



Status of Wetlands and Mugger Crocodile In and Around Chitwan National Park



Government of Nepal
Ministry of Forests and Soil Conservation
Department of National Parks and Wildlife Conservation
Chitwan National Park Office
Kasara, Chitwan



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Foreword



Reliable information for management of natural resources is the basis on which all decisions with regards to conservation and protection are made. Scientific inventories are of utmost importance for management authorities in conservation of biological diversity and the protection of resources in a systematic and effective manner. On this regard I am very pleased to publish the report entitled “Status of Wetlands and Mugger Crocodile in and around Chitwan National Park”.

Chitwan National Park (CNP), a world heritage property, is the hotspot for the biodiversity conservation in Nepal. The park, which constitutes an important component of Terai Arc Landscape, is among the best managed parks in the world. It is home to 68 species of mammals, more than 576 species of birds, 49 species of reptiles and amphibians, 120 species of fishes and several species of invertebrates which has significantly contribute in ecosystem processes in the park. Despite the biological richness of species in the park, the National Park office was lacking detail information on the number of wetlands in the park, and an understanding to accurately assess the extent, pressures and degree of degradation of the same.

Wetlands are the lifeline of CNP and its biodiversity. So without wetlands we cannot imagine the CNP. It plays crucial role in biodiversity conservation. Without water, food, space and cover, the habitat itself is incomplete. Wetlands of CNP have been called “biological super systems” as they are the most productive ecosystems and support a remarkable level of biodiversity. Combined with the wetlands record, a parallel study was conducted to assess the population status and threats to mugger crocodile (*Crocodylus palustris*) in CNP and its buffer zone. Mugger Crocodile, listed as a vulnerable species in the IUCN Red List, is restricted to isolated populations primarily in protected areas of Chitwan and Bardia National Parks, Koshi Tappu and Shuklaphanta Wildlife Reserves.

Recognizing the importance of wetlands and realizing an urgent need to protect Mugger Crocodile in wild, CNP office conducted a quick survey of them. It is an outcome of the hard work of study team of the park. I am confident that this report will provide information for the assessment, evaluation and monitoring of wetlands and Mugger Crocodiles of CNP and will prove to be useful for policy-makers and planners in the region and elsewhere.

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Kamal Jung Kunwar

Chief Conservation Officer
Chitwan National Park Office

Acronyms and Abbreviations:

BZ	Buffer Zone
BCF	Buffer Zone Community Forest
CNP	Chitwan National Park
FSU	Field Support Unit
GEF	Global Environment Facility
GIS	Geographic Information System
ha	Hectare
IUCN	International Union for Conservation of Nature and Natural Resources
NP	National Park
NTNC	National Trust for Nature Conservation
NTNC-BCC	National Trust for Nature Conservation-Biodiversity Conservation Center
SLM	Sustainable Landscape Management
SRCWP	Strengthening Regional Cooperation for Wildlife Protection in Asia
TAL	Terai Arc Landscape Program (Government of Nepal)
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wildlife Fund for Nature

PART-I
STATUS OF WETLANDS IN AND AROUND
CHITWAN NATIONAL PARK

Table of Contents

	Page No.
Executive Summary	
1. Introduction	1
2. Objective	2
3. Methods	3
<i>3.1. Wetland sites and locations</i>	3
<i>3.2. Literature review and information about wetland sites</i>	3
<i>3.2. Data collection</i>	3
<i>3.2. Wetland classification</i>	3
4. Results	4
<i>4.1. Accessibility to the wetlands</i>	4
<i>4.2. Area of wetlands</i>	4
<i>4.3. Vegetation cover and condition of wetlands</i>	4
<i>4.4. Major threats</i>	5
<i>4.5 Management Actions Required</i>	5
5. Conclusion	6
References	6
Site information of individual wetlands	7-123
1. Bishazar Lake	8
2. Kamal Tal	10
3. Budhi Rapti Ghol	12
4. Bet-ghari Tal	14
5. Tikauli Tal	16
6. Batuli Pokhari	18
7. Bob Tal	20
8. Century Ghol	22
9. Chandi Tal	24
10. Chepang Tal	26
11. Kalimati Tal	28
12. Kamero Matchan Ghol	30
13. Kingfisher Tal 1	32
14. Kuchkuche Ghol	34
15. Kumal Tal	36
16. Kumrose Ghol	38
17. Mayur Tal	40

18. Ratomate Tal	42
19. Niure Tal	44
20. Mushar Tal	46
21. Rapti Lok Tal	48
22. Sitamain Ghol	50
23. Chaperchuli Ghol	52
24. Devi Tal	54
25. Dumariya Ghol	56
26. Gaiindakhasa Ghol	58
27. Gaurmachan	60
28. CJL Ghol	62
29. Icharni Ghol Complex -1	64
30. Bob Tal (Complex 2)	66
31. Kabre Tal	68
32. Khagendra Malli Ghol	70
33. Laguna Tal	72
34. Lami Tal	74
35. Lamo Tal	76
36. Liglige Ghol	78
37. Mayur Ghol	80
38. Martchauli Ghol	82
39. Mardi Ghol	84
40. Munda Tal	86
41. Nanda Bhauju Tal	88
42. Nandan Tal	90
43. Patan/Garud Tal	92
44. Chisapani (Niure) Ghol	94
45. Sapanawoti Ghol	96
46. Shera Tal	98
47. Suksuke Ghol	100
48. Tamor Tal	102
49. Temple tiger Ghol	104
50. Thapaliya Tal	106
51. Thotari Tal	108
52. Simara Ghol	110
53. Singhe Tal	112
54. Kharkatta Ghol	114
55. Harabansa Ghol	116
56. Rapti Ghol	118
57. Martchauli Marsh	120
58. Temple Tiger 2 no. Ghol	122

Executive Summary

Wetlands are some of the most diverse and productive ecosystems which support high biodiversity. Chitwan National Park is blessed with numerous wetlands of ecological and economic importance. However, there was very limited information available about their overall bio-physical status, threats and management needs. With the above said objective, a quick survey of the wetlands of Chitwan was carried out in 2013. River and streams which also serves a crucial role for the ecosystem functioning and regulating the biodiversity of the park are not a part of the survey. A total 83 wetland sites were mapped and surveyed from Chitwan National Park and its Buffer zone. Of the total, only 58 wetlands were identified, 20 were recorded and mapped in the buffer zone and 38 in the core area. The study found that some of the wetlands were totally dry, flooded during monsoon and some washed away by the rivers. Some new wetland sites (oxbow lakes) were also recorded. Most of the wetlands lie on the floodplain area of Rapti, Reu and Narayani Rivers. From the overall assessment (based on observation) only five sites was found in excellent condition, 13 out of 21 wetland sites of buffer zone are in good condition whereas nearly half of the wetlands inside the park are in poor condition requiring immediate management interventions. The most important interventions identified from field observation for wetland management include the removal of sediments mechanically (for 26 wetlands), removal of invasive species (for 21 wetlands), construction of check dams and proper outlet for channelizing water (for 3 wetlands). More detailed and continued studies with the physiochemical analysis of water and wetland diversity is necessary to ensure the functionality of these wetlands and for the effectiveness of the management actions to be undertaken.

I. Introduction

Chitwan National Park (CNP) was gazetted in 1973 and designated as UNESCO's world heritage site in 1984 on account of its outstanding universal value. The park lies in the Central Nepal with an area of 932 km² and a buffer zone of 750 km². The area represents an inner *doon* valley in the central *terai* between the Siwalik hills in the south and the Mahabharat hills to the north. The park encompasses a wide diversity of habitats and species within the altitudinal range between 110 and 850m asl. Approximately 70% area is covered by Sal (*Shorea robusta*) forest, the remaining being grassland and riverine forests including Narayani, Rapti and Reu river systems and numerous oxbow lakes, marshes, waterholes etc. Beeshazar and its associate lakes, a wetland of international importance is also within the park.

Wetlands in Chitwan National Park (CNP) plays a vital role to maintain biodiversity and also to provide a number of goods and services. Most importantly, these wetlands are a home to a variety of species of microbes, plants, insects, amphibians, reptiles, birds, fish and mammals. Wetlands have significant role for aquatic plants and animals including crocodiles, dolphin, rhinoceros, migratory birds, and turtle species. For avifauna they serve as breeding grounds, resting, roosting and feeding sites of migratory or non-migratory birds. Out of the 576 birds species found in Chitwan; 120 species are wetland dependent (Baral and Upadhyay, 2006). Wetlands also have recreational, historical, scientific and cultural values. In CNP, many visitors enjoy wetlands for various activities like bird watching, boating and photographing.

Wetlands richness depends on physical status and its productivity. This inventory reveals that most of the wetlands have undergone degradation including Devital, Sheratal, Sitamai ghol, Singetal and many others. This has a direct impact on wetland depended species that have started to move outside their habitats to human settlements

and thereby creating human-wildlife conflict. On the retaliation, three muggers known to have killed and one is suspected to be killed at local fish farm. The reason for the killing may be linked to the dispersal of mugger crocodile from natural wetlands into village fish ponds. More than 500 private fish ponds (300 ha) have been constructed in the Buffer Zone, this has become a potential attraction to the wetlands' fauna. Nine juvenile muggers were rescued from the local fish farm between July 2012 to December 2012 (Khadka, 2013) and 10 muggers also rescued from 21 June 2013 to 24 December 2013.

Wetlands were intact and well known some two decades ago such as Jayamangala Ghol, Ajinger Ghol, Gaurmachan Ghol and Singe Tal which have now degraded, dried up and converted to grassland due to succession. With this scenario, it is likely that wetlands such as Devital, Marchauli Ghol may also disappear within near future if the treats are not minimized. Almost all wetlands are undergoing natural succession due to sedimentation and rapid infestation by invasive species such as water hyacinth (Jal Kumbhi, *Eichornia crassipes*), water cabbage (Kumbhika, *Pistia stratiotes*), Karauti Jhar (*Leersia hexandra*), Beshram (*Ipomoea camea*), and Reed (Narkat, *Phragmites karka*). Management interventions in the wetlands including sediment removal, high check-dam construction in dry season and removal of alien invasive species are being practiced by the park authority. Making wise use of different invasive species are now being practiced in the buffer zone area such as water hyacinth being used for making handicrafts, biomass for bio-gas digester and as mulch for compost making.

Realizing the limited information on wetlands of Chitwan National Park and its biodiversity, a quick assessment of wetlands was carried out. This report highlights the major findings of the condition of wetlands of Chitwan National Park and its buffer zone.

2. Objective

The main aim of this study was to provide information on the status of wetlands in and around CNP. The specific objectives were as follows:

- provide information on the current status of wetlands
- provide the physical and biological characteristics of wetlands
- prescribe management intervention for protecting wetlands

3. Methods

3.1 Wetland sites and locations

A total of 83 sites were surveyed except the river and streams which also have a crucial role for the ecosystem functioning and regulating the biodiversity of the park. The survey sites included lakes (mostly permanent) both natural and man-made, Waterhole (ponds) and others such as marshes etc. Survey was carried out in both the core area and the buffer zone of the Chitwan. Following section gives the details of the wetland sites.

3.2 Literature review and information about wetland sites

Literatures on the wetlands of CNP were reviewed. Similarly, informal interviews/ discussions with the key informants having vast experience working with CNP were also carried out for the past and existing information of wetlands sites as well as their socio-cultural importance.

3.3 Data collection

Site visits and observations were carried out for each wetland site and secondary information was collected from a wide range of literature. A standard survey format (Annex -I) was developed in consultation with the related researchers and survey was carried out in December 2013.

Most of the wetlands were accessed on foot, while elephants were used to reach some inaccessible lakes, smaller natural waterholes/ghols, and swamps/marshes of CNP. Most of the information was collected by direct observation using a pair of 10x50 DPSI OLYMPUS DPSR binoculars. Photographs were taken through Canon PowerShot 5x40 HS. GPS location of each site was recorded. Areas and perimeters were estimated with the help of Google Earth.

3.4 Wetland classification

Wetlands were categorized by visual judgement in following parameters.

Category	Parameters	
	Siltation and rate of drying up	Cover of invasive species
Excellent	Very low	<5%
Good	Low	5-25%
Fair	Moderate	25-90%
Poor	Heavy	>90%

4. Results

From the survey, of the 83 wetlands mentioned above, few wetlands lie very close to each other and have similar characteristics and origin, which were merged together. Some wetlands in past have now converted into other habitats such as grassland, river or woodland were removed from the existing surveyed list. All the wetland sites formed by Khageri canal excluding the Bishazar was called Khageri lake complex. Thus the total number of wetland sites reduced to 58. The following table gives the summary and location of these wetland sites.

Type of wetland	BZ	NP	Total
Ghol	3	10	13
Lake	16	14	30
Waterhole	1	7	8
Other		7	7
Total	20	38	58

4.1 Accessibility to the wetlands

Two third of the wetlands are accessible through the roads whereas one third have no road access and could be reached by foot, elephant and/or boat. Average distance to the wetlands from the nearest guard post was 2.22 (\pm 1.67) km with maximum distance of 9km.

Accessibly through	BZ	NP	Grand Total
Boat		1	1
Vehicle	20	19	39
Walk	1	17	18
Total	21	37	58

4.2 Area of wetlands

All the surveyed wetland sites covered an area of 255.93¹ ha of which only five wetlands (Temple Tiger Ghol, Tamor Tal, Bishazar Tal, Batuli pokhari Tal and Budhi Rapti Ghol) were found to have an area more than 10 ha. There were 34 wetland sites having area more than a hectare. These wetlands (excluding rivers & streams), occupy less than 0.5% of the total park area. The value seems lower because rivers and streams were not included which have higher percentage of coverage as wetland sites.

Wetland Area	Number of sites
> 10 ha	5
1-10 ha	29
< 1 ha	24

4.3 Vegetation cover and condition of wetlands

Vegetation cover of wetlands has been the major concern. Many wetlands are infested by invasive plants and gradually undergoing loss and degradation and succession to grasslands. Out of assessed 58 wetlands, six wetlands do not have any open water surface (completely covered by the invasive species or grasses), 17 sites have less than 50% of its total area with open water. Fortunately 11 sites have 100% open water. Forty one percent of the wetland (n=58) sites have open water more than 50% with varying coverage from invasive and other plants.

¹ Five out of total 58 wetlands were either almost converted into grassland or too small to calculate the areas. So the figure is applicable for 53 wetlands only. The 5 wetlands are placed in <1 ha category.

Open water %	Number of wetland sites
0	6
1 - 50	17
>50%	35

From the overall assessment of the wetlands (based on field observation), only five sites including two from buffer zone and three from core area were found in excellent condition. Many wetlands of buffer zone were in good condition (13 out of 21) whereas nearly half of the wetlands inside the park were in poor condition which requires immediate management interventions to keep it as functional wetlands. Details of each wetland site are provided in Annex.

Count of Lake condition	BZ	NP	Total
Excellent	2	3	5
Good	13	7	20
Fair	4	15	19
Poor	2	12	14
Total	21	37	58

4.4 Major Threats

Siltation and drying and leading to succession were found to be the major threat to the most of

the wetlands in CNP. The other threats include invasive plants, fishing extraction and pollution. The other observed threats include, washing away by flood and wetland loss completely after drying.

