20% of surface illumination corresponding to turbid Terai lakes where Secchi transparency was below 1 m, and two at depths less than 10% of surface illumination which were transparent lakes with Secchi transparency > 14 m. At 16% of surface illumination, 2 to 3-times the Secchi depth corresponds to 1% of surface illumination. This is important because the easily measured Secchi depth, times 2 or 3, can be used to define the photic zone, the depth where enough light penetrates to support algal and macrophyte photosynthesis. Low transparency is often considered undesirable and associated with pollution by the public. In Nepal low transparency is a result of suspended solids, most of which were inorganic contributions from weathering in the watershed not from cultural eutrophication.

The widespread existence of nitrogen limitation among Terai lakes and the generally low nutrient concentrations suggests sewage impact is nugatory compared to the more prevalent problem of hydrology. Drainage of lakes to enhance grazing areas or for fishing purposes is the greatest threat to Nepal's Terai lakes. Disturbance of sediments and littoral plant communities caused by livestock use should be managed, particularly in the immediate surroundings of lakes such as Ghodaghodi Tal that are not connected to a large river and hence derive their sediment load from the shoreline. The only apparent solution, however, would be to allow local people to harvest fodder from lake shores or by boat which can be combined with a ban on draining lakes. Such a management change would likely not be accepted without

effort because the present practice of allowing unlimited access of livestock to protected lakes requires no effort from livestock owners.

Nutrient limitation in the Midhill lakes, Phewa Tal and Begnas Tal, demonstrated a seasonal switch from nitrogen during monsoon to phosphorus during the dry season. Phosphorus concentrations remained within meso and even oligotrophic lake classifications while chlorophyll concentrations remained within mesotrophic conditions in Begnas Tal and predominately eutrophic conditions in Phewa Tal. Proper sewage management at Lakeside may reduce chlorophyll concentrations in Phewa Tal, however, this is uncertain because of the low pelagic nutrient concentrations measured in Phewa Tal. Surface runoff is the likely source of much of the unsightly surface scum on Phewa Tal. Management at Phewa Tal should concentrate on reducing surface runoff from lakeside by increasing the effectiveness of storm drains and minimizing garbage accumulation below the restaurants and shops. Proposals that a green strip be allowed from the fenced area at the boat ramp to the fisheries offices would aid the situation immensely without the high costs of continued management. The area would have to be fenced to limit access by grazing animals.

The following table suggests trophic state catagorization to be used in management based on our nitrogen data from Nepal and compares it to those suggested elsewhere. Catagorization using TP and chlorophyll can still follow Forserg & Ryding, keeping in mind that most of the Terai and Midhill lakes in Nepal are limited by low nitrogen availability:

**Table 7. Proposed change to Forsberg & Ryding (1980) trophic state indices for TN in Nepal's lakes based on lake means (n=32).**

| TROPHIC CATAGORY | FORSBERG & RYDING TN µG.L-1 | JONES & KNOWLTON TN µG.L-1 | NEPAL TN µG.L-1 |
|---|---|---|---|
| Oligotrophic | <400 | ≤300 | <250 |
| Mesotrophic | 401-600 | 301-500 | 251-500 |
| Eutrophic | 601-1500 | 501-1200 | 501-800 |
| **Hypereutrophic** | **>1500** | **>1200** | **>800** |

The largest threats to surface water quality in Nepal is lack of water. Future management should concentrate on maintaining lake levels and limiting livestock disturbance at shorelines, particularly in the dry season proceeding monsoon. An outright ban is not necessary nor is it feasible but access should be limited to some percentage of lake shorelines.

## IUCN–The World Conservation Union

Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 882 members in all, spread across some 135 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. A central secretariat coordinates the IUCN Programme and serves the Union membership, representing their views on the world stage and providing their goals. Through its six Commissions, IUCN draws together over 6,000 experts volunteers in project teams and action groups, focusing in particular on species and biodiversity conservation and the management of habitats and natural resources. The Union has helped many countries to prepare National Conservation Strategies, and demonstrates the application of its knowledge forward by an expanding network of regional and country offices, located principally in developing countries.

The World Conservation Union builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

IUCN–The World Conservation Union officially launched the Nepal Country Office on 23 February 1995 with His Majesty's Government, Ministry of Finance as the government partner. IUCN Nepal has been developing partnerships with various government line agencies as well as non-governmental organizations to carry forward its activities to conserve Nepal's natural resources and ecological processes.

IUCN
The World Conservation Union