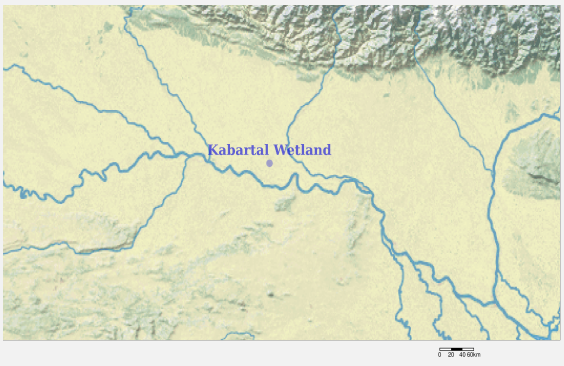
Ramsar Information Sheet

Published on 16 October 2020

India

Kabartal Wetland



Designation date	21 July 2020
Site number	2436
Coordinates	25°37'05"N 86°08'22"E
Area	2 620,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Kabartal is a part of an extensive floodplain wetland complex formed in the lower reaches of Gandak – Kosi interfan in North Bihar. Located at a distance of 21 km from Begusarai town, Kabartal is the largest of a series of shallow permanent as well as intermittently inundated wetlands formed in the depression between River Burhi Gandak and paleochannel of River Bagmati. Exchange of water, sediment, and species with the flood pulses of the Burhi Gandak (and Kosi prior to 50s) support highly productive fisheries and agriculture sustaining livelihoods of nearly 15,000 households living in 17 villages in and around the wetland. Kabartal also plays an important role in the hydrography of the region by accommodating a significant proportion of rainfall and bankflows of River Gandak protecting the adjoining settlements from flood risk as well as recharging groundwater. The wetland teems with waterbirds in the winters, and is one of the important congregation areas in North Bihar, particularly for migrating ducks and coots. Over 200 bird species have been recorded at Kabartal, of which 58 are migratory waterbirds. Besides birds, recorded biodiversity at Kabartal includes 165 plant species: 44 Phytoplankton and 46 Macrophyte species girdled and interspersed with patches of 75 terrestrial species. In addition to that, there are 394 animal species: 70 zooplankton, 17 molluscs, 39 insects, 35 fish, 7 amphibians, 5 reptile, and 221 bird species, several of which are vulnerable, rare and endangered. Kabartal is also an important source of animal fodder. The island of Jaimangalgarh located near the southern boundary of the wetland is revered as a site of religious and cultural significance.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency: Department of Environment, Forest and Climate Change

Postal address:
Additional Principal Chief Conservator of Forest (Environment,Climate Change and Wetland)
Aranya Bhawan
Riding Road
Patna
Bihar

National Ramsar Administrative Authority

Institution/agency: Wetlands International South Asia

Postal address:
Director
Wetlands International South Asia
A 25, 1-2 Floor, Defence Colony
New Delhi 110024
India

2.1.2 - Period of collection of data and information used to compile the RIS

From year: 2015

To year: 2020

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish): Kabartal Wetland

Unofficial name (optional): Kanwar jheel

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<1 file(s) uploaded>

Former maps: 0

Boundaries description

Boundaries represent the area where maximum inundation is achieved during post-monsoon season. River Burhi Gandak meanders on the western and southern margins of the wetland complex. Western margin of the wetland is formed by Nagri Jheel and Bikrampur Chaur located in the vicinity of Basahi village. A drainage channel connects these two waterbodies into Guabari Chaur located near Sakarbasa village. The island of Jaimangalgarh is located in the southern part of the wetland. The southern tip is marked by the Chhoti and Badi Patiya chaur, two waterbodies near Pahsara village. There are 14 waterbodies located mostly on northern, eastern and southern fringes of Kabartal, which connect to the wetland system during periods of high flows, but appear as distinct bodies in lean seasons. Majhaul town is the largest settlement around the wetland and is located in the south. Jaimangalgarh island can be accessed through a road extending to Majhaul town. A 12 km long channel connects the wetland from Jaimangalgarh to Bagras maun, which finally drains into Burhi Gandak at Bagras village.