Analysis of the threat due to invasive species found that *Mikania* was present in 38 sites followed by Water cabbage (*Pistia* sps) in 16 sites, Water hyacinth and Karaute both in 13 sites.

Invasive species	Number of sites
<i>Mikania</i>	38
Water hyacinth	13
Karaute	13
Water cabbage	16

4.5 Management Actions Required

From the field observation, the most appropriate action for the wetland management were mechanical removal of deposited sediments (26), removal of invasive species (21), check dam and outlet management (3) and water augmentation by diverting a stream (Icherny). For remaining wetlands immediate action for management is not required. The detail of the management action site wise is provided in annex.

Level of threat	Siltation	Invasive species	Conversion to grassland	Drying	Pollution	Fishing and other extraction
High	36	14	36	34	3	5
Medium	3	8	4	2	3	10
Low	10	26	7	9	1	5
No	9	10	11	13	51	38
Total	58	58	58	58	58	58

5. Conclusion

Survey of wetlands of CNP has given much information about the status and immediate management intervention required. The study has also enhanced our knowledge and understanding on wetlands of CNP. This study helps to prescribe management actions required to protect and conserve these wetlands. This study also provides baseline information on wetlands and also helps to seek financial resources to manage these wetlands to further preventing them to being degraded and loss on the long run.

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Site Information of Individual Wetlands

I. Bishazar Lake Photos



I. Bishazar Lake - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Bishazar Lake Altitude: 183 m
 Location: Bharandhabhar Nearest post: Bishazari
 Accessibility: Vehicle Distance from post: 200 m

SN	Longitude	Latitude
1	0247084	3057398
2	0247062	3057524
3	0247076	3057233
4	0247396	3057246

B. Physical description of the wetland

Total Area: 29.82ha. Area of open water (%): 75
 Perimeter: 14427.39m Depth: 10 feet
 Inlet (type): Khageri canal Outlet (type): Khageri canal
 Broad habitat type: 1. Sal forest 2. Invasive species 3. Mathe
 Specific habitat type: 1. Gandhe Jhar 2. Invasive species 3. Mathe
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Karkalo	Mugger Crocodile	Darter	Grey-headed Fish Eagle
2	Water Chestnut		Pond Heron	
3	Mathe		Bronze-winged Jacana	
4	Unknown		Cormorant	

Major Invasive species: 1. *Mikania* 2. Water Hyacinth 3. Karauti Jhar

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - low f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species 2. Removal of sedimentation
 3. Regulation of water inlets and outlets

F. Additional notes about the wetland:

Shrinking wetland area

2. Kamal Tal - Photos



2. Kamal Tal - Site Information

Recorder: B.B. Khadka

Date: 31st Dec. 2013

A. Location and general information

Name of the wetland: Kamal Tal Altitude: 142 m
 Location: East of Sukhibhar Nearest post: Sukhibhar
 Accessibility: Vehicle Distance from post: 1km

SN	Longitude	Latitude
1	0229141	3048438
2	0229446	3048685

B. Physical description of the wetland

Total Area: 4.12 ha Area of open water (%): 25
 Perimeter: 2979.93m Depth: 5 feet
 Inlet (type): None Outlet (type): None
 Broad habitat type: 1. Mixed forest 2. Sal forest
 Specific habitat type: 1. Tall swamp grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Dhaddi	Mugger Crocodile	Bronze- winged Jacana	
2	Neuro		White-breasted Waterhen	
3	Narkat			
4	Karkalo			
5	Mathe			
6	Badeher			

Major Invasive species: 1. Water cabbage 2. Water hyacinth 3. Karauti Jhar 4. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - low

E. Priority actions for wetland restoration

1. Excavation of sedimentation area 2. Removal of invasive species
 3. Management of outlet system

3. Budhi Rapti Ghol - Photos



3. Budhi Rapti Ghol - Site Information

Recorder: B.B. Khadka

Date: 31st Dec. 2013

A. Location and general information

Name of the wetland: Budhi Rapti Ghol Altitude: 131 m

Location: East of Bhimle Nearest post: Bhimle

Accessibility: Vehicle, Walk Distance: 2Km

SN	Longitude	Latitude
1	0225674	3050160
2	0224149	3049885
3	0224655	3049947
4	0224663	3049827
5	0224931	3049584

B. Physical description of the wetland

Total Area: 14.4 ha.

Area of open water (%): 90

Perimeter: 3954.2m

Depth: 15 feet

Inlet (type): None

Outlet (type): None

Broad habitat type:

1. Riverine forest 2. Swamp grassland

Specific habitat type:

1. Swamp grassland 2. Grassland meadow

Lake condition: (Excellent/Good/Fair/Poor): Excellent

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds
1	Narkat	Mugger Crocodile	Common Moorhen
2	Dhaddi		
3	Bader		
4	Neuro		
5	Non-Edible Fern		
6	Mathe		
7	Algal floating		
8	Unknown weeds		

Major Invasive species: 1. Water Cabbage 2. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - low

b. Invasive species - low

c. Conversion to grasslands - medium

d. Drying - low

e. Pollution - no

f. Fishing and other extraction - low

E. Priority actions for wetland restoration

1. Earth excavation at sedimentation area

2. Removal of invasive species

F. Additional notes about the wetland:

4. Bet-ghari Tal - Photos



4. Bet-ghari Tal - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Betghari Tal Altitude: 168 m
 Location: Bharandhabhar Nearest post: Debnagar
 Accessibility: Vehicle Distance: 7km
 Type of wetland: Lake (in present fish farming by community)
 History of the wetland: Wet meadow

SN	Longitude	Latitude
1	0248795	3060595

B. Physical description of the wetland

Total Area: 0.77ha. Area of open water (%): 100
 Perimeter: 505.17m Depth: 6 feet
 Inlet (type & no): Bharandhabhar catchment Outlet (type & no): Khageri canal
 Broad habitat type: 1. Sal forest
 Specific habitat type: 1. Short grass 2. Bushes
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Water Cabbage		Great Cormorant	G. headed Fish Eagle
2	Poison Jhar		Egret species	
3	Mathe			
4	Unknown weeds			

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low

E. Priority actions for wetland restoration

1. Removal of invasive species 2. Regulation of water sources

F. Additional notes about the wetland:

5. Tikauli Tal - Photos



5. Tikauli Tal - Site Information

Recorder: B.B. Khadka

Date: 13th Dec. 2013

A. Location and general information

Name of the wetland: Tikauli Tal Altitude: 173 m
 Location: Bharandhabhar Nearest post: Bharandhabhar
 Accessibility: Vehicle Distance from post: 2 km

SN	Longitude	Latitude
1	0251226	3058789
2	0251297	3058849
3	0251167	3059064
4	0251148	305906
5	0251186	3058855

B. Physical description of the wetland

Total Area: 5.72ha. Area of open water (%): 95
 Perimeter: 3230.87m Depth: 7 feet
 Inlet (type & no): None Outlet (type & no): Khageri canal
 Broad habitat type: I. Sal forest
 Specific habitat type: I. Sal forest
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Water Chesnut	Mugger Crocodile	Darter	Stork-billed Kingfisher
2	Unknown weeds		Pond Heron	
3			Great Cormorant	
4			Bronze winged Jacana	

Major Invasive species: 1. *Mikania* 2. Water Hyacinth 3. Water Cabbage

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low

E. Priority actions for wetland restoration

I. Removal of invasive species

F. Additional notes about the wetland:

6. Batuli Pokhari - photos



6. Batuli Pokhari - Site Information

Recorder: B.B. Khadka

Date: 12th Dec. 2013

A. Location and general information

Name of the wetland: Batuli pokhari (Reservoir)

Altitude: 156 m

Location: Bharandhabhar

Nearest post: Belsar

Accessibility: Vehicle

Distance from post: 2 km

SN	Longitude	Latitude
1	243099	3054037
2	0243111	3054166
3	0243170	3054210
4	0243147	3054237

B. Physical description of the wetland

Total Area: 20.96 ha.

Area of open water (%): 100

Perimeter: 6584.73m

Depth: 12 feet

Inlet (type & no): Khageri Irrigation canal

Outlet (type & no): None

Broad habitat type:

I. Sal forest

Specific habitat type:

I. Short grass

Lake condition: (Excellent/Good/Fair/Poor): Excellent

Wetland management: Not necessary

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds
1	Unknown weeds	Mugger Crocodile	L. Adjutant Stork
2			G. Cormorant
3			Little Cormorant
4			Darter
5			Pond Heron
6			Egret species

Major Invasive species: I. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - low

b. Invasive species - low

c. Conversion to grasslands - low

d. Drying - low

e. Pollution - low

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration

F. Additional notes about the wetland:

This wetland has been renovated for irrigation purposes

7. Bob Tal - Photos



7. Bob Tal - Site Information

Recorder: B.B. Khadka

Date: 18th Dec. 2013

A. Location and general information

Name of the wetland: Bob Tal Altitude: 175m
 Location: Bharandhabhar Nearest post: Khorsor
 Accessibility: Foot, Elephant Distance: 2km

SN	Longitude	Latitude
1	0248476	3054426
2	0248629	3054269

B. Physical description of the wetland

Total Area: 4.09ha. Area of open water (%): 100
 Perimeter: 3220.27m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: I. Sal forest
 Specific habitat type: I. Wet grass
 Lake condition: (Excellent/Good/Fair/Poor): Excellent
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Niuro	Mugger Crocodile		Common Kingfisher
2	Mathe			
3	Lahare Jhar			
4	Latre Jhar			
5	Unknown Weeds			

Major Invasive species: I. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - medium
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low

E. Priority actions for wetland restoration

I. Excavation in sedimentation area

F. Additional notes about the wetland:

8. Century Ghol - Photos



8. Century Ghol - Site Information

Recorder: B.B. Khadka

Date: 24th Dec. 2013

A. Location and general information

Name of the wetland: Century Ghol Altitude: 137m
 Location: Lamichaur Nearest post: Lamichaur
 Accessibility: Foot, Elephant, Vehicle Distance: 3km

SN	Longitude	Latitude
1	0219367	3056609
2	0219243	3057559

B. Physical description of the wetland

Total Area: 3.47 ha. Area of open water (%): 75
 Perimeter: 4005.8m Depth: 5 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest 2. Grassland swamp
 Specific habitat type: 1. Grassland swamp 2. Wet meadow
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Pater			
2	Unknown weeds			
3	Algal floating			
4	Hydrilla			

Major Invasive species: 1. Water hyacinth 2. *Mikania* 3. Karautijhar

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low

E. Priority actions for wetland restoration

1. Management of outlet system 2. Earthen Check-dam
 3. Removal of invasive weeds 4. Removal of sedimentation

F. Additional notes about the wetland:

Wetland is severely sedimented

9. Chandi Tal - Photos



10. Chepang Tal - Photos



II. Kalimati Tal - Photo



11. Kalimati Tal - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Kalimati Tal Altitude: 172m
 Location: Bharandhabhar Nearest post: Debnagar
 Accessibility: Vehicle, Foot Distance: 7km

SN	Longitude	Latitude
1	0248091	3060106

B. Physical description of the wetland

Total Area: 1.82ha. Area of open water (%): 90
 Perimeter: 1138.1m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): Khageri canal
 Broad habitat type: 1. Sal forest
 Specific habitat type: 1. Short grass 2. Bushes
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Unknown weeds			

Major Invasive species: 1. *Mikania* 2. Karuatijhar

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - medium c. Conversion to grasslands - low
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low
 g. Other (specify): Over disturbances

E. Priority actions for wetland restoration

1. Removal of invasive species 2. Regulate water flow

F. Additional notes about the wetland:

12. Kamero Matchan Ghol - Photos



13. Kingfisher Tal I - Photos



13. Kingfisher Tal I - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Kingfisher Tal -I Altitude: 173m

Location: Bharandhabhar Nearest post: Debnagar

Accessibility: Vehicle Distance: 1km

SN	Longitude	Latitude
1	0245350	3057440

B. Physical description of the wetland

Total Area: 5.5ha

Area of open water (%): 90

Perimeter: 3970.1m

Depth: 7 feet

Inlet (type & no): None

Outlet (type & no): Khageri canal

Broad habitat type:

1. Sal forest

Specific habitat type:

1. Short grass

Lake condition: (Excellent/Good/Fair/Poor): Good

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Poison grass	Mugger Crocodile	Darter	Stork-billed Kingfisher
2	Lahare Grass			Grey-headed headed fish Eagle
3	Unknown weeds			

Major Invasive species: 1. Water Hyacinth 2. Water Cabbage

D. Threats (High/Medium/Low/No)

a. Siltation - low

b. Invasive species - low

c. Conversion to grasslands - medium

d. Drying - low

e. Pollution - low

f. Fishing and other extraction - low

g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species

2. Regulation of water sources year around

F. Additional notes about the wetland:

14. Kuchkuche Ghol - Photos



14. Kuchkuche Ghol - Site Information

Recorder: B.B. Khadka

Date: 27th Dec. 2013

A. Location and general information

Name of the wetland: Kuchkuche Ghol Altitude: 189m

Location: Kathar Nearest post: Khagendramalli

Accessibility: Vehicle Distance: 3km

SN	Longitude	Latitude
1	0265151	3052583

B. Physical description of the wetland

Total Area: 0.028ha

Area of open water (%): 90

Perimeter: 63.35m

Depth: 2 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Mixed forest

Specific habitat type:

1. Bushes

Lake condition: (Excellent/Good/Fair/Poor): Fair

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1				

Major Invasive species: None

D. Threats (High/Medium/Low/No)

a. Siltation - low

b. Invasive species - low

c. Conversion to grasslands - low

d. Drying - medium

e. Pollution - low

f. Fishing and other extraction - medium

g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any)

1. Construction of concrete check-dam

F. Additional notes about the wetland:

15. Kumal Tal - Photos



16. Kumrose Ghol - Photos



16. Kumrose Ghol - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Kumrose Tal Altitude: 183m
 Location: Kumrose Nearest post: Janakpur
 Accessibility: Foot, Elephant Distance: 3km.

SN	Longitude	Latitude
1	0256790	3050884
2	0256213	3050584

B. Physical description of the wetland

Total Area: 0.10ha Area of open water (%): Swampy Ghol
 Perimeter: 200m Depth: 2 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest
 Specific habitat type: 1. Wet grass
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			

Major invasive species: 1. Mikania

D. Threats (High/Medium/Low/No)

a. Siltation -high b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - high e. Pollution - low f. Fishing and other extraction - high
 g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any)

1. Earth excavation 2. Earthen check-dam
 3. Divert some water from Rapti river to this wetland 4. Grazing control of domestic animals

F. Additional notes about the wetland:

17. Mayur Tal - photos



17. Mayur Tal - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Mayur Tal Altitude: 178m
 Location: Bharandhabhar Nearest post: Debnagar
 Accessibility: Vehicle Distance: 9 km.