2.2.2 - General location

a) In which large administrative region does the site lie? The wetland is situated in Begusarai district in the state of Bihar

b) What is the nearest town or population centre? Majhaul

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes ○ No ◉

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ○ No ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 2620

Area, in hectares (ha) as calculated from GIS boundaries: 2621.935

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Freshwater Ecoregions of the World (FEOW)	Indo-gangetic plains

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

☑ Criterion 1: Representative, rare or unique natural or near-natural wetland types

Hydrological services provided	Kabartal wetland is representative of an extensive floodplain wetland regime formed in the Indo-Gangetic plains by the complex fluvial processes of the tributaries of River Ganges. Locally known as maun, chaur, and taal, these wetlands are critical for water security through their role in groundwater recharge and flood protection. With over 70% of the Bihar state receiving flood inundation, which causes massive destruction of life and property, water storage within the wetlands acts as an important buffer for flood protection. With over 80 – 90% of the river runoff confined to only four monsoon months, the ability of the wetland to store water and regulate overall hydrological regimes is important for securing water availability in the region. Hydrological connectivity has a great influence on wetland biodiversity. Nutrient enrichment and connectivity with riverine environments make these ecosystems important breeding and nursing grounds of fish.
Other ecosystem services provided	The rich fisheries and agriculture in the wetland system are the main source of livelihoods of 15,000 households of 17 villages in and around the wetland who are engaged in harvesting fish, bivalves, and aquatic plants for use as food and fodder, and fuelwood. Several of these wetlands also constitute important stopovers for migratory waterbirds in the Central Asian Flyway. The wetland is also a source of Wild rice (Desaria – a variety of deepwater rice), makahana (Euryale ferox), singada (Trapa natans), Kamal (Nelumbo nucifera), Crab (Paratelphusa spinigera) and edible mollusc (Pila globosa). The Jaimangal temple and the Jaimangal fort on the bank of the Kabartal are known for their historical, cultural, and significance importance.

☑ Criterion 2 : Rare species and threatened ecological communities

☑ Criterion 3 : Biological diversity

Justification	Kabartal Wetland teems with waterbirds in the winters, and is visited by over 59 species during their annual migration cycle. Besides it also supports 106 resident birds. Recorded biodiversity of the wetland also includes 35 fish species, 75 terrestrial plants, 46 macrophyte, 44 phytoplankton, 70 zooplankton, 17 benthos, 39 insects, 7 amphibians, 5 reptiles and 5 mammals species, several of high conservation significance.

☑ Criterion 4 : Support during critical life cycle stage or in adverse conditions

☑ Criterion 7 : Significant and representative fish

Justification	Riverine connectivity plays a critical role in structuring the fish biodiversity of Kabartal wetland. Of the 50 species reported, 26 species mainly belong to Cypriniformes, Siluriformes, Beloniformes, Channiformes, Perciformes, and Mastacembeliformes. Zoological Survey of India records the presence of 35 species throughout the year and an additional 15 when the river connects to the wetland in times of flood. Records indicate a gradual increase in air breathing species (Clarias batrachus, Heteropneustes fossilis, Anabas testudineus); catfishes (Wallago attu, Mystus sp.) and forage fishes. Indian major carps like Labeo rohita, Catla catla are also found in the wetland.

☑ Criterion 8 : Fish spawning grounds, etc.

Justification	Wetland serves as a breeding ground for vulnerable species like Wallago Attu.