SN	Longitude	Latitude
1.	0248856	3061685

B. Physical description of the wetland

Total Area: 0.45 ha. Area of open water (%): 90
 Perimeter: 621.3m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): Khageri canal
 Broad habitat type: 1. Sal forest
 Specific habitat type: 1. Short grass 2. Bushes
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Unknown weeds			

Major Invasive species: 1. Karauti Jhar

D. Threats (High/Medium/Low/No)

a. Siltation - no b. Invasive species - medium c. Conversion to grasslands - no
 d. Drying - no e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify): Picnic groups

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species 2. Regulation of water sources year around

F. Additional notes about the wetland:

18. Ratomate Tal - Photos



19. Niure Tal - Photos



19. Niure Tal - Site Information

Recorder: B.B. Khadka

Date: 14th Dec. 2013

A. Location and general information

Name of the wetland: Niure Tal Altitude: 100m
 Location: Bharandhabhar Nearest post: Debnagar
 Accessibility: Vehicle Distance: 2km

SN	Longitude	Latitude
1	0247029	3058551

B. Physical description of the wetland

Total Area: 1.82 ha. Area of open water (%): 90
 Perimeter: 1903.1m Depth: 7 feet
 Inlet (type & no): None Outlet (type & no): Khageri canal
 Broad habitat type: 1. Sal forest
 Specific habitat type: 1. Short grass
 Lake condition: Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Unknown weeds			

Major Invasive species: 1. *Mikania* 2. Water Cabbage

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - medium
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low
 g. Other (specify): From recreation purposes (picnic spot)

E. Priority actions for wetland restoration (if any)

1. Remove of invasive species 2. Regulation of water resources year around

F. Additional notes about the wetland:

20. Mushar Tal - Photos



20. Mushar Tal - Site Information

Recorder: B.B. Khadka

Date: 26th Dec. 2013

A. Location and general information

Name of the wetland: Mushar tal Altitude: 169m
 Location: Bagmara BCF Nearest post: Sauraha
 Accessibility: Vehicle Distance: 3km

SN	Longitude	Latitude
1	0251297	3054061
2	0251206	3053992

B. Physical description of the wetland

Total Area: 0.30 ha. Area of open water (%): 100
 Perimeter: 354.1m Depth: 5 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: I. Mixed forest
 Specific habitat type: I. Bushes
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Niuro	Mugger Crocodile		Grey-headed Fish Eagle
2	Latre Jhar			Common Kingfisher
3	Sete Grass			Stork-billed Kingfisher

Major Invasive species I. *Mikania*

D. Threats (High/Medium/Low/No)

- a. Siltation - high b. Invasive species - low c. Conversion to grasslands - low
 d. Drying - low e. Pollution - low f. Fishing and other extraction - low
 g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any)

- I. Excavate sediments

F. Additional notes about the wetland:

2I. Rapti Lok Tal - Photos



21. Rapti Lok Tal - Site Information

Recorder: B.B. Khadka

Date: 29th Dec. 2013

A. Location and general information

Name of the wetland: Rapti Lok Tal Altitude: 190m
 Location: Kathar Nearest post: Janakpur
 Accessibility: Vehicle Distance: 2Km

SN	Longitude	Latitude
1	0260828	3050996
2	0260846	3051029
3	0260624	3050967

B. Physical description of the wetland

Total Area: 4.01 ha Area of open water (%): 100
 Perimeter: 2539m Depth: 10 feet
 Inlet (type & no): Rapti water Outlet (type & no): Drain
 Broad habitat type: 1. Riverine forest swamp 2. Swamp grassland
 Specific habitat type: 1. Narkat swamp 2. Grassland meadow
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: No

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1			Red-wattled Lapwing	

Major Invasive species: None

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - low
 d. Drying - low e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any): None

F. Additional notes about the wetland:

This wetland is managed by Rapti Lok Kalyan Buffer zone community forest for aquaculture.

22. Sitamain Ghol - Photos



22. Sitamain Ghol - Site Information

Recorder: B.B. Khadka

Date: 15th Dec. 2013

A. Location and general information

Name of the wetland: Sitamain Ghol Altitude: 177m
 Location: Bharandhabhar Nearest post: Belsar
 Accessibility: Vehicle Distance: 2 km

SN	Longitude	Latitude
1	0241773	3053016
2	0241562	3052512
3	0241393	3052400
4	0241493	3052343

B. Physical description of the wetland

Total Area: 4.12ha. Area of open water (%): 90
 Perimeter: 2879.93m Depth: 7 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Sal forest
 Specific habitat type: 1. Short grass 2. Bushes
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Ajambari			
2	Water Chesnut			
3	Typha			
4	Mathe			
5	Latare Jhar			
6	Unknown weeds			

Major Invasive species: 1. Karauti Jhar

D. Threats (High/Medium/Low/No)

- a. Siltation - medium b. Invasive species – medium c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - low f. Fishing and other extraction: low
 g. Other (specify): From recreation purposes (from picnic spot)

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species 2. Regulation of water sources year around
 3. Removal of sedimentation

F. Additional notes about the wetland:

23. Chaperchuli Ghol - Photos



23. Chaparchuli Ghol - Site Information

Recorder: B.B. Khadka

Date: 29th Dec. 2013

A. Location and general information

Name of the wetland: Chaparchuli Ghol Altitude: 186m

Location: Chaparchuli Nearest post: Chaparchuli

Accessibility: Foot, Elephant Distance: 200m

SN	Longitude	Latitude
1.	0263596	3050263

B. Physical description of the wetland

Total Area: 0.022ha

Area of open water (%): No water

Perimeter: 61.65m

Depth:

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Riverine forest

Specific habitat type:

1. Narkat

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			
2	Jhaksi			
3	Bader			
4	Khadai			
5	Unknown weeds			

Major Invasive species: 1. *Mikania* 2. Karauti jhar

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - high

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Excavation of siltation area

2. Renovation of check-dam

F. Additional notes about the wetland:

24. Devi Tal - Photos



24. Devi Tal - Site Information

Recorder: B.B. Khadka

Date: 23th Dec. 2013

A. Location and general information

Name of the wetland: Devi Tal Altitude: 127m
 Location: Khorla Muhan Nearest post: Khorla Muhan
 Accessibility: Foot, Elephant, Vehicle Distance: 1km

SN	Longitude	Latitude
1	0217057	3049389
2	0216866	3049422

B. Physical description of the wetland

Total Area: 7.56ha Area of open water (%): 5
 Perimeter: 1611.1m Depth: 8 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest swamp
 Specific habitat type: 1. Tall grassland swamp
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Bader	Mugger crocodile	Purple Heron	G. headed Fish Eagle
2	Swamp tall grass		Common Morhen	
3	Mathe		B. winged Jacana	
4	Water Chesnut		Pond Heron	
5	Unknown Weeds			

Major Invasive species: 1. Water hyacinth 2. *Mikania* 3. Karauti Jhar

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species
2. Divert the Hati Marura Kholra through vegetative check dam

F. Additional notes about the wetland:

During monsoon season, water overflows through a gully. This gully needs to be controlled.

25. Dumariya Ghol - Photos



25. Dumariya Ghol - Site Information

Recorder: B.B. Khadka

Date: 10th Dec. 2013

A. Location and general information

Name of the wetland: Dumariya Ghol Altitude: 147m
 Location: North-west of Dumariya Nearest post: Dumariya
 Accessibility: Vehicle Distance: 1 km

SN	Longitude	Latitude
1	0243568	3051046
2	0243464	3051018

B. Physical description of the wetland

Total Area: 0.97ha. Area of open water (%): 100
 Perimeter: 720.86m Depth: 8 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest swamp 2. Tall grass swamp
 Specific habitat type: 1. Swamp grassland
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1			Pond Heron	
2			Darter	

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - medium
 d. Drying - low e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of sedimentation 2. Removal of invasive species

F. Additional notes about the wetland:

26. Gaindakhasa Ghol - Photo



26. Gainda Khasa Ghol - Site Information

Recorder: B.B. Khadka

Date: 23th Dec. 2013

A. Location and general information

Name of the wetland: West of Temple Tiger Altitude: 99m

Location: Gaindakhasa Ghol Nearest post: Temple Tiger

Accessibility: Foot, Elephant, Vehicle Distance: 3km

SN	Longitude	Latitude
1	0208117	3049594
2	0208000	3049595

B. Physical description of the wetland

Total Area: 3.83ha

Area of open water (%): 75

Perimeter: 3999.1m

Depth: 1-2 feet

Inlet (type & no): Kukurni Khola

Outlet (type & no): None

Broad habitat type:

1. Mixed forest 2. Wet meadow

Specific habitat type:

1. Wet meadow

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			
2	Bader			
3	Tall grass			

Major Invasive species: None

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - no

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earthen Check-dam

F. Additional notes about the wetland:

27. Gaurmachan - Photos



27. Gaurmachan Ghol

Recorder: B.B. Khadka

Date: 10th Dec. 2013

A. Location and general information

Name of the wetland: Gaurmachan Ghol Altitude: 159m
 Location: Charahara. Nearest post: Dumariya
 Accessibility: Vehicle Distance: 2 km

SN	Longitude	Latitude
1	0246413	3049977
2	0246120	2050145

B. Physical description of the wetland

Total Area: Area of open water (%): No water
 Perimeter: Depth:
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine habitat 2. Wet meadow
 Specific habitat type: 1. Narkat grass wet meadow
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Need numerous earthen check dam at different locations 2. Excavation of sediment
 3. Removal of invasive species

F. Additional notes about the wetland:

28. CJL Ghol - Photos



28. CJL Ghol - Site Information

Recorder: B.B. Khadka

Date: 29th Dec. 2013

A. Location and general information

Name of the wetland: CJL Ghol Altitude: 203m
 Location: CJL Nearest post: Khagendramalli
 Accessibility: Foot, elephant Distance: 2km

SN	Longitude	Latitude
1	0266443	3050358
2	0266375	3050314

B. Physical description of the wetland

Total Area: 0.49 ha. Area of open water (%): 10
 Perimeter: 284.7m Depth: 2 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest swamp 2. Sal forest
 Specific habitat type: 1. Narkat swamp 2. Grassland meadow
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			
2	Jhaksi			
3	Bader			
4	Khadai			
5	Mathe			
6	Unknown plants			

Major Invasive species: 1. Water Cabbage 2. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - high
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Excavation of sediments 2. Renovation of check-dam

F. Additional notes about the wetland:

During CJL hotel operation ten individuals of mugger and no. of wetland dependent species were noted but after hotel shutdown, wetland degraded displacing many species.

29. Icharni Ghol Complex - I - Photos



29. Icharni Ghol Complex -I - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Itcharni Complex -I Altitude: 167m

Location: Itcharni Nearest post: Sauraha

Accessibility: Foot, Elephant Distance: 3km

SN	Longitude	Latitude
I	0255059	3049988

B. Physical description of the wetland

Total Area: 0.012ha

Area of open water (%): <10

Perimeter: 55.05m

Depth: Wet ground

Inlet (type & no):

None

Outlet (type & no):

None

Broad habitat type:

1. Riverine habitat

2 Wet meadow

Specific habitat type:

1. Tall grass

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
I				

Major Invasive species: None

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - no

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - high

g. Other (specify): Over disturbances

E. Priority actions for wetland restoration (if any)

1. Earth excavation

2. Earthen check-dam required

3. Diversion of Dhungre Khola with inlet and outlet system

F. Additional notes about the wetland:

30. Bob Tal (Complex 2) Photos



30. Bob Tal (Complex 2) - Site Information

Recorder: B.B. Khadka

Date: 18th Dec. 2013

A. Location and general information

Name of the wetland: Bob Tal (Complex 1) Altitude: 164m

Location: Bharandhabhar BZ

Nearest post: Khorsor

Accessibility: Foot, Elephant

Distance: 1km

SN	Lat.	Long.
1.	0249305	3054216

B. Physical description of the wetland

Total Area: 0.350143

Area of open water (%): 10

Perimeter: 285.432217

Depth: 4 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Sal forest swamp

Specific habitat type:

1. Wet grass 2. Wetter ground

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Niuro			
2	Poison weeds			
3	Unknown weeds			

Major Invasive species: 1. *Mikania*

2. Water Hyacinth

D. Threats (High/Medium/Low/No)

a. Siltation -high

b. Invasive species - high

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - low

f. Fishing and other extraction - high

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation in sedimentation area

2. Construct check dam with proper outlet system

3. Removal of invasive species

F. Additional notes about the wetland :

31. Kabre Tal - Photos



31. Kabre Tal - Site Information

Recorder: B.B. Khadka

Date: 22nd Dec. 2013

A. Location and general information

Name of the wetland: KabreTal

Altitude: 106m

Location: South of Bagmara

Nearest post: Bagmara

Accessibility: Foot, Elephant

Distance: 1km

SN	Longitude	Latitude
1	0219815	3050461
2	0219747	3050378

B. Physical description of the wetland

Total Area: 0.54 ha.

Area of open water (%): 75

Perimeter: 521.95m

Depth: 10 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Mixed forest swamp 2. Tall grassland swamp

Specific habitat type:

1. Wet grassland swamp

Lake condition: (Excellent/Good/Fair/Poor): Good

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Bader	Mugger crocodile		
2	Karkalo			
3	Nartkat			
4	Niuro			
5	Mathe			
6	Pater			
7	Water Chesnut			
8	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - medium

b. Invasive species - medium

c. Conversion to grasslands - high

d. Drying - low

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species

2. Excavation of siltation

F. Additional notes about the wetland:

32. Khagendra Malli Ghol - Photos



32. Khagendra Malli Ghol - Site Information

Recorder: B.B. Khadka

Date: 29th Dec. 2013

A. Location and general information

Name of the wetland: Khagendramalli Ghol Altitude: 210m
 Location: Khagendramalli Nearest post: Khagendramalli
 Accessibility: Foot, Elephant Distance: 2km

SN	Longitude	Latitude
1	0267326	3051359
2	0267176	3051312
3	0266843	3051216

B. Physical description of the wetland

Total Area: 0.6ha Area of open water (%): 90
 Perimeter: 734.5m Depth: 2 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest 2. Grassland
 Specific habitat type: 1. Grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		White-breasted Waterhen	
2	Jhaksi		Common Morhen	
3	Mathe		Lesser Whistling Duck	
4	Unknown plants		Gadwall	
5			Cinnamon Bittern	

Major Invasive species: 1. *Mikania* 2. Karautijhar

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - low c. Conversion to grasslands - medium
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - high
 g. Other (specify): about 3/4th of the water dries out in post monsoon season

E. Priority actions for wetland restoration (if any)

1. Construction of numerous check - dam 2. Earth excavation at sedimentation area
 3. Removal of invasive species

F. Additional notes about the wetland:

33. Laguna Tal - Photos



33. Laguna Tal - Site Information

Recorder: B.B. Khadka

Date: 10th Dec. 2013

A. Location and general information

Name of the wetland: Laguna Tal Altitude: 160m
 Location: West of Jarnali Nearest post: Jarneli
 Accessibility: Vehicle Distance: 1 km

SN	Longitude	Latitude
1	0241754	3050530
2	0241680	3050532
3	0241674	3050569

B. Physical description of the wetland

Total Area: 0.19 ha. Area of open water (%): 60
 Perimeter: 213.4m Depth: 2 feet
 Inlet (type & no): Ghol of Jarneli
 Outlet (type & no): None
 Broad habitat type: 1. Riverine forest swamp 2. Sal forest
 Specific habitat type: 1. Tall grass swamp
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			
2	Bader			
3	Mathe			
4	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Sedimentation excavation 2. Removal of aquatic weeds and invasive species
 3. Renovation of leaching point of wetland 4. Extension of high earthen check-dam

F. Additional notes about the wetland:

34. Lami Tal - Photos



34. Lami Tal - Site Information

Recorder: B.B. Khadka

Date: 9th Dec. 2013

A. Location and general information

Name of the wetland: Lami Tal Altitude: 144m
 Location: East of Kasara Nearest post: Ghatgain
 Accessibility: Vehicle Distance: 200m

SN	Longitude	Latitude
1	0238914	3050634
2	0239236	3050813
3	0239198	3050855
4	0238907	3050690

B. Physical description of the wetland

Total Area: 2.95ha. Area of open water (%): 90
 Perimeter: 1861.9m Depth: 10 feet
 Inlet (type & no): None
 Outlet (type & no): None
 Broad habitat type: I. Riverine forest
 Specific habitat type: I. Swamp
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Mugger crocodile	Bronze- winged Jacana	Brown fish Owl
2	Water Chesnut		Common Moorhen	
3	Water Cabbage		Lesser Whistling Duck	
4	Hydrilla		Darter	
5			Snipe species	
6			Heron & Egret spp.	