3.2 - Plant species whose presence relates to the international importance of the site

<no data available>

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
Fish, Mollusc and Crustacea																		
CHORDATA/ ACTINOPTERYGII	*Anabas testudineus*	Climbing perch; Climbingperch; Gourami	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Indigenous air breathing species found in Indo-Gangetic floodplains. Species is widely distributed in Asia.
CHORDATA/ ACTINOPTERYGII	*Channa punctata*	spotted snakehead	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Native to Indian subcontinent, species contributes to biodiversity of the site.
CHORDATA/ ACTINOPTERYGII	*Clarias batrachus*	Albino walking fish; Clarias catfish; Climbing perch; Freshwater catfish; Magur; Philippine catfish; Thai hito; Thailand catfish; Toyman's spotted catfish; Walking catfish	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Freshwater, air breathing catfish species, native to Asia. Wetland provides habitat to the species. India is a part of its range countries.
CHORDATA/ ACTINOPTERYGII	*Gibelion catla*	Catla; Catla catla; Major carp; Pla kra ho; Theila	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Indian major carp species that contributes to biodiversity of the site. Species is endemic to the region.
CHORDATA/ ACTINOPTERYGII	*Labeo rohita*	Roho labeo; Rohu; Ruee	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Indo-riverine wetland species that is also used in polyculture. Species is widely distributed in tropical freshwater in Indian Subcontinent.
CHORDATA/ ACTINOPTERYGII	*Notopterus notopterus*	Asiatic knifefish; Bronze featherback; Common knife fish; Feather back; Grey featherback	☐	☐	☐	☐	☐	☐	☑	☐				LC	☐	☐		Wetland provides habitat to the species, native to South and South East Asia.
CHORDATA/ ACTINOPTERYGII	*Wallago attu*	wallago catfish	☑	☑	☐	☐	☐	☐	☐	☑				VU	☐	☐		Wetland provides breeding grounds to the species, native to South and South East Asia.
Birds																		
CHORDATA/ AVES	*Anas acuta*	Northern Pintail	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Anas clypeata*	Northern Shoveler	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Anas penelope*	Eurasian Wigeon	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Anas querquedula*	Garganey	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Anas strepera*	Gadwall	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Anastomus oscitans*	Asian Openbill	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland provides habitat for the species.

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA/ AVES	*Anhinga melanogaster*	Darter; Oriental Darter	☐	☐	☐	☐	☑	☐	☐	☐				NT	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Anser anser*	Greylag Goose	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland provides a wintering site for the species.
CHORDATA/ AVES	*Anser indicus*	Bar-headed Goose	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland provides a wintering site for the species.
CHORDATA/ AVES	*Aquila clanga*	Greater Spotted Eagle	☑	☑	☐	☐	☐	☐	☐	☐				VU	☐	☐		Wetland acts as a wintering site for the species.
CHORDATA/ AVES	*Aythya baeri*	Baer's Pochard	☑	☐	☐	☐	☑	☐	☐	☐				CR	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Aythya ferina*	Common Pochard	☑	☐	☐	☐	☑	☐	☐	☐				VU	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Aythya fuligula*	Tufted Duck	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Aythya nyroca*	Ferruginous Duck	☑	☑	☐	☐	☑	☐	☐	☐				NT	☐	☑		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Ciconia episcopus*	Woolly-necked Stork	☑	☐	☐	☐	☑	☐	☐	☐				VU	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Circus aeruginosus*	Western Marsh Harrier	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Ephippiorhynchus asiaticus*	Black-necked Stork	☐	☐	☐	☐	☑	☐	☐	☐				NT	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Falco cherrug*	Saker Falcon	☑	☐	☐	☐	☑	☐	☐	☐				EN	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Fulica atra*	Eurasian Coot	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is the major congregation site in the entire Indo-Gangetic plains for these species
CHORDATA/ AVES	*Gyps bengalensis*	White-rumped Vulture	☑	☐	☐	☐	☑	☐	☐	☐				CR	☐	☑		Wetland provides habitat for the species.
CHORDATA/ AVES	*Gyps indicus*	Indian Vulture	☑	☐	☐	☐	☑	☐	☐	☐				CR	☐	☑		Wetland provides habitat for the species.
CHORDATA/ AVES	*Haliaeetus leucoryphus*	Pallas's Fish Eagle	☑	☐	☐	☐	☑	☐	☐	☐				EN	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Leptoptilos dubius*	Greater Adjutant	☑	☐	☐	☐	☑	☐	☐	☐				EN	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Leptoptilos javanicus*	Lesser Adjutant	☑	☐	☐	☐	☐	☐	☐	☐				VU	☐	☐		
CHORDATA/ AVES	*Mycteria leucocephala*	Painted Stork	☐	☐	☐	☐	☑	☐	☐	☐				NT	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Neophron percnopterus*	Egyptian Vulture	☑	☐	☐	☐	☑	☐	☐	☐				EN	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Netta rufina*	Red-crested Pochard	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Numenius arquata*	Eurasian Curlew	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Pelecanus crispus*	Dalmatian Pelican	☐	☐	☐	☐	☑	☐	☐	☐				NT	☐	☐		Wetland provides habitat for the species.
CHORDATA/ AVES	*Pluvialis apricaria*	European Golden Plover; European Golden-Plover	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland is a wintering site for the species.
CHORDATA/ AVES	*Sarcogyps calvus*	Red-headed Vulture	☑	☐	☐	☐	☑	☐	☐	☐				CR	☐	☐		Wetland provides habitat for the species.