Major Invasive species: 1. Water Cabbage 2. *Mikania*

D. Threats (High/Medium/Low/No)

- a. Siltation - medium b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

- I. Earth excavation at sedimentation area

F. Additional notes about the wetland:

Plantation of fast growing species is urgent in this wetland for restoring breeding colony of Asian Openbill.

35. Lamo Tal - Photos



35. Lamo Tal - Site Information

Recorder: B.B. Khadka

Date: 22th Dec. 2013

A. Location and general information

Name of the wetland: Lamo Tal Altitude: 120m
 Location: Khorla muhan Nearest post: Khorla muhan
 Accessibility: Vehicle Distance: 2km

SN	Longitude	Latitude
1	02178803	3050560
2	0219367	3050423

B. Physical description of the wetland

Total Area: 0.87 ha. Area of open water (%): 75
 Perimeter: 1335.95m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Mixed forest 2 Tall grassland swamp
 Specific habitat type: 1. Tall grassland swamp 2. Wet grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Niuro	Mugger Crocodile		
2	Bader			
3	Tall Grass			
4	Mathe			
5	Unknown weeds			

Major Invasive species: 1. *Mikania* 2. Water Cabbage

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - medium c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation in sedimentation area 2. Construction of strong check dam
 3. Removal of invasive species

F. Additional notes about the wetland:

36. Liglige Ghol - Photos



36. Liglige Ghol - Site Information

Recorder: B.B. Khadka

Date: 28th Dec. 2013

A. Location and general information

Name of the wetland: Liglige Ghol Altitude: 221 m
 Location: Liglige Nearest post: Liglige
 Accessibility: Foot, Elephant Distance: 1 km

SN	Longitude	Latitude
1	0273550	3049804
2	0273474	3050109
3	0273405	3050284

B. Physical description of the wetland

Total Area: 1.34ha Area of open water (%): 100
 Perimeter: 1574.80m Depth: 1 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest 2. Grassland
 Specific habitat type: 1. Grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		White-breasted Waterhen	
2	Jhaksi		Green sandpiper	
3	Pater			
4	Unknown weeds			

Major Invasive species: 1. *Mikania* 2. Water Hyacinth

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - high
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Check -dam should be construct with inlet/outlet system
 2. Earth excavation from the bottom of ghol

F. Additional notes about the wetland:

37. Mayur Ghol - Photos



37. Mayur Ghol - Site Information

Recorder: B.B. Khadka

Date: 10th Dec. 2013

A. Location and general information

Name of the wetland: Mayur Ghol

Altitude: 170m.

Location: East of Dumariya

Nearest post: Dumariya

Accessibility: Vehicle

Distance: 3km

SN	Longitude	Latitude
1	0246821	3050460

B. Physical description of the wetland

Total Area:

Area of open water (%):

Perimeter:

Depth:

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Grassland habitat

Specific habitat type:

1. Saccharum grass

2. Invasive species

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1				

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - low

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - no

g. Other (specify): flooding by Rapti river

E. Priority actions for wetland restoration (if any):

Urgent renovation of wetland is necessary

F. Additional notes about the wetland:

38. Martchauli Ghol - Photos



38. Marchauli Ghol - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Marchauli Ghol Altitude: 168m
 Location: Padampur Nearest post: Sauraha
 Accessibility: Foot, elephant Distance: 3km

SN	Longitude	Latitude
1	0252068	3050068

B. Physical description of the wetland

Total Area: 0.53 ha. Area of open water (%):
 Perimeter: 781.43m Depth:
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Grassland habitat 2. Narkat grass
 Specific habitat type: 1. Narkat Grass 2. Invasive species
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Excavation of siltation area 2. Earthen vegetative check-dam

F. Additional notes about the wetland:

39. Mardi Ghol - Photos



39. Mardi Ghol - Site Information

Recorder: B.B. Khadka

Date: 25th Dec. 2013

A. Location and general information

Name of the wetland: Mardi Ghol Altitude: 131

Location: Bandarjhula Nearest post: Bandarjhula

Accessibility: Foot, Elephant, Boat

Distance: 2km

SN	Longitude	Latitude
1	0222297	3057325

B. Physical description of the wetland

Total Area: 3 ha.

Area of open water (%): 25

Perimeter: 2927.57m

Depth: 3 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

I. Riverine forest

Specific habitat type:

I. Grassland

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1			Asian Openbill	
2			Ruddy Shelduck	

Major Invasive species: None

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - no

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - medium

g. Other (specify): Affected by Narayani flood

E. Priority actions for wetland restoration (if any)

I. Construction of earthen Check dam at different location of ghol is needed

F. Additional notes about the wetland:

Over siltation by Narayani flood

40. Munda Tal - Photos



40. Munda Tal - Site Information

Recorder: B.B. Khadka

Date: 22th Dec. 2013

A. Location and general information

Name of the wetland: MundaTal Altitude: 121m
 Location: South of Bagmara Post Nearest post: Bagmara
 Accessibility: By vehicle Distance: 1km

SN	Longitude	Latitude
1	0220381	3050689
2	0220111	3050586

B. Physical description of the wetland

Total Area: 1.68 ha. Area of open water (%): 100
 Perimeter: 982.5m Depth: 13 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: I. Mixed forest
 Specific habitat type: I. Wet grassland
 Lake condition: (Excellent/Good/Fair/Poor): Excellent
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Bader	Mugger crocodile	Darter	Kingfisher Species
2	Unknown weeds			

Major Invasive species: I. Mikania

D. Threats (High/Medium/Low/No)

- a. Siltation - low b. Invasive species - medium c. Conversion to grasslands - low
 d. Drying - low e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify): Outlet broken

E. Priority actions for wetland restoration (if any)

- I. Maintain proper outlet system in the west part of lake

F. Additional notes about the wetland:

41. Nanda Bhauju Tal - Photos



41. Nanda Bhauju Tal - Site Information

Recorder: B.B. Khadka

Date: 31th Dec. 2013

A. Location and general information

Name of the wetland: Nanda Bhauju Tal Altitude: 123m

Location: Bhimle Nearest post: Bhimle

Accessibility: Vehicle, Walk Distance: 500m

SN	Longitude	Latitude
1	0223878	3050910
2	0223711	3050915

B. Physical description of the wetland

Total Area: 0.6ha.

Area of open water (%): 90

Perimeter: 502.7m

Depth: 4 feet

Inlet (type & no): None

Outlet (type & no): Yes

Broad habitat type:

1. Mixed forest 2. Grassland swamp

Specific habitat type:

1. Grassland swamp 2. Grassland meadow

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		Pond Heron	Grey-headed Fish eagle
2	Jhaksi			
3	Bader			
4	Neuro			
5	Gandhe Jhar			
6	Algal floating			
7	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - low

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - medium

g. Other (specify): Severely sedimentation

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area

2. Construction of earthen check dam

3. Removal of invasive species

4. Construction of proper outlet system

F. Additional notes about the wetland:

Wetland is gradually converting into swampy ghol/grassland due sedimentation.

42. Nandan Tal - Photos



42. Nandan Tal - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Nandan Tal Altitude: 185m
 Location: Padampur Nearest post: Bhimpur
 Accessibility: Foot, Elephant Distance: 4km

SN	Longitude	Latitude
1	0250392	3048812
2	0250364	3048830
3	0240412	3048757

B. Physical description of the wetland

Total Area: 0.35 ha. Area of open water (%): 100
 Perimeter: 423.3m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Sal forest 2. Swamp
 Specific habitat type: 1. Swamp 2. Wet grass
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Turtle species		
2	Bader			
3	Kande Karkalo			
4	Beth			
5	Non edible fern			
6	Latare grass			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

- a. Siltation - low b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - low e. Pollution - no f. Fishing and other extraction - medium
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Excavation of siltation
2. Earthen check-dam in different location of lake should be constructed

F. Additional notes about the wetland:

43. Patan/Garud Tal - Photos



43. Patna/Garud Tal - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Patna/Garud Tal Altitude: 168m

Location: Padampur. Nearest post: Bhimpur

Accessibility: Foot, elephant Distance: 2km

SN	Longitude	Latitude
1	0252823	3049417
2	0253078	3049349

B. Physical description of the wetland

Total Area: 8.8 ha.

Area of open water (%): 40

Perimeter: 1559.4m

Depth: 3 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

I. Marsh

Specific habitat type:

I. Marsh

Lake condition: (Excellent/Good/Fair/Poor): Fair

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		Common Coot	
2	Mathe		Tufted Duck	
3			Lesser Adjutant	
4			Asian Openbill	
5			Purple Heron	
6			Egrets species	

Major Invasive species: 1. *Mikania* 2. Karauti jhar

D. Threats (High/Medium/Low/No)

a. Siltation - medium

b. Invasive species - low

c. Conversion to grasslands - high

d. Drying - medium

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Construction of check-dam

F. Additional notes about the wetland:

44. Chisapani (Niure) Ghol - Photos



44. Chisapani (Niure) Ghol - Site Information

Recorder: B.B. Khadka

Date: 9th Dec. 2013

A. Location and general information

Name of the wetland: Niure/Chisapani Ghole Altitude: 161m

Location: West of Kasara

Nearest post: Kasara

Accessibility: Vehicle

Distance: 2km

SN	Longitude	Latitude
1	0234352	3049881
2	0234352	3049893
3	0234365	3049901
4	0234480	3049678

B. Physical description of the wetland

Total Area: 2.28 ha.

Area of open water (%): 10

Perimeter: 822.8m

Depth: 1 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Mixed forest 2. Sal forest 3. Swamp

Specific habitat type:

1. Swamp 2. Wet meadow

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Bader			
2	Karkalo			
3	Neuro			
4	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - high

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - medium

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Numerous check - dam should be construct in different locations

F. Additional notes about the wetland:

This wetland is being converted to grassland.

45. Sapanawoti Ghol - Photos



45. Sapanawoti Ghol - Site Information

Recorder: B.B. Khadka

Date: 30th Dec. 2013

A. Location and general information

Name of the wetland: Sapanawoti Ghol Altitude: 138m

Location: Amalia Nearest post: Bankatta

Accessibility: Vehicle, Foot Distance: 3Km

SN	Longitude	Latitude
1	0232818	3044687
2	0231834	3045187

B. Physical description of the wetland

Total Area: Area of open water (%): 90

Perimeter: Depth: 1 feet

Inlet (type & no): None Outlet (type & no): None

Broad habitat type: 1. Riverine forest swamp

Specific habitat type: 1. Swamp bushes 2. Grassland meadow

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Karkalo		Ruddy Shelduck	
2	Narkat		Red-wattled Lapwing	
3	Jhaksi			
4	Mathe			
5	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - low

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - medium

f. Fishing and other extraction - high

g. Other (specify): Over grazing and heavy anthropogenic pressure.

E. Priority actions for wetland restoration (if any)

1. Earth excavation at bottom of ghol

2. Construction of earthen check dams

3. Removal of weeds

F. Additional notes about the wetland:

This wetland lies near to the Amalia village, so its proper management helps for species as well as for irrigation purposes to local people.

46. Shera Tal - Photos



46. Shera Tal - Site Information

Recorder: B.B. Khadka

Date: 31th Dec. 2013

A. Location and general information

Name of the wetland: Sera Tal Altitude: 134m
 Location: Dhurba Nearest post: Dhurba
 Accessibility: Vehicle Distance: 2km

SN	Longitude	Latitude
1	023001	3050808
2	0230773	3050280
3	0231816	3050560

B. Physical description of the wetland

Total Area: 5.74ha. Area of open water (%): 25
 Perimeter: 4366.45m Depth: 10 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Mixed forest 2. Sal forest
 Specific habitat type: 1. Marsh
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Neuro	Mugger Crocodile		
2	Narkat			
3	Karkalo			
4	Kande karkalo			
5	Unknown weeds			

Major Invasive species: 1. Karautijhar 2. Water Hyacinth 3. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - medium
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area 2. Removal of invasive species
 3. Earthen check-dam at different location

F. Additional notes about the wetland:

This wetland is severely affected by Karauti Jhar and Water hyacinth needs urgent renovation.

47. Suksuke Ghol - Photos



47. Suksuke Ghol - Site Information

Recorder: B.B. Khadka

Date: 31th Dec. 2013

A. Location and general information

Name of the wetland: Suksuke Ghol Altitude: 134m
 Location: Sukhibhar Nearest post: Sukhibhar
 Accessibility: On foot, by elephant Distance: 3km

SN	Longitude	Latitude
1	0226014	3049190
2	0226383	3049138

B. Physical description of the wetland

Total Area: 3.19 ha. Area of open water (%): 60
 Perimeter: 4780.6m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Mixed forest 2. Tall grass marsh
 Specific habitat type: 1. Tall grass marsh 2. Grassland meadow
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Mugger Crocodile	Darter	
2	Bader			
3	Dhaddi			
4	Unknown weeds			

Major Invasive species: 1. Water Cabbage 2. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - medium c. Conversion to grasslands - high
 d. Drying - low e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify): about 40% water area is covered by water cabbage

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area 2. Removal of invasive species

F. Additional notes about the wetland:

48. Tamor Tal - Photos



48. Tamor Tal - Site Information

Recorder: B.B. Khadka

Date: 9th Dec. 2013

A. Location and general information

Name of the wetland: Tamor Tal Altitude: 165m
 Location: South of Kasara Nearest post: Kasara
 Accessibility: Vehicle Distance: 3km

SN	Longitude	Latitude
1	0236133	3048090
2	0236210	3047984
3	0236802	3048247
4	0236943	3048163

B. Physical description of the wetland

Total Area: 14.12ha. Area of open water (%): 60
 Perimeter: 2687.8m Depth: 8 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Sal forest 2. Swamp grassland
 Specific habitat type: 1. Tall grass 2. Aquatic weeds
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Unknown weeds	Mugger crocodile	Bronze-winged Jacana	G.H. Fish Eagle
2	Water chesnut		Darter	
3			Pond Heron	
4			Common Morhen	

Major Invasive species: 1. Water Cabbage

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - low e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species 2. Removal of sedimentation

F. Additional notes about the wetland :

West part of this lake is severely silted and being converted to grassland.

49. Temple tiger Ghol - Photos



49. Temple tiger Ghol - Site Information

Recorder: B.B. Khadka

Date: 23th Dec. 2013

A. Location and general information

Name of the wetland: Temple tiger Ghol Altitude: 123m
 Location: Temple Tiger Nearest post: Temple Tiger
 Accessibility: Foot, Elephant, Vehicle Distance: 500m

SN	Longitude	Latitude
1	0211406	3049306
2	0211277	3049341

B. Physical description of the wetland

Total Area: 8.15 ha. Area of open water (%): 75
 Perimeter: 3421.42 Depth: 10 feet
 Inlet (type & no): Forest catchment water Outlet (type & no): No, natural flow
 Broad habitat type: 1. Riverine forest swamp 2. Tall grass swamp
 Specific habitat type: 1. Tall grassland swamp 2. Wet meadow
 Lake condition: (Excellent/Good/Fair/Poor): Excellent
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Ajambari	Mugger Crocodile	Common Morhen	Grey-headed fish eagle
2	Jhaksi		Bronze-winged Jacana	
3	Narkat		Lesser Whistling Duck	
4	Dhaddi		Darter	
5	Algal float		Cormorant spp.	
6	Unknown weeds		Heron & Stork spp.	

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

- a. Siltation - low b. Invasive species - low c. Conversion to grasslands - low
 d. Drying - low e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify): South and west part of this Ghol is severely siltation by Muhan Khola

E. Priority actions for wetland restoration (if any)

1. Earthen check-dam for regular water flow 2. Removal of sedimentation
3. Divert Muhana Khola in monsoon season

F. Additional notes about the wetland:

This is very productive wetland and habitat of several types of wetland depended species as well as for flagship species of CNP.

50. Thapaliya Tal - Photo



50. Thapaliya Tal - Site Information

Recorder: B.B. Khadka

Date: 9th Dec. 2013

A. Location and general information

Name of the wetland: Thapaliya Tal Altitude: 163m
 Location: West of Kasara Nearest post: Kasara
 Accessibility: Vehicle Distance: 3km

SN	Longitude	Latitude
1	0234407	3049103
2	0234269	3049081
3	0234306	3049045
4	0234427	3049082

B. Physical description of the wetland

Total Area: 0.53 ha. Area of open water (%): 90
 Perimeter: 313.06m Depth: 3 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Sal forest 2. Swamp
 Specific habitat type: 1. Swamp 2. Wet grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Saccharum			
2	Algae			
3	Unknown weeds			

Major Invasive species: None

D. Threats (High/Medium/Low/No)

- a. Siltation - medium b. Invasive species - no c. Conversion to grasslands - medium
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - no
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

- Increase depth of wetland
- Should maintain proper outlet system

F. Additional notes about the wetland:

51. Thotari Tal - Photos



51. Thotari Tal - Site Information

Recorder: B.B. Khadka

Date: 31th Dec. 2013

A. Location and general information

Name of the wetland: Thotari Tal

Altitude: 134m

Location: South of Sukhibhar

Nearest post: Sukhibhar

Accessibility: By Vehicle

Distance: 1km

SN	Longitude	Latitude
1	0228442	3048104

B. Physical description of the wetland

Total Area: 0.69 ha

Area of open water (%): 25

Perimeter: 383.27m

Depth: 3 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Mixed forest 2. Sal forest

Specific habitat type:

1. Tall grassland

Lake condition: (Excellent/Good/Fair/Poor): Fair

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Dhaddi			
2	Unknown weeds			

Major Invasive species: 1. Water Cabbage

2. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - medium

b. Invasive species - high

c. Conversion to grasslands - high

d. Drying - medium

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify): water covered by water cabbage and brown algal

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area

2. Removal of water cabbage and algal floating species

F. Additional notes about the wetland:

52. Simara Ghol - Photos



52. Simara Ghol - Site Information

Recorder: B.B. Khadka

Date: 30th Dec. 2013

A. Location and general information

Name of the wetland: Simara Ghol Altitude: 143m
 Location: Bote simara Nearest post: Bote simara
 Accessibility: Vehicle, Walk Distance: 1Km

SN	Longitude	Latitude
1	0233272	3043374
2	0237443	3042130

B. Physical description of the wetland

Total Area: Area of open water (%): 90
 Perimeter: Depth: 1 feet
 Inlet (type & no): None
 Outlet (type & no): None
 Broad habitat type: 1. Riverine forest 2. Grassland swamp 3. Bush swamp
 Specific habitat type: 1. Grassland swamp 2. Grassland meadow 3. Wet meadows
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Latre Grass			
2	Kans			
3	Unknown weeds			

Major Invasive species: 1. *Mikania*

D. Threats (High/Medium/Low/No)

a. Siltation - high b. Invasive species - medium c. Conversion to grasslands - high
 d. Drying - high e. Pollution - medium f. Fishing and other extraction - high
 g. Other (specify): Over grazing and heavy pressure of people.

E. Priority actions for wetland restoration (if any)

1. Earth excavation 2. Construction of earthen check dam is necessary

F. Additional notes about the wetland:

This wetland lies near to village settlements proper management helps both for wildlife and for irrigation

53. Singhe Tal - Photos



53. Singhe Tal - Site Information

Recorder: B.B. Khadka

Date: 23th Dec. 2013

A. Location and general information

Name of the wetland: Singhe Ghol Altitude: 125m
 Location Saili Maile Khola Nearest post: Saili Maile Khola
 Accessibility: Foot, Elephant, Vehicle Distance: 1km

SN	Longitude	Latitude
1	0213972	3049344
2	0213944	3049250

B. Physical description of the wetland

Total Area: 5.38ha. Area of open water (%): 5
 Perimeter: 1190.74m Depth: 2 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Mixed forest 2. Sal forest 3. Swamp
 Specific habitat type: 1. Swamp 2. Wet meadow grassland 3. Wetter ground
 Lake condition: (Excellent/Good/Fair/Poor): Poor
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Mugger crocodile	Purple Heron	
2	Bader		Black Stork	
3	Jhaksi		Woolly-necked Stork	
4	Unknown weeds		Lesser Adjutant Stork	
5			Green Sandpiper	
6			Pond Heron	

Major Invasive species: 1. Water hyacinth 2. *Mikania*

D. Threats (High/Medium/Low/No)

- a. Siltation - high b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - high e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Construction of earthen check-dam 2. Removal of sedimentation and invasive species

F. Additional notes about the wetland:

54. Kharkatta Ghol - Site Photos



54. Kharkatta Ghol - Site Information

Recorder: B.B. Khadka

Date: 31th Dec. 2013

A. Location and general information

Name of the wetland: Kharkatta Ghol

Altitude: 134m

Location: East of Surung Khola

Nearest post: Surung Khola

Accessibility: Foot

Distance: 2 km

SN	Longitude	Latitude
1	0225526	3047964

B. Physical description of the wetland

Total Area: 1.58ha.

Area of open water (%): 100

Perimeter: 1259.18m

Depth: 3 feet

Inlet (type & no): None

Outlet (type & no): None

Broad habitat type:

1. Riverine swamp forest

2. Sal forest

Specific habitat type:

1. Swamp grassland

Lake condition: (Excellent/Good/Fair/Poor): Fair

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		Ruddy Shelduck	
2	Dhaddi		Common morhen	
3	Unknown weeds		Red-wattled Lapwing	
4			Green sandpiper	

Major Invasive species:

D. Threats (High/Medium/Low/No)

a. Siltation - medium

b. Invasive species - no

c. Conversion to grasslands - high

d. Drying - medium

e. Pollution - no

f. Fishing and other extraction - low

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area through mechanical instruments

F. Additional notes about the wetland:

55. Harabansa Ghol - Photos



55. Harabansa Ghol - Site Information

Recorder: B.B. Khadka

Date: 31st Dec. 2013

A. Location and general information

Name of the wetland: Harbansa Ghol Altitude: 134m
 Location: West of Sukhibhar Nearest post: Sukhibhar
 Accessibility: Walk Distance: 3 km

SN	Longitude	Latitude
1	0226664	3050590

B. Physical description of the wetland

Total Area: 3.7 ha Area of open water (%): 10
 Perimeter: 1818 m Depth: 6 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine swamp 2. Sal forest
 Specific habitat type: 1. Swamp grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Mugger crocodile	Purple heron	
2	Pater		Asian Openbill	
3	Unknown weeds		Green Sandpiper	

Major Invasive species: 1. Water hyacinth

D. Threats (High/Medium/Low/No)

- a. Siltation - medium b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - high
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation at sedimentation area 2. Removal of invasive species

F. Additional notes about the wetland:

56. Rapti Ghol - Photos



56. Rapti Ghol - Site Information

Recorder: B.B. Khadka

Date: 31st Dec. 2013

A. Location and general information

Name of the wetland: Rapti Ghol Altitude: 173m
 Location: Belhattha, Jagatpur Nearest post: Kasara
 Accessibility: Vehicle Distance: 2 km

SN	Longitude	Latitude
1	0233912	3052059
2	0233491	3051399
3	0234200	3051912

B. Physical description of the wetland

Total Area: 4.64 ha. Area of open water (%): 10
 Perimeter: 3808.1m Depth: 7 feet
 Inlet (type & no): None
 Outlet (type & no): None
 Broad habitat type: I. Riverine forest
 Specific habitat type: I. Grassland
 Lake condition: (Excellent/Good/Fair/Poor): Fair
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat	Mugger Crocodile	Lesser Whistling-duck	Stork-billed Kingfisher
2	Unknown weeds		Bronzed-winged Jacana	
3			Common Morhen	
4			Brown Crake	
5			Dater	
6			Heron and Egret species	

Major Invasive species: 1. *Mikania* 2. Water Hyacinth

D. Threats (High/Medium/Low/No)

a. Siltation - medium b. Invasive species - high c. Conversion to grasslands - high
 d. Drying - medium e. Pollution - no f. Fishing and other extraction - medium
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of invasive species 2. Regulation of water sources year around

F. Additional notes about the wetland:

57. Martchauli Marsh - Photos



57. Marchauli Marsh - Site Information

Recorder: B.B. Khadka

Date: 17th Dec. 2013

A. Location and general information

Name of the wetland: Marchauli marsh (new) Altitude: 163

Location: Old Padampur. Nearest post: Sauraha

Accessibility: Walk, Elephant Distance: 3km

SN	Longitude	Latitude
1	0252134	3049228
2	0252134	3049228

B. Physical description of the wetland

Total Area: Area of open water (%): 100

Perimeter: Depth: 1 feet

Inlet (type & no): None Outlet (type & no): None

Broad habitat type: 1. Riverine habitat 2. Narkat grass swamp

Specific habitat type: 1. Wet meadow grass 2. Narkat grass swamp

Lake condition: (Excellent/Good/Fair/Poor): Poor

Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1				

D. Threats (High/Medium/Low/No)

a. Siltation - high

b. Invasive species - Medium

c. Conversion to grasslands - high

d. Drying - high

e. Pollution - no

f. Fishing and other extraction - no

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Earth excavation

2. High Earthen check-dam

F. Additional notes about the wetland:

58. Temple Tiger 2 no. Ghol - Photos



58. Temple Tiger - 2 Ghol - Site Information

Recorder: B.B. Khadka

Date: 23rd Dec. 2013

A. Location and general information

Name of the wetland: Temple tiger 2 no. Ghol Altitude: 123m
 Location: West of Saili Maile Khola Nearest post: Saili Maile
 Accessibility: Foot, Elephant, Vehicle Distance: 2km

SN	Lat.	Long.
1.	0213336	3049105
2.	0212928	3049090

B. Physical description of the wetland

Total Area: 49.38 ha. Area of open water (%): 60
 Perimeter: 9341.2m Depth: 5 feet
 Inlet (type & no): None Outlet (type & no): None
 Broad habitat type: 1. Riverine forest swamp 2. Swamp grassland
 Specific habitat type: 1. Swamp tall grassland 2. Meadow grassland
 Lake condition: (Excellent/Good/Fair/Poor): Good
 Wetland management: Yes

C. Major flora and fauna observed during survey

SN	Flora	Aquatic fauna	Aquatic birds	Birds
1	Narkat		Common Moorhen	Grey -headed Fish Eagle
2	Bader			
3	Unknown weeds			

D. Threats (High/Medium/Low/No)

a. Siltation - low b. Invasive species - low c. Conversion to grasslands - high
 d. Drying - low e. Pollution - no f. Fishing and other extraction - low
 g. Other (specify):

E. Priority actions for wetland restoration (if any)

1. Removal of sedimentation area 2. Removal of encroached tall grass

F. Additional notes about the wetland:

PART-II
POPULATION STATUS OF MUGGER CROCODILE
(*Crocodylus palustris*) IN CNP

Table of Contents

	Page No.
Executive Summary	
1. Background	130
2. Objective	131
3. Study area	132
4. Methodology	133
5. Result and discussion	134
6. Conclusion	137
References	138
Glossary	139
Annexs	141

Executive Summary

This Study was carried out to assess the population status and threats to mugger crocodile (*Crocodylus palustris*) in Chitwan National Park (CNP) and its Buffer Zone (BZ). The field survey was conducted in March 2014. Total 245 mugger crocodiles were recorded from Rapti River (44), Narayani River (38), lakes, marshes and waterholes of CNP (77), and BZ of CNP (86). Some sections of Narayani and Rapti rivers and some buffer zone's wetland is facing high and diverse anthropogenic pressure. The wetlands of core area have comparatively lower anthropogenic pressure. The principal threats to the Mugger crocodile are habitat destruction, sedimentation, food shortage and seasonal fluctuation of water level. The size and depth of the lakes inside and outside are shrinking due to high rate of invasion by alien invasive species such as water hyacinth (Jal Kumbhi, *Eichornia crassipes*), water cabbage (Kumbhika, *Pistia stratiotes*), Karauti Jhar (*Leersia hexandra*) etc. Detail and regular study on water quality and wetland diversity is required to ensure the functionality of these wetlands. This also provides crucial information for timely and effective management actions. Conservation awareness program within the vicinity of CNP, private fish farm communities is necessary. Moreover, rapid response team should be established to rescue mugger crocodile entering into the fish ponds and settlement area to prevent attacks to human, economic loss of local people and retaliatory killings. Conservation and proper management of the wetlands are urgent necessity for better habitat of crocodile.

I. Background

Among the 23 species of crocodylian within its 4 families, only two species, Mugger crocodile (*Crocodylus palustris* Lesson; hereafter mugger) and Gharial (*Gavialis gangeticus*) occur in Nepal. Muggers at smaller sizes often eat aquatic insects, small fish and crustaceans, and as they grow larger they tend to eat more vertebrates, including fish, turtles, birds and mammals (Wagle 2010). Mugger crocodile is a semi-aquatic, keystone and top carnivore of slow flowing freshwater ecosystem and performs a vital service in the aquatic ecosystem by distributing the nutrients throughout the water body resulting an increment in the primary production and fish population (Mulozoki 2000). Mugger crocodiles have several features that differentiate them from other crocodiles. They have the broadest snout of any member of their genus. They generally reach maturity between 1.7 and 2.6 meters between the ages of six to ten years. The Mugger is a hole-nesting species, with egg-laying taking place during the annual dry season. Females become sexually mature at approximately 1.8 - 2m body length and lay 25-30 eggs (Whitaker & Whitaker 1989). Mugger crocodile is principally restricted to the Indian subcontinent where it may be found in various freshwater habitat types including rivers, lakes, and marshes (Whitaker 1987, Whitaker & Whitaker 1989). It is listed as a vulnerable species in the IUCN Red list and is protected by law in all the countries of its occurrence (Whitaker 1987). Historically, Mugger crocodile was relatively common throughout the Terai of Nepal in marshy lakes, ponds and small rivers (Groombridge 1982).