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA / AVES	*Tachybaptus ruficollis*	Little Grebe	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland provides habitat to the species.
CHORDATA / AVES	*Tadorna ferruginea*	Ruddy Shelduck	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Wetland provides a wintering site for the species.
CHORDATA / AVES	*Vanellus gregarius*	Sociable Lapwing	☑	☐	☐	☐	☑	☐	☐	☐				CR	☐	☐		Wetland provides habitat for the species.

1) Percentage of the total biogeographic population at the site

3.4 - Ecological communities whose presence relates to the international importance of the site

<no data available>

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

Kabartal is the largest of a complex of 18 interconnected wetlands formed in the lower reaches of River Burhi Gandak. The wetland and its surroundings have a mosaic of landforms including open water, marshes, plantations, agricultural lands, and interspersed settlements. The entire complex gets inundated with the monsoon to a maximum depth of 1.5 m. The eastern part maintains open water and marsh areas almost round the year, whereas in the rest of the Site, dried out marsh areas are cultivated. Kabartal is a shallow, alkaline, nutrient-rich freshwater wetland. Hydrological and ecological connectivity between the river channel, riparian zone, and floodplains underpin the high biological diversity and habitat heterogeneity found in Kabartal. Floods and flood pulses connect the various lotic and lentic environments facilitating the exchange of matter, species, and energy. With the onset of monsoon, high inundation with nutrient flux favours the growth of submerged and floating vegetation. The dominance shifts in favour of floating vegetation as water recedes and lotic pockets emerge in the wetland. The peripheral marshes are dominated by emergent macrophytes in the post-monsoon and winter season. This also favours the growth of benthic organisms, which are important food sources for migrating water birds. The wetland is located in a rural agrarian setting and surrounded by 23 villages, 10 of which are located within the Kanwar Lake Bird Sanctuary boundary. Fishers and farmers are the major groups inhabiting these villages. While farmers engage mostly in agriculture within and outside the wetland area, fishers have diversified into a range of activities including wage labour, small and marginal farming, and running petty businesses.

4.2 - What wetland type(s) are in the site?

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Marshes on inorganic soils >> W: Shrub-dominated wetlands		1	2620	Representative

Human-made wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type
2: Ponds	mauns	2	

(ECD) Habitat connectivity	Monsoon inundations connect the wetland to the riverine environment of Burhi Gandak as well as the adjacent waterbodies, leading to exchange of water, nutrients and species. This connectivity is critical especially for fish and vegetation.

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Scientific name	Common name	Position in range / endemism / other
Ceratophyllum demersum	Hornwort	Submerged perennial macrophyte known to oxygenate water, provide food for aquatic herbivores and filters heavy metals. Plant has medicinal properties.
Colocasia esculenta	Taro	Native to tropical areas, the species is widely used as fodder and food plant
Euryale ferox	Prickly water lily	Species are food source to many herbivores
Hydrilla verticillata	Water Thyme	Provides food for a number of aquatic birds
Lemna minor	Common duckweed	Source of food for fish and waterfowl
Nelumbo nucifera	Sacred lotus	Source of food
Nymphaea nouchali	water lily	Act as food source and provides shelter to aquatic species
Trapa natans	Water chestnut	Native to sub-tropical region, species is used as a source of food by humans;foraging by fish and birds

Invasive alien plant species

Scientific name	Common name	Impacts	
Eichhornia crassipes	water hyacinth	Actual (major impacts)	No change
Phragmites karka	Tall reed	Potential	No change

4.3.2 - Animal species

<no data available>

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
C: Moist Mid-Latitude climate with mild winters	Cwa: Humid subtropical (Mld with dry winter, hot summer)

The inundation pattern of Kabartal is closely related to rainfall and inundations received from the Burhi Gandak River. Since 2005 the Begusarai District has been experiencing high variability, particularly deficits in rainfall as compared to seasonal averages. An analysis of total rainfall in the district for the period 2004-2012 indicates that the total rainfall exceeded the average only for two years, 2007 and 2008. Significant deficits were also observed for the months of May, August, and September. This period has also corresponded with a rapid decrease in areas under inundation. The communities have increased groundwater extraction to meet water deficits for agriculture and fisheries. Further research is required to establish the extent to which the variability in monsoon is related to changing climate.

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 27

a) Maximum elevation above sea level (in metres): 45

- Entire river basin ☐
- Upper part of river basin ☐
- Middle part of river basin ☑
- Lower part of river basin ☐
- More than one river basin ☐
- Not in river basin ☐
- Coastal ☐

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

Kabartal wetland falls within Burhi Gandak sub-basin of the Ganges River Basin.

4.4.3 - Soil

- Mineral ☑
- Organic ☑
- No available information ☐

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes ○ No ◉

Please provide further information on the soil (optional)

The Indo-Gangetic plains are mostly comprised of primarily unaltered alluvium and texturally vary from sandy loam to loam in the meander scroll and levee areas, to silty loam and silt in flood basin areas and from loam in the levees of Ganga to clayey loam and clay in the basin of Burhi Gandak and River Bagmati. Lake sediment assessments in 1989-91 indicated loamy nature rich in humus

4.4.4 - Water regime

Water permanence

Presence?	
Usually seasonal, ephemeral or intermittent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	
Water inputs from precipitation	☑	No change
Water inputs from groundwater	☐	No change
Water inputs from surface water	☑	No change

Water destination

Presence?	
Feeds groundwater	No change

Stability of water regime

Presence?	
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

The water regimes of Kabartal are governed largely by bank inundations received from River Burhi Gandak and rainfall. During peak rainfall, the water extends to the entire wetland complex, connecting different chaur (marshy depressions) and maun (ox-bow lake) areas. However, as the monsoon recedes, the inundation area rapidly shrinks to less than 600 ha, exposing large areas used for agriculture and part maintained as grasslands. In recent times, lower rainfall has promoted the communities to extract water from shallow to deep bore wells to irrigate agricultural fields, as well as water for aquaculture.

(ECD) Connectivity of surface waters and of groundwater	Groundwater quality assessments done for the wetland region have indicated high conductivity, alkalinity and hardness. Several upstream and downstream areas have also reported high fluoride.
(ECD) Stratification and mixing regime	Not relevant for Kabartal, as it is a shallow ecosystem.