Mugger crocodile (*Crocodylus palustris*)

Common Names: Mugger, marsh crocodile, swamp crocodile

Range: Iran, India, Nepal, Pakistan, Sri Lanka, Bangladesh, Bhutan, Myanmar

Principal threats: Habitat destruction, fragmentation, and transformation, mortality due to increased fishing activities.

Modification of the habitats by river disruption and damming and mortality in fisheries operations are major causes of range and population decline (McEachern 1994). Reduction of wetland areas, deposition of silt and sediments, eutrophication, deterioration of water quality, construction of dams and other anthropogenic factors are responsible for its population decline in Nepal (Shrestha 2001). Estimated 200 wild muggers in Nepal in 1993 (Andrews and McEachern 1994). Current status and threats to muggers in Nepal is poorly understood. Periodic assessment of physiochemical parameters of water is crucial to maintain functional aquatic ecosystem and understand composition, abundance and distribution of aquatic flora and fauna. Understanding the population status and identifying the threats to determine the vulnerability is foremost step to start conservation measures for a species.

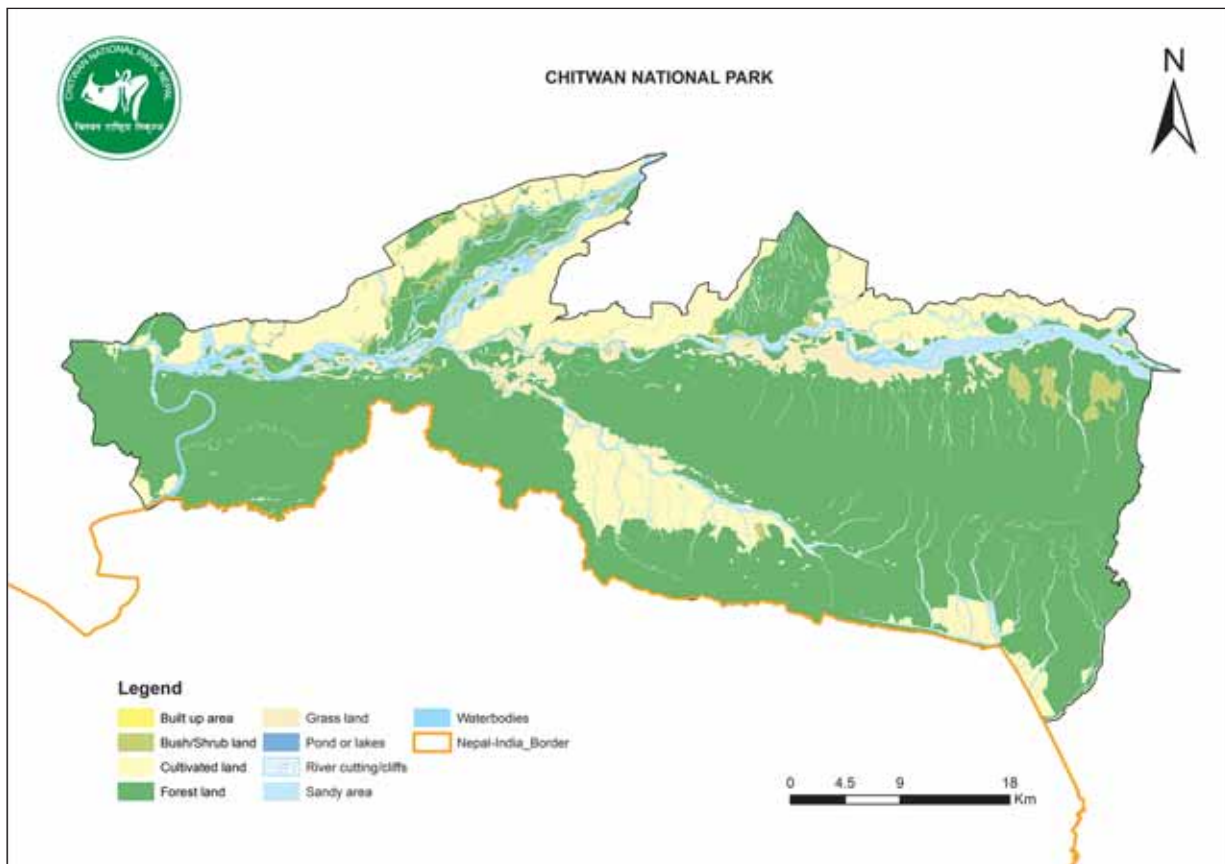
2. Objective

The aim of this study was to find distribution, population status and threats of mugger crocodile in Chitwan National Park and its buffer zone area.

3. Study area

The study was carried out in Chitwan National Park and its Buffer zone and its associate lakes which was listed as globally important Ramsar site in 2003 on account of its outstanding universal value. It also hosts large numbers of migratory or non-migratory birds. Chitwan National Park is one of the natural world heritage sites (UNESCO), situated in south central Nepal, covering 932 km² core and 750 km² buffer zone in the sub-tropical lowlands of the inner Terai (27°30'N 84°20'E). It has a subtropical monsoonal climate with relatively high humidity (2100 mm).The park has wide diversity of species and habitats within the elevation range from 110 to 850 masl. More

than 70% of the park is covered by Sal (*Shorea robusta*) forest, about 20% covered by floodplain grasslands, 7% riverine forest and 3 % includes other forests, riverbeds etc. It is habitat for about 70 species of mammals, more than 576 species of birds, 49 species of reptiles and amphibians and more than 120 species of fishes. The park is drained by three major rivers-Narayani, Rapti and Reu. The three major river systems and other more than 58 wetland sites including Bishazar lake complex (Ramsar site) in and around Chitwan National Park makes it a good habitat for many reptiles and amphibians.



4. Methodology

The survey was conducted in the month of March, 2014. Direct observation method was used for total count of mugger crocodile. Total numbers of individual mugger crocodiles were counted in each site during peak basking time assuming that all individuals comes out from water for basking. The age size classes and their habitat parameters were recorded by the experienced observer. For the observation and photographic purpose 10x50 DPSI OLYMPUS DPSR binoculars and Canon PowerShot 5x40 HS cameras were used respectively. Dugout canoes were used to conduct surveys on rivers while observation was done from vantage point or elephant back on ponds, lakes and marshes. They bask on land during day time in post winter and pre-summer month of March for longer period on sun due to mild temperature, providing high chances for sighting. The survey was conducted from 8:30 am to 11:00 am in morning and from 3:45 pm to 5:00 pm in afternoon, avoiding the midday hot sun during which they stay in water. Only directly sighted animals were recorded. Trained local youths and the citizen scientists were used for field survey in addition to the trained staff of CNP.

Similarly, informal interview/discussion with the key informants having long experience in Chitwan National Park was conducted to design field survey and understand the past and present issues of muggers & wetland habitats. Site visit and observation was carried out in each wetland site based on the information from the key informants, literature review and also with the personal knowledge and experience. A standard survey format was developed to record mugger and habitat parameters during field survey consulting with the researchers and academicians.

Age class used in this survey

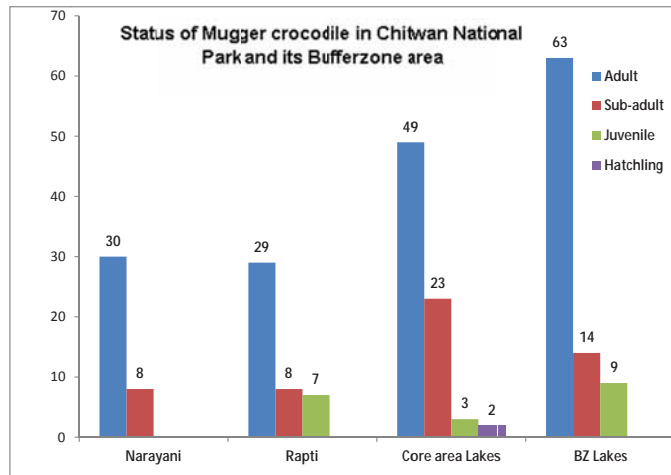
Age class	Description
Hatchling	<30cm. (of age < 1 year)
Yearling	> 30 - <50cm. (of age of 1 to 2years)
Juvenile	>50 - <125 cm. (of age of >2 years)
Sub adult	>125 - <180 cm.(of age 4-10 years)
Adult	>180 cm. (>10 years)

(Khadka et al, 2014)



5. Result and discussion

A recent survey of wetland in CNP has recorded 58 natural wetland sites including lakes, ponds, and marshes or ghols excluding three major rivers, streams and waterholes. Muggers were recorded from 37 of these wetland sites and two rivers i.e. Rapti and Narayani including their tributaries. The muggers are found widely distributed in CNP but distribution was patchy correlating with the number and quality of the wetland sites. They are not limited only to natural wetlands, even found in the artificial pond in between rainy to winter season and eventually they get back to natural wetlands in dry season due to low availability of water, food and nesting site.



In Chitwan National Park and its Buffer zone area, a total of 245 mugger crocodiles including 171 adults, 53 sub-adults, 19 juveniles and 2 yearlings were recorded during survey. A high number of muggers (86) were recorded from the wetlands of buffer zone which makes 35% of total mugger population. In spite of our expectation, no sign of mugger could be found in Reu River.

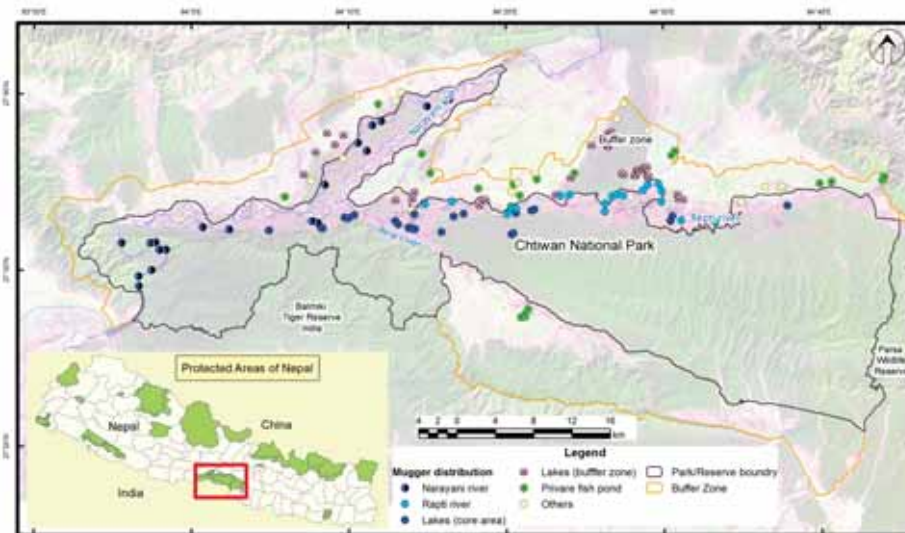
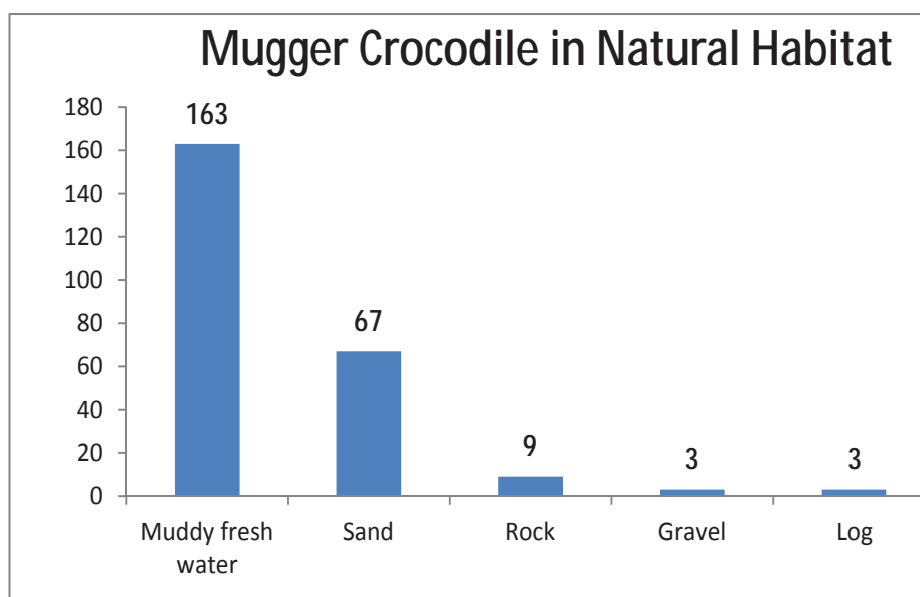


Figure 1: Distribution of Mugger crocodile in Chitwan National Park and Buffer zone area.

Site location	Adult	Sub-adult	Juvenile	Yearling	Total
Narayani	30	8			38
Rapti	29	8	7		44
CNP lakes	49	23	3	2	77
BZ lakes	63	14	9		86
Total	171	53	19	2	245



Distribution pattern of mugger crocodile

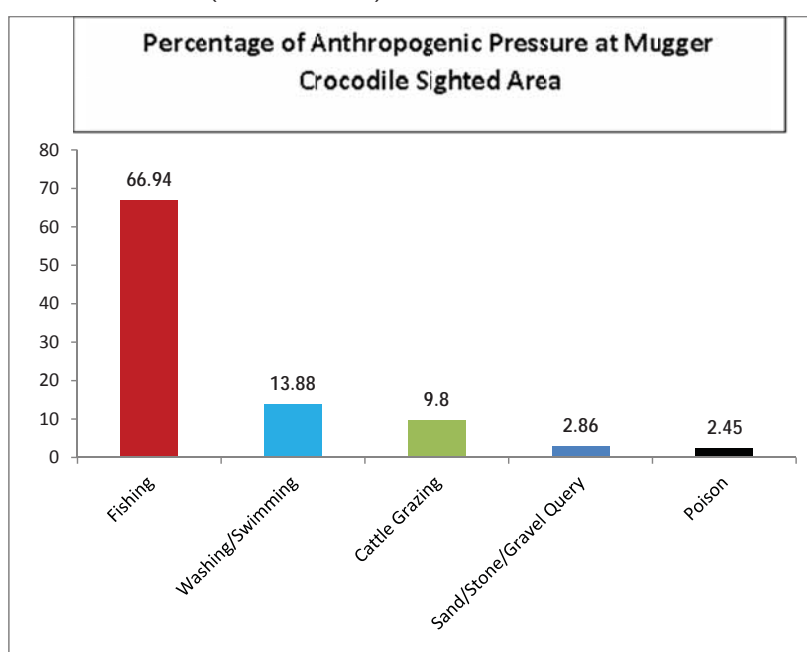
Presently in Nepal, mugger crocodile is confined in Chitwan and Bardia National Parks and Koshi Tappu and Sukhlaphanta Wildlife Reserves. The results of a 1993 survey indicated that the muggers were restricted to protected habitats in isolated populations in Mahakali, Karnali, Babai, Rapti/Narayani and Koshi (Andrews and McEachern 1994).