4.4.5 - Sediment regime

- Significant erosion of sediments occurs on the site ☐
- Significant accretion or deposition of sediments occurs on the site ☑
- Significant transportation of sediments occurs on or through the site ☑
- Sediment regime is highly variable, either seasonally or inter-annually ☐
- Sediment regime unknown ☐

Please provide further information on sediment (optional):

Bank inundations have a significant influence on sedimentation within Kabartal and associated waterbodies. Assessment of chemical quality of sediment in 1989-91 indicated a high concentration of organic carbon (2.5-17.94%) and high conductivity (248-820 µmho/cm) indicating high mineral content. The soil is slightly acidic (5.0-6.5) mainly due to humus. Higher concentrations of available nitrate (1.42-1.51 g/100 gm) and available phosphorus (3.6-7.0g/100gm) indicate the higher trophic status of the bottom sediments.

(ECD) Water turbidity and colour	Wetland water has blue-green colour primarily due to suspended & particulate organic matter, (phyto and zoo) planktons
(ECD) Light - reaching wetland	Transparency was observed to be low (0.1 m) during monsoon and upto 3.4 m during summer
(ECD) Water temperature	Water temperature ranges between 18 °C in winters to 31° C in summers

4.4.6 - Water pH

- Acid (pH<5.5) ☐
- Circumneutral (pH: 5.5-7.4) ☐
- Alkaline (pH>7.4) ☑
- Unknown ☐

4.4.7 - Water salinity

- Fresh (<0.5 g/l) ☑
- Mixohaline (brackish)/Mixosaline (0.5-30 g/l) ☐
- Euhaline/Eusaline (30-40 g/l) ☐
- Hyperhaline/Hypersaline (>40 g/l) ☐
- Unknown ☐

Please provide further information on salinity (optional):

Surface water of Kabartal wetland is fresh. However, high chloride content has been reported from shallow aquifers.

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☑

Mesotrophic ☐

Oligotrophic ☐

Dystrophic ☐

Unknown ☐

Please provide further information on dissolved or suspended nutrients (optional):

Assessments in 1989-91, 1996 and 2000-01 indicated increasing concentration of nitrate-nitrogen (traces - 0.83 in 1989-91 to 0.3 - 1.3 mg/l during 1996) and phosphate phosphorus (traces - 0.8 during 1989-91 to 0.6 - 1.6 mg/l during 2000-01).

(ECD) Water conductivity: High conductivity ranging from 108 - 554 µmho/cm in 1989-91 to 230 - 456 µmho/cm during 2000-01

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ○ ii) significantly different ◉

Surrounding area has greater urbanisation or development ☐

Surrounding area has higher human population density ☑

Surrounding area has more intensive agricultural use ☑

Surrounding area has significantly different land cover or habitat types ☐

Please describe other ways in which the surrounding area is different:

Kabartal is located within an agrarian landscape, with paddy, maize, and sugarcane as the major crops. There are 23 villages located around the complex, which directly or indirectly depend on the wetland resources for sustenance. Embankments have been constructed along the river channel of Burhi Gandak, which has a significant influence on water and sediment exchange with the wetland complex.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	High
Fresh water	Drinking water for humans and/or livestock	Low
Wetland non-food products	Fuel wood/fibre	High
Wetland non-food products	Reeds and fibre	Medium
Wetland non-food products	Livestock fodder	Medium
Genetic materials	Medicinal products	Low
Genetic materials	Genes for tolerance to certain conditions (e.g., salinity)	Medium
Genetic materials	Ornamental species (live and dead)	Low

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	High
Erosion protection	Soil, sediment and nutrient retention	High
Pollution control and detoxification	Water purification/waste treatment or dilution	Low
Climate regulation	Local climate regulation/buffering of change	High
Biological control of pests and disease	Support of predators of agricultural pests (e.g., birds feeding on locusts)	Medium
Hazard reduction	Flood control, flood storage	High

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Picnics, outings, touring	Medium
Recreation and tourism	Nature observation and nature-based tourism	Low
Spiritual and inspirational	Inspiration	High
Spiritual and inspirational	Cultural heritage (historical and archaeological)	High
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	High
Spiritual and inspirational	Spiritual and religious values	High
Spiritual and inspirational	Aesthetic and sense of place values	High
Scientific and educational	Educational activities and opportunities	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High
Scientific and educational	Major scientific study site	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High
Soil formation	Sediment retention	Medium
Soil formation	Accumulation of organic matter	Medium
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	Medium
Nutrient cycling	Carbon storage/sequestration	Medium

Within the site: 28,000

Outside the site: 30,000

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes ◉ No ○ Unknown ○

Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies may be located (e.g. website links, citation of published literature):

An economic valuation of ecosystem services in the context of conversion of agriculture has been carried out as a part of TII (The Economics of Ecosystem Services and Biodiversity India Initiative)
http://www.indo-germanbiodiversity.com/pdf/publication/publication25-09-2017-1506325 582.pdf

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland ☐

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland ☑

Description if applicable

Jaimanglagarh island is linked with several archeological excavations which date to 4-5th century AD and underline the historical importance of the site. It is also believed that the site was frequented by Buddhist scholars during 4th century BC. These historical values are one of the several attributes which are of interest to the local communities and tourists.

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples ☑

Description if applicable

The ecological character of Kabartal is greatly influenced by inundation regime and linked agriculture – fisheries based livelihood systems. The harvest of macrophytes helps keep the overall invasiveness in check. Similarly, harvest of bivalves and fish constitute an important part of the nutrient and carbon cycles within the wetland system. Conversely, the state of wetland is influenced by the mechanisms through which ecosystem services integrate with livelihood capitals. Increased pressure on fisheries and use of destructive gears has impacted fish populations. Excessive dependence of groundwater for agriculture and aquaculture has implications for water and sediment regimes.

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland ☑

Description if applicable

The island of Jaimangalgarh houses a historic temple of local deity, Goddess Durga which is highly revered by the communities living in and around. Every year, the temple attracts local pilgrims on the eve of festivals as Dusshera.

4.6 - Ecological processes

(ECD) Notable aspects concerning migration	Inundation plays an important role in migration of fish from riverine environment to the wetland system, however, specific assessments need to be carried out.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	Inundation patterns of Kabartal have drastically changed over the years, with a large part remaining dry and used for agriculture. It affected habitat of fish, aquatic flora and avifauna.

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Local authority, municipality, (sub)district, etc.	☐	☑
Public land (unspecified)	☑	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	☑	☑

Provide further information on the land tenure / ownership regime (optional):

A major portion of Kabartal wetland was under private ownership and used traditionally for agriculture and fisheries. Capture fishing within the inundated areas was traditionally done by fishers based on British period judgment dated August 1895. the canal was constructed to reclaim waterlogged areas for agriculture. Embankment breaches in 1987, 2004, and 2007 also brought in extensive amounts of silt into the Kabartal wetland complex further changing the inundation regime and increasing fishing-related conflicts. In 1986, the government declared a major portion of the wetland as a protected area under section 37 of the Indian Wildlife (Protection) Act, 1972. The wetland area was declared as a closed area under the name “Kanwar Lake Pakshi Vihar” in 1987. Further, in 1989, an area of 6311.63 ha (lying within 9 villages) was declared as a Bird Sanctuary.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

Conservator of Forest Muzaffarpur Circle
Department of Environment and Forests
Aranya Vihar, Gandak Colony, Shirpur, Post Office –MIC, Beta
Muzaffarpur, Bihar

Provide the name and/or title of the person or people with responsibility for the wetland:

SUNIL KUMAR

Postal address:

Conservator of Forest Muzaffarpur Circle
Department of Environment and Forests
Aranya Vihar, Gandak Colony, Shirpur, Post Office –MIC, Beta
Muzaffarpur, Bihar