The number of Muggers recorded on lentic water (lakes, marshes, ponds) was much higher (66.5% of total records) than in lotic water (river/streams).

This shows the preference of mugger towards lentic ecosystem.

During this study, it was recorded that the Mugger crocodile found on rock were only adults. Logs are preferred by the sub adults and juvenile. Mugger prefers highly the stagnant muddy freshwater found mainly in core lakes and buffer zone lakes.

Unlike gharials which avoid human disturbance, Muggers are tolerant to anthropogenic pressure. Fishing and other human disturbance activities were also recorded from most of the mugger sighting places. More than two thirds of the mugger crocodile sighted place was found to be disturbed



by the fishing activities. Highly destructive human disturbances like mining and poisoning were found at few sites (2.25%) of the Mugger sighted area.

Kumbika (*Pistia* spp.) and Jalkumbhi (*Eichornia* spp.) were major invasive species present on the places where mugger was recorded. The Narayani river habitat of mugger sighted area has not been affected by any of these invasive species while the habitats in core area lakes and Buffer zone lakes have been severely affected by these invasive species.

Threats

Almost all wetlands are found shrinking due to sediment deposition and dense encroachment

of alien invasive species such as water hyacinth (Jalkumbhi, *Eichornia crassipes*), water cabbage (Kumbhika, *Pistia stratiotes*), Karauti grass (*Leersia hexandra*), Besharm (*Ipomoea carnea*) etc. The close observation reveals that the severely affected wetlands of CNP due to these reasons are Devital, Sheratal, Sitamaighol, and Singe tal. Thus, muggers are moving outside the park to village fish ponds resulting increased retaliatory killing by local fish farmers. More than 500 private fish ponds (300 ha) are in the buffer zone/vicinity of park. These ponds are potential food source for the muggers.

6. Conclusion

This study was carried out for preparing baseline information of population status and threats to mugger crocodile (*Crocodylus palustris*) in CNP and its Buffer zone area. The study found that, the total 245 numbers of mugger crocodiles were recorded from rivers of Rapti, Narayani and lakes, marshy land and waterholes of core area of CNP and its Buffer zone areas. Out of the 245 individuals, highest 86 (35.10%) individual muggers were recorded from buffer zone followed by 77 (31.43%) individuals in core area of CNP lakes, marshy land and waterholes, and 44 (17.96%) from Rapti and 38 (15.51%) from Narayani Rivers.

The Narayani and Rapti River and some buffer zone wetland face comparatively higher anthropogenic pressure than wetlands of core area of CNP. The principal threats to the Mugger crocodile include water pollution, habitat destruction, sedimentation, food shortage and seasonal fluctuation of water level. The size and depth of

the lakes inside and outside are shrinking due to dense encroachment of alien invasive species such as water hyacinth (Jal Kumbhi, *Eichornia crassipes*), water cabbage (Kumbhika, *Pistia stratiotes*), Karauti Jhar (*Leersia hexandra*) etc. Detail and continuous study of the physiochemical analysis of water and wetland diversity is required to ensure the functionality of these wetlands and the effective management actions. Effective campaigns of conservation awareness program within the vicinity of CNP, private fish farm communities and also establish mugger crocodile rescue team for the reduction of human attacks should be initiated to save its population in CNP. Under this situation, conservation and proper management of the wetlands are urgent necessity for better habitat of crocodile. Mugger crocodile is a predatory apex species in the wetland ecosystem but it has been kept in overshadows compared with other terrestrial flagship species in conservation.



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Glossary

Abundance:	The number of organisms in a population
Anthropogenic:	of, relating to, or resulting from the influence of human beings on nature
Bask:	lie exposed to warmth and light, typically from the sun, for relaxation and pleasure
Biodiversity:	The number and variety of different organisms found within a specified geographic region.
Biogas digester:	A biogas digester, also known as a methane digester, is a piece of equipment which can turn organic waste into usable fuel
Composition:	the combination of parts or elements that make up something
Crustacean:	any of various types of animal that live in water and have a hard outer shell
Distribution:	Arrangement or spatial pattern of a species over its habitat
Doon:	The Doon Valley is an unusually wide, long valley within the Shivalik Hills in the Lower Himalayas
Ecosystem:	a biological community of interacting organisms and their physical environment
Eutrophication:	The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish. Eutrophication is a natural, slow-aging process for a water body, but human activity greatly speeds up the process.
Floodplain:	an area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding
Hatchling:	a young animal that has recently emerged from its egg
Invasive species:	A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health
Keystone species:	A keystone species is a plant or animal that plays a unique and crucial role in the way an ecosystem functions. Without keystone species, the ecosystem would be dramatically different or cease to exist altogether
Lake:	A lake is a large body of water that is surrounded by land. The lake is made up of three key elements: lake basin, later water, and substances in the water.
Lake Complex:	A group of many different lakes lying close to each other and having similar characteristics
Leach:	To remove or remove from by the action of a liquid passing through a substance
Lentic:	Pertaining to or living in still water
Marsh/Ghol:	An area of low-lying land that is usually saturated with water and is dominated by herbaceous rather than woody plants
Microhabitat:	A habitat that is of small or limited extent and which differs in character from some surrounding more extensive habitat
Mulch:	Mulch is a layer of material applied to the surface of an area of soil. Its purpose is to conserve moisture or to improve the fertility and health of the soil
Oxbow lake:	A crescent-shaped lake formed when a meander of a river or stream is cut off from the main channel
Physiochemical:	Relating to physiological chemistry

Pond:	A pond is a body of standing water, either natural or artificial, that is usually smaller than a lake
Primary production:	Primary production is the synthesis of new organic material from inorganic molecules such as H ₂ O and CO ₂
Ravine:	A small narrow steep-sided valley that is larger than a gully and smaller than a canyon and that is usually worn by running water
Relocation:	To move to or establish in a new place
Retaliatory killing:	Killing, as an act of revenge
Riverbed:	The channel bottom of a stream or river
Roost:	A place where winged animals, especially birds or bats, rest or sleep; the act of doing so
Sedimentation:	The natural process in which material (such as stones and sand) is carried to the bottom of a body of water and forms a solid layer
Siltation:	Siltation is the pollution of water by fine particulate terrestrial clastic material, with a particle size dominated by silt or clay. It refers both to the increased concentration of suspended sediments, and to the increased accumulation (temporary or permanent) of fine sediments on bottoms where they are undesirable
Succession:	The gradual and orderly process of change in an ecosystem brought about by the progressive replacement of one community by another until a stable climax is established
Swamp:	A swamp is any wetland dominated by woody plants
Vegetation cover:	Percentage of ground surface covered by vegetation
Vulnerable:	Susceptible to physical or emotional attack or harm.
Vulnerable species:	A vulnerable species is one which has been categorized by the International Union for Conservation of Nature as likely to become endangered unless the circumstances threatening its survival and reproduction improve
Water augmentation:	The transfer of water from one source to another for the purpose of maintaining or raising the water level of a surface water body
Waterhole:	A waterhole is a depression in the ground in which water can collect, especially one that is regularly drunk from by animals
Wetland:	A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem
Yearling:	An animal that is one year old or has not completed its second year

Annexes

Annex - I - Survey Format

Survey of Wetland of Chitwan National Park, 2013

Site ID:

Recorder (s):

Date:

A. Location and general information

Name of the wetland:

GPS of 4 corners

Altitude

Location:

Nearest post:

S.N.	Wpt.	Lat.	Long.

Accessibility:

Distance:

Type of wetland:

History of the wetland:

B. Physical description of the wetland

Total Area

Area of open water (%):

Perimeter:

Depth:

Inlet (type & no):

Outlet (type & no):

Broad habitat type: 1.

2. 3.

Specific habitat type: 1.

2. 3.

Lake condition (Excellent/Good/Fair/Poor):

Wetland management:

C. Major native flora and fauna

S.N.	Flora	Emergent/Submerged	Aquatic fauna	Aquatic birds	Birds
1					
2					
3					
4					
5					
6					

Major Invasive species: 1.

2.

3.

4.

D. Threats (High/Medium/Low/No)

a. Siltation

b. Invasive species

c. Conversion to grasslands

d. Drying

e. Pollution

f. Fishing and other extraction

g. Other (specify):

E. Priority actions for wetland restoration (if any)

1.

2.

3.

4.

F. Additional notes about the wetland

Annex -II - The wetland list

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
1	Bishazar Tal	Bharandhabhar	Bishazari	0.2	Vehicle	Lake	lake (formed after the construction of Khageri irrigation canal)	247084	3057398
2	Bet-ghari Tal	Bharandhabhar	Devnagar	7	Vehicle	Lake	Wet meadow, developed as lake	248795	3060595
3	Tikauli Tal	Bharandhabhar	Bharandhabhar	2	Vehicle	Lake	Wet meadow, handed over to CF in 2007 & developed as lake by CF	251226	3058789
4	Kamal Tal	East of Sukibhar	Sukibhar	1	Vehicle	Permanent lake	Permanent lake (oxbow origin)	229141	3048438
5	Bishazari Tal c-1	Bharandhabhar	Bharandhabhar	0.5	Vehicle	Temporary wet meadow	Permanent wet meadow (oxbow origin)	250684	3057926
6	Bishazari Tal c-2	Bharandhabhar	Bharandhabhar	0.3	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	250342	3057715
7	Bishazari Tal c-3	Bharandhabhar	Bharandhabhar	0.5	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	249679	3057825
8	Bishazari Tal c-4	Bharandhabhar	Bharandhabhar	0.6	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	249439	3057908
9	Bishazari Tal c-5	Bharandhabhar	Bharandhabhar	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	249088	3057746
10	Bishazari Tal c-6	Bharandhabhar	Bharandhabhar	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	248933	3057653
11	Bishazari Tal c-7	Bharandhabhar	Bharandhabhar	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	248878	3057611
12	Bishazari Tal c-8	Bharandhabhar	Bharandhabhar	2	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	248628	3057494
13	Bishazari Tal c-9	Bharandhabhar	Bharandhabhar	2	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	248464	3057392

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
14	Bishazari Tal c-10	Bharandhabhar	Bharandhabhar	2	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	248242	3057321
15	Bishazari Tal c-11	Bharandhabhar	Bharandhabhar	2	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	247659	3057131
16	Bishazari Tal c-12	Bharandhabhar	Bishazari	0.5	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	247180	3057168
17	Bishazari Tal c-13	Bharandhabhar	Bishazari	0.5	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	247130	3057168
18	Bishazari Tal c-14	Bharandhabhar	Bishazari	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	246600	3057589
19	Bishazari Tal c-15	Bharandhabhar	Bishazari	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	244600	3057378
20	Bishazari Tal c-16	Bharandhabhar	Bishazari	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	246069	3057050
21	Bishazari Tal c-17	Bharandhabhar	Bishazari	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	245843	3057124
22	Bishazari Tal c-18	Bharandhabhar	Devnagar	1	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	245623	3057091
23	Bishazari Tal c-19	Bharandhabhar	Devnagar	0.3	Vehicle	Temporary wet meadow	Permanent wet meadow(oxbow origin)	245151	3056745
24	Batuli Pokhari	Bharandhabhar	Belsar	2	Vehicle	Permanent lake	Temporary wet meadow and lake formed after dam construction by CF)	243099	3054037
25	Bob Tal	Bharandhabhar	Khosor	2	Walk	Permanent lake	Wet meadow, handed over to BCF, developed as lake by CF	248476	3054426
26	Bob Tal-I	Bharandhabhar	Khosor	1	Walk	Temporary wet meadow	Permanent wet meadow(oxbow origin)	249305	3054216
27	Century Ghol	Lamichaur	Lamichaur	3	Vehicle	Permanent marshy ghol	Permanent water ghol(oxbow origin)	219367	3056609

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
28	Chandi Tal	Bharandhabhar	Devnagar	3	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	243727	3054595
29	Chepang Tal	Bharandhabhar	Bharandhabhar	2	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	251313	3059096
30	Kalimati Tal	Bharandhabhar	Devnagar	7	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	248091	3060106
31	Kamero Matchan Ghol	Lamichaur	Lamichaur	2		Ghol	Temporary wet meadow handed over to BCF, develop as permanent Ghol	215943	3054368
32	Kingfisher - I	Bharandhabhar	Devnagar	1	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	245350	3057440
33	Kingfisher - 2	Bharandhabhar	Devnagar	0.8	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	245341	3057254
34	Kingfisher - 3	Bharandhabhar	Devnagar	0.5	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	245354	3057166
35	Kuchkuche ghol	Kathar	Khagendra malli	3	Vehicle	Flowing stream	Flowing Ghol	265151	3052583
36	Kumal Tal	Bharandhabhar	Bharandhabhar	0.2	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	250474	3057362
37	Kumrose	Kumrose	Janakpur	3	Vehicle	Swampy Ghol	Permanent Ghol	256213	3050584

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
38	Mayur Tal	Bharandhabhar	Devanagar	9	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	248856	3061685
39	Ratomate Tal	Bharandhabhar	Devanagar	5	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	247441	3058807
40	Neure Tal	Bharandhabhar	Devanagar	2	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	247029	3058551
41	Mushar Tal	Bagmara BCF	Sauraha	3	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	251297	3054061
42	Rapti Lok Tal -1	Kathar	Janakpur	2	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	260828	3050996
43	Rapti Lok Tal -2	Kathar	Janakpur	2	Vehicle	Lake	Temporary wet meadow handed over to BCF, develop as permanent lake	260992	3051059
44	Sitamain Ghol	Patihani	Belsar	2	Vehicle	Lake	Temporary wet meadow, BCF develops as permanent lake	241562	3052512
45	Budhi Rapti Ghol	Bhimle	Bhimle	2	Vehicle	Ghol	Ghol	224655	3049947
46	Chaparchuli Ghol	Chaparchuli	Chaparchuli	0.2	Walk	Wet grassland	Ghol	263596	3050263
47	Devi Tal	Khoriyamuhan	Khoriyamuhan	1	Vehicle	Lake	Lake	217057	3049389
48	Dumre Ghol	Dumarya	Dumariya	1	Walk	Ghol	Ghol	243568	3051046
49	Gaindakhasa Ghol	Gaindakhasa	Temle tiger	3	Walk	Waterhole	Bigger Ghol	208000	3049595