E-mail address:

cfmuzaffarpur@gmail.com

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site’s ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Housing and urban areas		Low impact	☐	☑

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Drainage	High impact		☑	☑
Water abstraction	High impact		☑	☑
Canalisation and river regulation	High impact		☑	☑

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Annual and perennial non-timber crops	Medium impact		☑	☑
Livestock farming and ranching	Medium impact		☐	☑

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Roads and railroads	Low impact		☐	☑

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Hunting and collecting terrestrial animals	Low impact		☑	☐

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Dams and water management/use	High impact		☑	☑
Vegetation clearance/ land conversion	Medium impact		☑	☐

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Invasive non-native/ alien species	Medium impact		☑	☑

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Droughts	Medium impact		☑	☑

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Bird Sanctuary	Kanwar Jheel Pakshi Vihar		partly

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Kanwar Jheel Pakshi Vihar		partly

5.2.3 - IUCN protected areas categories (2008)

Ia Strict Nature Reserve ☐

Ib Wilderness Area: protected area managed mainly for wilderness protection ☐

II National Park: protected area managed mainly for ecosystem protection and recreation ☐

III Natural Monument: protected area managed mainly for conservation of specific natural features ☐

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention ☑

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation ☐

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems ☐

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Partially implemented

Habitat

Measures	Status
Catchment management initiatives/controls	Partially implemented
Improvement of water quality	Proposed
Habitat manipulation/enhancement	Proposed
Hydrology management/restoration	Proposed
Soil management	Proposed
Land conversion controls	Proposed
Faunal corridors/passage	Proposed

Species

Measures	Status
Control of invasive alien plants	Proposed

Human Activities

Measures	Status
Management of water abstraction/takes	Proposed
Fisheries management/regulation	Proposed
Harvest controls/poaching enforcement	Proposed
Communication, education, and participation and awareness activities	Partially implemented
Research	Partially implemented

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site? Yes ○ No ◉

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes ○ No ◉

URL of site-related webpage (if relevant): http://forest.bih.nic.in

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No, but a plan is being prepared

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water quality	Proposed
Water regime monitoring	Proposed
Soil quality	Proposed
Plant community	Proposed
Plant species	Proposed
Animal community	Proposed
Animal species (please specify)	Proposed
Birds	Proposed

A hierarchical monitoring plan forms a part of the management planning framework.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

WISA, 2016. Kanwar Jheel - An Integrated Management Action Plan for Conservation and Wise Use. Technical Report submitted to the World Bank, New Delhi.
Wetlands International South Asia, New Delhi, India.

Editor-Director, 2002. Fauna of Kabar Lake (Bihar), Wetland Ecosystem Series 4 : 1-134 (Published: Director, Zool. Surv. India, Kolkata)

Ravikant Anand and Rachana Kumari (2020),"Environmental Assessment Of Kabar Tal Wetland: The Asia's Largest Fresh Water Oxbow Lake" SIPN VOL-40-ISSUE-3-FEBRUARY-2020

BirdLife International (2020) Important Bird Areas factsheet: Kawar (Kabar) Lake Wildlife Sanctuary.

http://www.indo-germanbiodiversity.com/pdf/publication/publication25-09-2017-150 6325582.pdf

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<1 file(s) uploaded>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<no file available>

iii. a description of the site in a national or regional wetland inventory
<no file available>

iv. relevant Article 3.2 reports
<no file available>

v. site management plan
<1 file(s) uploaded>

vi. other published literature
<no file available>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

A fisher within Nelumbo beds in Kabartal (*Wetlands International South Asia, 07-06-2018*)

A lesser adjutant in Kabartal (*Wetlands International South Asia, 07-06-2018*)

Fishers at Kabartal (*Wetlands International South Asia, 12-05-2015*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation: 2020-07-21