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
50	Gaurmatchan Ghol	Charahara	Dumariya	2	Vehicle	Wet meadow	Permanent Ghol	246413	3049977
51	CJL Ghol	Khagendra Mali	Khagendra mali	2	Walk	Wet meadow	Permanent Ghol	266443	3050358
52	Itcharni complex-1	Itcharni	Sauraha	3	Walk	Wet meadow	Permanent Ghol	255059	3049988
53	Itcharni complex-2	Itcharni	Sauraha	2	Walk	Wet meadow	Permanent Ghol	254043	3051121
54	Jamuna Ghol	Banderjhula	Kujauli	1	Walk	Nayayani Bhangalo	Water Ghol	227964	3061600
55	Kabre tal	Bagmara, west of Tiger Top	Bagmara	1	Walk	Lake	Lake	219815	3050461
56	Khagendra Mali Ghol	Khagendra Mali	Khagendra mali	2	Walk	Water Ghol	Water Ghol	267326	3051359
57	Laguna Tal	West of Jarnali post	Jarnali	1	Vehicle	Tal	Water Ghol	241754	3050530
58	Lami Tal	West of Ghatgain Post	Ghatgain	0.3	Vehicle	Tal	Permanent lake (oxbow origin)	239236	3050813
59	Lamotal	west of Bagmara	Bagmara	2		Tal	Permanent lake (oxbow origin)	219367	3050423
60	Ligige Ghol	North of Ligige Post	Ligige	1	Walk	Waterhole	Water Ghol	273550	3049804
61	Majur Ghol	Charahara	Dumaria	3	Vehicle	Not found	Water Ghol	246821	3050460
62	Martchauli Marsh	Old Padampur	Sauraha	3	Walk	Marshy land	Water Ghol	252134	3049228
63	Martchauli Ghol	Old Padampur	Sauraha	3	Walk	Wet meadow	Water Ghol	252068	3050068
64	Mardi Ghol	Bandarjhula Island	Banderjhula	3	Boat	Water Ghol	Water Ghol	222297	3057325
65	Munda Tal	Bagmara	Bagmara	1	Vehicle	Lake	Permanent lake (oxbow origin)	220381	3050689

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
66	Nanda Bhaju Tal	Bhimle	Bhimle	0.3	Vehicle	Lake	Permanent lake (oxbow origin)	223878	3050910
67	Nandan Tal	Bhawanipur	Bhimpur	4	Walk	Lake	Permanent lake (oxbow origin)	250392	3048812
68	Niure/Chisapani Ghol	West of Kasara	Kasara	2	Vehicle	Seasonal Ghol in rainy	Permanent Ghol	234352	3049881
69	Patana/Garud Tal	Old Padampur	Bhimpur	2	Walk	Marsh Lake	Wet meadow, develop permanent marsh lake through water divert from Patana Khola	252823	3049417
70	Sapanwoti Ghol	Amaliya	Bankatta	3	Vehicle	Permanent Ghol	Water Ghol	232818	3044687
71	Sera Tal	Dhurba	Dhurba	2	Vehicle	Permanent Lake	Permanent lake (oxbow origin)	231816	3050560
72	Simara Ghol	Boate Simara	Boate Simara	1	Vehicle	Permanent Ghol	Permanent Ghol	237443	3042130
73	Singe Tal	Bagmara	Bagmara	1	Walk	Wet meadow	Permanent tal	217803	3050560
74	Suksuke Ghol	Sukhibhar	Sukhibhar	3	Walk	Permanent Ghol	Permanent Ghol	226383	3049138
75	Tamor Tal	Tamo Tal	Kasara	3	Vehicle	Permanent lake	Permanent lake	236210	3047984
76	Temple Ghol-2	West of Sali-Mailie Khola	SaliMailie Khola	2	Vehicle only dry season	Permanent marshy Ghol	Permanent Ghol	213336	3049105
77	Temple Ghol	Temple tiger	Temple tiger	0.5	Vehicle only dry season	Permanent marshy Ghol	Permanent Ghol	211406	3049306
78	Thapali tal	West of Kasara	Kasara	3	Vehicle	Seasonal tal	Wet grassland, develop as tal	234407	3049103
79	Thotari Tal	South of Sukhibhar	Sukhibhar	1	Vehicle	Permanent lake	Permanent lake (oxbow origin)	228442	3048104

SN	Name of wetland	Location	Nearest post	Distance (km)	Accessibility	Type wetland	History of wetland	Longitude	Latitude
80	Kharkatta Ghol	East of Surung Khola	Surung Khola	2	Walk	Permanent marshy Ghol	Permanent marshy Ghol	225526	3047964
81	Harabansa Ghol	West of Sukhibhar	Sukhibhar	3	Walk	Permanent marshy Ghol	Permanent marshy Ghol	226664	3050590
82	Rapti Ghol	Jagatpur	Kasara	3	Vehicle	Permanent Ghol	Rapti Bhangalo, develop as ghol through Rapti divert	233491	3051399
83	Singe Tal	West of Khorea Muhan	SailiMailie Khola	1	Walk	Wet meadow	Permanent Lake	213944	3049250

Annex III

List of recorded Lakes/Ghols in Chitwan National Park and its Buffer Zone

Sn.	Name of Wetland	Nearest post	GPS E	GPS N	Total area (ha.)	Perimeter (m)	Wetland condition cure/BZ
1	Batuli Pokhari	Belsar	243099	3054037	20.968949	6584.732	Excellent
2	Nanda Bhaujatal	Bhimle	223878	3050910	0.60511	502.703897	Poor
3	Betgharital	Devnagar	248795	3060595	0.774599	505.174159	Good
4	Bishazar	Bishazari	247084	3057398	29.82	14427.39	Fair
5	Bobtal	Khorsor	248476	3054426	3.743365	2934.84475	Excellent
6	Bobtal (complex I)	Khorsor	249305	3054216	0.350143	285.432217	Poor
7	Budhi Rapti	Bhimle	224655	3049947	14.406449	3954.19258	Excellent
8	Centuryghol	Lamichaur	219367	3056609	3.470751	4005.8223	Good
9	Chandital	Devnagar	243727	3054595	2.760132	1154.95808	Good
10	Chapparchuli ghol	Chapparchuli	263596	3050263	0.022055	61.649319	Poor
11	Chepang tal	Bharandhabhar	251313	3059096	1.984155	735.869748	Fair
12	CJL ghol	Khagendra malli	266443	3050358	0.492107	284.698982	Poor
13	Devi tal	Khoriyamuhan	217057	3049389	7.557055	1611.09958	Poor
14	Shreratal	Dhurba	231816	3050560	5.743691	4366.45555	Poor
15	Dumaria ghol	Dumariya	243568	3051046	0.9705	720.855188	Good
16	Gaidakhasa ghol	Temple tiger	208117	3049594	3.834559	3999.08666	Poor
17	Gaur machan ghol *	Dumariya	246413	3049977			Fair
18	Harabansa ghol	Sukhibhar	226664	3050590	3.7	1818.123	Fair
19	Icherny ghol	Sauraha	255059	3049988	0.012156	55.051551	Poor
20	Kabre tal	Bagmara	219815	3050461	0.538269	521.954415	Good
21	Kalimatital	Devnagar	248091	3060106	1.819559	1138.11703	Good
22	Kamere Ghol	Lamichaur	215943	3054368	3.515401	2921.2313	Good
23	Khagendrammali ghol	Khagendramalli	267326	3051359	0.616643	734.534635	Fair
24	Kharkatta ghol	Surung Khola	225526	3047964	1.584941	1259.18433	Fair
25	Kingfisher	Devnagar	245350	3057440	5.544095	3970.08563	Good
26	Kuchkuche ghol	Khagendra malli	265151	3052583	0.028274	63.354469	Poor
27	Kumaltal	Bharandhabhar	250474	3057362	7.663722	2317.93724	Good
28	Kumroj ghol	Janakpur	256790	3050884	0.102098	200.024812	Poor
29	Laguna tal	Jarnali	241754	3050530	0.193731	213.43312	Poor
30	Kamal tal	Sukhibhar	229141	3048438	4.12	2979.93	Fair
31	Lami tal	Ghatgain	239236	3050813	2.947676	1861.91308	Fair

Sn.	Name of Wetland	Nearest post	GPS E	GPS N	Total area (ha.)	Perimeter (m)	Wetland condition cure/BZ
32	Lamotal	Bagmara	219367	3050423	0.869615	1335.94968	Fair
33	Liglige ghol	Liglige	273550	3049804	1.336108	1574.80789	Fair
34	Marchauli ghol	Sauraha	252068	3050068	0.527395	781.428062	Poor
35	Mardighol	Banderjhula	222297	3057325	2.999165	2927.57228	Poor
36	Mayurtal	Devanagar	248856	3061685	0.454303	621.320837	Good
37	Mundatal	Bagmara	220381	3050689	1.680994	982.531187	Excellent
38	Mushahartal, Baghmar	Sauraha	251297	3054061	0.304611	354.114521	Good
39	Nandan tal	Bhimpur	250392	3048812	1.985605	1336.64571	Good
40	Neure tal	Devanagar	247029	3058551	1.818277	1903.09719	Good
41	Chisapani ghol	Kasara	234352	3049881	2.287469	822.833182	Poor
42	Patna/Garud tal	Bhabanipur	252823	3049417	8.795432	1559.37062	Fair
43	Rapti Loktantrik	Janakpur	260828	3050996	4.011479	2538.992	Good
44	Rapti ghol, Jagatpur	Kasara	233491	3051399	4.64429	3808.13787	Fair
45	Ratomate tal	Devanagar	247441	3058807	4.311869	2296.80284	Good
46	Singe tal	SailiMailie Khola	213944	3049250	5.381368	1190.74393	Poor
47	Sitamain ghol	Belsar	241562	3052512	4.124817	2879.93132	Fair
48	Suksuke ghol	Sukibhar	226383	3049138	3.194641	4780.6016	Good
49	Tamorr tal	Kasara	236210	3047984	14.124722	2687.83176	Good
50	Temple ghol 2	Sailimaili	213336	3049105	49.383841	9341.23646	Good
51	Temple tiger ghol	Temple tiger	211406	3049306	8.152732	3421.42507	Excellent
52	Thapaliya tal	Kasara	234407	3049103	0.537527	313.064065	Fair
53	Thotari tal	Sukhibhar	228442	3048104	0.690394	383.272286	Fair
54	Tikauli tal	Bharandhabhar	251226	3058789	5.720766	3230.87589	Good
55	Mayur ghol *	Dumariya	246821	3050460			Fair
56	Sapanawoti ghol #	Bankatta	232818	3044687			Fair
57	Simara ghol #	Bote simara	237443	3042130			Fair
58	Martchauli marsh *	Bhawanipur	252134	3049228			Fair

* Natural succession has converted the lake into marshy grass vegetation so the area is not shown

Smaller drain/cannel so the area is not shown

Annex IV

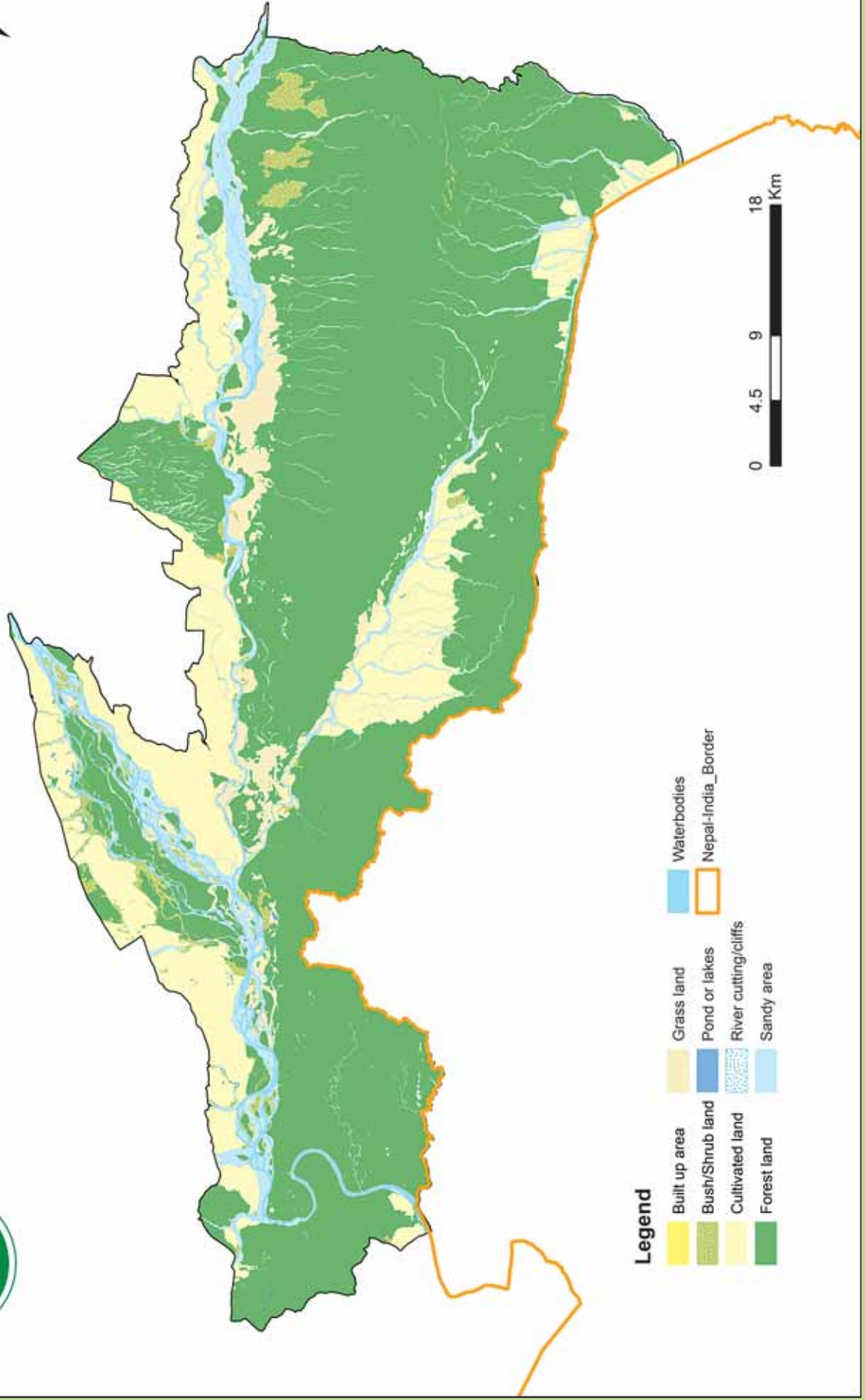
Budget

Title	Amount (NRs)	Source
1. Study of Wetlands	1,00,000	Terai Arc Landscape Program (TAL), Government of Nepal
2. Study of Mugger crocodile	3,00,000	National Park Project, Government of Nepal
3. Report printing	2,50,000	National Trust for Nature Conservation-Biodiversity Conservation Center (NTNC-BCC)

The study of wetlands in and around Chitwan National Park was conducted as an annual program of Terai Arc Landscape (TAL) program of Government of Nepal, and the study of population status of Muggur Crocodile in and around CNP was conducted as an annual program of Chitwan National Park.



CHITWAN NATIONAL PARK



Legend

- | | |
|---|--|
|  Built up area |  Waterbodies |
|  Bush/Shrub land |  Nepal-India_Border |
|  Cultivated land |  Pond or lakes |
|  Forest land |  River cutting/cliffs |
| |  Sandy area |

0 4.5 9 18 Km



Government of Nepal
Ministry of Forests and Soil Conservation
Department of National Parks and Wildlife Conservation
Chitwan National Park Office
Kasara, Chitwan